End Semester Examination, Dec. 2021

B. Tech. – Third Semester

BASICS OF AERONAUTICAL ENGINEERING (BAE-DS-301)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following parts briefly:

a) Differentiate Petrol cycle with Diesel cycle. [CO2][L4]

b) List out the components of instruments landing system. [CO5][L2]

c) Define AOA, chord, camber and CP. [CO1][L1]

d) Differentiate gyroplane and glider. [CO1][L3]

e) Establish reasons for the following: [CO3][L4]

i) Staging of rockets.

ii) Rocket engines do not use Jet aviation fuel. **4x5**

PART-A

Q.2 a) Classify various types of flight vehicles based on the operation domain, source of lifting force and the operator for flying. Discuss prominent features of each type. [CO1][L4]**14**

b) What are slat and slot? How do they help in increasing lift? [CO1][L3]**6**

Q.3 a) Explain various types of air speeds for aircraft used by the pilot for flying operations. Enumerate the working principle of air speed measurement in aircraft. How can we measure ground speed? [CO2][L2]**12**

b) The Boeing 777 was to land at Netaji Subhash International Airport, Kolkatta at 1700 hours IST covering a ground distance of 2200 Km during cruise at a true a Speed of 1025 Km/hr. Due to change in wind from tail wind of 75 Km/hr, the pilot revised the landing time to 1712 hours. Calculate the change in wind speed and direction. [CO2][L4]**8**

Q.4 a) Classify various types of piston engines used in aircraft. [CO3][L2]**5**

b) Draw a labeled schematic sketch of a typical solid propellant motor and indicate the main components. [CO3][L1]**10**

c) Compare and contrast solid propellant rockets with liquid propellant rockets. [CO3][L4]**5**

PART-B

Q.5 a) What are composites? Explain various advantages of composite materials for use in aviation sector. [CO4][L2]**6**

b) Plot Vn diagram for the following acrobatic ac
Mass= 2300 kg, Wing Area= 19.33 m2,
Max Lift Coefficients = +2 and -1.2
Cruise Speed = 310 KEAS [CO4][L5]**14**

Q.6 a) With suitable diagrams, differentiate functioning of Manual, power assisted and powered flying control systems. [CO6][L5]**12**

b) Compare and contrast Air frame and Engine Fuel system with the help of sketch highlighting the interface between the two. [CO6][L5]**8**

Q.7 a) Distinguish between engine instruments and navigation instruments. [CO5][L3]**5**

b) List out the various gyroscopic instruments used in the aircraft. [CO5][L1]**5**

c) What are the frequency band widths for operation of ADF, VOR, ILS and GPS? Write briefly the purpose served by these navigation aids. [CO5][L2]**10**

End Semester Examination, Dec. 2021

M. Sc. (Biotechnology) - Third Semester

STEM CELL AND REGENERATIVE MEDICINE (MS-BT-324)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt atleast **ONE** question from each **PART**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Define potency stem cells and their types. [CO1][L-1]

b) Contrast between totipotent and pleuripotent cells. [CO2][L-3]

c) Outline the role of micro RNA in the development of pleuripotent cells. [CO3][L-4]

d) Illustrate the need of hypoxia in the stem cells niche. [CO2][L-3]

e) Summarize the key components of Hedgehog pathway. [CO5][L-2]

f) Evaluate the conditions for the activation of JAK/STAT signaling pathway. [CO4][L-5]

g) Enlist the types of notch receptors present in mammals. [CO5][L-5]

h) State the sources of stem cells that can be use in the regenerative therapy for nervous system. [CO6][L-1]

i) Discuss the requirements for the stem cell regenerative therapy for cardiac repair.

j) Contrast between Type-I and Type-II diabetes. [CO6][L-4]**2x10**

PART-A

Q.2 a) Illustrate the cell therapy and explain how it works with an example. [CO1][L-4]**15**

b) State about the mesenchymal cells, their sources and uses in regenerative medicines [CO1][L-1]**5**

Q.3 a) Discuss the pluripotency factors and the epigenetic regulation of chromatin which are important for pluripotency maintenance in ES cells. [CO1][L-2]**10**

b) Analyze the modes by which a cell can become specified for a particular fate. [CO2][L-4]**10**

PART-B

Q.4 a) Discuss the hedgehog proteins and the signaling mechanism of hedgehog pathway. [CO6][L-4]**20**

Q.5 a) Which pathway is involved in the cell-cell communication process via influencing the patterns of gene expression and differentiation? Illustrate the mechanism of action after binding of ligand to its receptor for the modification of gene expression. [CO4][L-3]**15**

b) Contrast between adult stem cells and embryonic cells. [CO1][L-5]**5**

PART-C

Q.6 Explain in detail about cause and strategies to treat the diabetes. [CO6][L-3]**20**

Q.7 a) Evaluate different modes of delivery of stem cells in the regenerative therapy for the cardiac repair. [CO6][L-5]**10**

b) Discuss different IPR issues in stem cell and regenerative medicine. [CO6][L-2]**10**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

GAS DYNAMICS (BAE-DS-501)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions:

a) When does the maximum mass flow occur for an isentropic flow with variable area? Define the coefficient of compressibility
b) State two necessary conditions for a normal shock to occur in compressible flow
c) What are the applications of moving shock wave? Shock waves cannot develop in subsonic flow. Why?
d) State the assumptions used for oblique shock wave
e) Under what condition Prandtl Glauret rule is applicable
f) At a given point on the surface of an airfoil, the pressure coefficient is -0.3 at a very low speeds. If the free stream mach number is 0.6, calculate Cp at this point.
g) Define drag divergence mach number
h) What is the relevance of Area Mach rule in Gas Dynamics
i) What are the assumptions made to linearised velocity potential equation
j) What is Prandtyl –Meyer Relation. **2x10**

PART-A

Q.2 The pressure, temperature and Mach Number at the entry of a flow passage are 2.45 bar, 26.5^{o}C and 1.4 respectively. If the exit Mach number is 2.5, determine the following for adiabatic flow of a perfect gas (γ=1.3, R=0.469KJ/kg K).

a) Stagnation temperature.
b) Temperature and velocity of gas at exit.
c) The flow rate per square meter of the inlet cross section. **20**

Q.3 The state of the gas upstream of a normal shock wave is given by the following data: M_x = 2.5, P_x= 2 bar, T_x = 275K. Calculate M_Y, P_y, T_y, a_y and V_y of the gas downstream of the shock. **20**

Q.4 An oblique shock wave occurs at the leading edge of a symmetrical wedge. Air has a Mach number of 2.1 and deflection angle of 15 degrees. Evaluate the following for weak and strong shock waves.

i) Wave angle. ii) Pressure ratio. iii) Density ratio. iv) Temperature ratio.
v) Downstream mach no. **4x5**

PART-B

Q.5 Obtain the linearised potential flow equation for flow over an airfoil using small perturbation theory. **20**

Q.6 a) Explain the shock expansion theory considering a 2D Supersonic flow over an airfoil. Also show the wave pattern for the flow over an airfoil and a flat plate at an angle of attack. **10**

b) Explain the thin airfoil theory and analyse its pressure distribution for lift generation. **10**

Q.7 a) Analyse the time dependent techniques using predictor and corrector steps. **10**

b) Draw a schematic sketch of a supersonic nozzle and evaluate its design features. **10**

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

AIRCRAFT STRUCTURES (BAE-DS-502)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

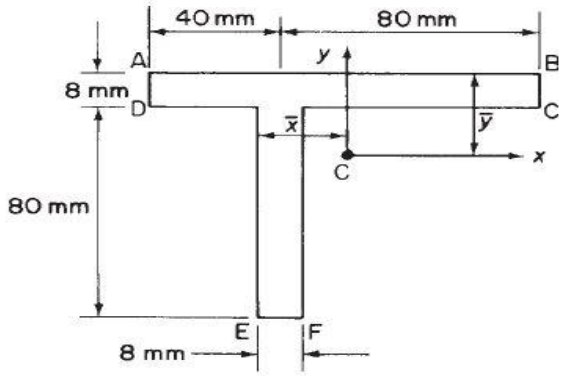
Q.1 Answer in brief:

a) Differentiate symmetrical and unsymmetrical bending.
b) Define 'neutral axis'.
c) Sketch the bending stress and shear stress distribution of a square section.
d) Locate shear centre of four standard sections of your choice.
e) Explain Bredt-Batho shear flow.
f) Classify different types of columns.
g) Define 'principal plane'.
h) What is strain energy?
i) State Maxwell's reciprocal theorem.
j) Differentiate statically determinate and statically indeterminate structures. **2x10**

PART-A

Q.2 a) State the assumptions of Euler's theory of bending. [CO1][L-2]**8**

b) A beam having the cross-section shown in the figure is subjected to a bending moment of 1500 Nm in a vertical plane. Calculate the maximum bending stress acting on the section.



[CO1][L-3]**12**

Q.3 a) Derive the relation between shear force, bending moment and load intensity. [CO2][L-3]**10**

b) Find the lowest buckling load for a fixed-pin ended column. [CO2][L-3]**10**

Q.4 a) Derive equilibrium equations for a 3-Dimensional structure. [CO3][L-3]**10**

b) Derive the expression for shear flow and explain its significance in airframe structural analysis. [CO4][L-2]**10**

PART-B

Q.5 a) What is structural idealization? Explain the assumptions used in structural idealization of Airframe structures. [CO4][L-2]**8**

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

AIRCRAFT SYSTEMS (BAE-DS-503)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.*

Q.1 Answer in brief:

a) Explain the concept of LAF in Airbus A-320.
b) Differentiate between 'Electro Mechanical' and 'Electro Hydraulic Actuator'.
c) Differentiate between 'Push-Pull Rod' and 'Cable Pulley System'.
d) What are the factors to be considered while selecting a hydraulic fluid?
e) What is the function of baffles which are incorporated in hydraulic reservoir?
f) Differentiate between 'Pressure Relief Valve' and 'Pressure Reducing Valve'.
g) Draw a schematic diagram of Oleo-Pneumatic Struct.
h) Name the Air Supply sources of Air-Conditioning and Cabin Pressurization.
i) Differentiate between 'Anti-Icing' and 'De-Icing'.
j) What are the different types of fuels used in modern airliners? **2x10**

PART-A

Q.2 a) Describe with a schematic diagram, a typical Fly By Wire System. **10**

b) What is the necessity of Auto Pilot System? Explain the layout with the help of a neat diagram. **10**

Q.3 a) Illustrate with neat sketches the operation of power assisted and power operated hydraulic flight control systems. **10**

b) Explain the operation of Bent-Axis Piston Pump and Swash Plate Piston Pump with necessary sketches. **10**

Q.4 a) Explain the Pressure feed fuel system used in large transport aircraft with a suitable diagram. **10**

b) What is Fuel Jettison system? Explain with a neat Sketch. **10**

PART-B

Q.5 a) What is the need for air conditioning system for an aircraft? Explain Air cycle cooling system of a typical transport aircraft with neat sketch. **10**

b) Explain cabin altitude, cabin differential pressure, Cabin rate of climb. **10**

Q.6 a) Explain a typical pressure demanded oxygen system installed in an aircraft. **10**

b) Explain the oxygen system flow indicators and pressure gauges. **10**

Q.7 a) Explain and Fenwal type continous loop fire detection systems. **10**

b) Explain the different types of ice formation and anti-icing systems used in an aircraft with neat sketch. **10**

End Semester Examination, Dec 2021

B. Tech. – Fifth Semester

AIRCRAFT MATERIALS (BAE-DS-521)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.*

Q.1 Answer the following questions:

a) Explain strength/ weight ratio of materials.
b) Explain two properties of flight vehicle materials.
c) Define yield point in context to stress strain curve.
d) Explain importance of weldability.
e) Define alloy Steel.
f) Explain importance of heat treatment.
g) Name any two Aluminium alloys with composition.
h) What are superalloys?
i) Explain the need of composite materials?
j) Define anisotropic elasticity. **2x10**

PART-A

Q.2 a) Explain various factors affecting selection of materials for different airplane parts. [CO3][L2]**10**

b) Illustrate various mechanical properties of metals used in aircraft structure. [CO3][L3]**10**

Q.3 Explain the following in detail:

a) stress-strain curve of Steel. [CO3][L2]**10**
b) Iron-Carbon equilibrium diagram. [CO3][L2]**10**

Q.4 a) Explain the effect of various alloying elements on Steel in detail. [CO4][L2]**10**

b) Describe the effects of corrosion on mechanical properties of materials.[CO4][L1]**1**

PART-B

Q.5 a) Explain various characteristics of Alumimun alloys making them suitable for aircraft construction. [CO4][L2]**10**

b) Describe the mechanism of heat treatment of nonferrous metals and alloys. [CO4][L1]**10**

Q.6 a) Explain super alloys with its applications in aerospace vehicles. [CO4][L2]**10**

b) Explain Titanium alloys in detail. [CO4][L2]**10**

Q.7 Write a note on composite materials and their application in aerospace engineering.[CO5][L2

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

PROPELLERS (BAE-DS-722)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Differentiate between 'fixed' and 'controllable pitch'.
b) Analyse the requirement of dynamic balancing during propeller maintenance.
c) List out various safety features in the design of a propeller system.
d) Differentiate the functions of synchronising and synchrophasing.
e) Briefly explain the construction method and materials used for composite propellers. **4x5**

PART-A

Q.2 Explain the requirement of a propeller control system. With appropriate diagrams, differentiate functioning of the two systems that are used to control propellers. **20**

Q.3 a) From basic principles and Blade element theory. Derive expression for thrust, force and torque for a propeller. **10**

b) How do propellers produce thrust? Analysing the requirement, explain the system of feathering. **10**

Q.4 a) Analyse the need of blade twist to optimize the aerodynamic performance of a propeller. **6**

b) With appropriate diagrams and mathematical formulations, differentiate blade twist and blade pitch. **14**

PART-B

Q.5 a) Proper cleaning of the propeller is critical to maintaining its continued airworthiness. What are various inspection methods used to ensure proper cleanliness of Propellers. Explain any two. **10**

b) What are the non-destructive inspection and visual inspection techniques that have been adapted to, or are unique to, the propeller? Explain Propeller tracking inspection. **10**

Q.6 a) The formation of ice on the propeller leading edges, cuffs, and spinner reduces the efficiency of the powerplant system. What are the de icing systems used to address this phenomenon. With a schematic sketch, explain functioning of an electric de-icing system for propellers. **15**

b) Distinguish between anti icing and de icing. **5**

Q.7 a) Analyse the need for preservation of propellers. **10**

b) The existing state of the propeller will dictate the method of storage required, for example a propeller installed on a stored aircraft and a propeller disassembled and stored in its component parts in a crate, will require for different treatment. Evaluate the differences in the preservation procedures for an installed and an uninstalled propeller. **10**

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

ROCKET PROPULSION (BAE-DS-723)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) What is the effect of varying nozzle configuration on the thrust output of vehicle? [CO1][L-3]

b) Define linear burning rate and propellant area ratio. [CO1][L-2]

c) State two advantages and disadvantages of Double based extruded propellant. [CO2][L-2]

d) What are the important application of rocket propulsion? [CO2][L-2]

e) What are the applications of small thrusters? [CO3][L-3]

f) What is the benefit of separating pressurizing gas from the liquid propellant in the tank? [CO4][L-2]

g) What are the desirable physical properties of a liquid propellant? [CO5][L-2]

h) The selection of the propellant combination is based on which factors. [CO5][L-23]

i) List out the applications of electric propulsion. [CO6][L-2]

j) Why grain configuration is a necessary element in solid propellant type of casing? [CO4][L-2]**2x10**

PART-A

Q.2 A rocket has the following data: Propellant flow rate: 5 kg/s Nozzle exit Diameter= 10 cm Nozzle exit pressure= 1.02 bar Ambient pressure = 1.013 bar Thrust chamber Pressure= 20 bar Thrust= 7KN Determine the effective jet velocity, actual jet velocity, specific impulse, and the specific propellant consumption. [CO1][L-2]**20**

Q.3 a) How are regressive, neutral and progressive burning of the solid propellant grain achieved? Explain with the aid of diagrams. [CO2][L-2]**10**

b) Describe five important properties of the solid propellants desired for rocket propulsion. [CO2][L-2]**10**

Q.4 a) Classify the types pf processed modern propellants used in a solid propellant rocket motor. [CO3][L-2]**10**

b) Describe the manufacturing process of a composite solid propellant for a rocket motor. [CO3][L-2]**10**

PART-B

Q.5 a) Explain the characteristics of Liquid Propellant Rocket Engine based on boost propulsion and auxiliary propulsion. [CO4][L-2]**10**

b) With a schematic sketches explain the tank arrangement of a turbopump fed liquid propellant rocket engine. [CO4][L-2]**10**

Q.6 a) What are the advantages and disadvantages of gelled propellants? [CO5][L-2]**10**

b) Differentiate with appropriate sketches the processes of:

i) Regenerative cooling.

ii) Radiation cooling. [CO5][L-2]**10**

Q.7 a) Evaluate functional features of:

i) Resisto jets.

ii) Arc jets.

Draw appropriate diagrams to explain your answer. [CO6][L-5]**10**

b) Carry out a comparative evaluation of the chemical propulsion systems and electric propulsion systems based on advantages and disadvantages. [CO6][L-5]**10**

End Semester Examination, Dec. 2021

OPEN ELECTIVE – COMMON FOR ALL BRANCHES

ELECTRIC MOBILITY (BAU-OE-001)

Time: 3 hrs. Max Marks: **100**

No. of Pages: 2

*Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.*

Q.1 Answer in brief:

a) Calculate air resistance at 30 Kmph if the air resistance at 10kmph is W. [CO3][L-3]

b) A car has a weight of 7000 N calculate rolling resistance if constant of rolling resistance is 0.21. [CO2][L-2]

c) Name five electric cars in Indian market. [CO1][L-1]

d) In India first electric three wheeler was _____ developed by company _____. [CO1][L-1]

e) What are the advantages and disadvantages of DC motor? [CO2][L-2]

f) Where are ADC and DAC used? [CO2][L-2]

g) Name the material of Anode, Cathode and Electrolyte for Na ion battery. [CO1][L-1]

h) Name four materials and electrolytes that can be combined to form a battery. [CO1][L-1]

i) Explain the significance of specific energy. [CO2][L-2]

j) Name two major players who are setting battery swapping stations in India. [CO1][L-1]**2x10**

PART-A

Q.2 Explain the components and working of fuel cells, with the help of neat sketch? [CO2][L-2]**20**

Q.3 For a 2-wheeler, e-rickshaw and sedan with specifications as given below, compute total traction force, traction Power and Torque required at 50 kmph. Consider the pickup time to attain 50 kmph to be 20 seconds. Assume slope to be zero. [CO4][L-4]**20**

Vehicle	ρ (kg/m^3)	C_D	A (m^2)	μ	weight (kg)	Tyre radius (m)
2-wheeler	1.2	0.9	0.5	0.013	180	0.28
e-rickshaw	1.2	0.44	1.6	0.013	680	0.2
Sedan	1.2	0.35	2.5	0.013	1200	0.31

Q.4 Compare DC Brushed, DC Brushless, Induction, Synchronous, Switched Reluctance Motor on following parameters.

a) Power to weight ratio b) Torque Speed c) Efficiency

d) Cost of Controllers d) Cost of Motors [CO5][L-5]**20**

End Semester Examination, Dec. 2021

B. Tech- Third Semester

BASICS OF AUTOMOBILE ENGINEERING (BAU-DS-301)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer in brief:

a) Name main four car body styles.
b) A car has a weight of 9000 N Calculate rolling resistance if constant of rolling resistance is 0.11.
c) Give reason for changing lubricating oil at specific periods.
d) Justify the need of VVT technology in engines.
e) Calculate air resistance at 30Kmph if the air resistance at 10kmph is W.
f) Analyze the significance of aspect ratio of a tyre.
g) How is tandem master cylinder different from normal master cylinder?
h) The front axle of a car has pivot centers 1.3 m apart. The angle of inside lock is 40° and the angle of the outside lock is 35°. What is the wheelbase of the car?
i) Why skidding take place in a vehicle? How it can be prevented?
j) Evaluate the statement "Clutch should have less size and weight". **2x10**

PART-A

Q.2 a) Name the different parameters used for specifying a vehicle and explain the importance of each with suitable example. [CO2][L-2]**10**

b) With the help of neat and labeled sketch explain how the power from the engine is transmitted to the wheels. [CO2][L-2]**10**

Q.3 a) Justify the necessity of cooling system for engine with the help of neat sketch. [CO5][L-5]**10**

b) Differentiate with the help of neat sketch the working of L and D MPFI systems. [CO4][L-4]**10**

Q.4 a) Justify the necessity of a transmission in a vehicle. Explain with the help of total resistance – tractive effort curve. [CO5][L-5] **10**

b) Explain the principle and working of diaphragm spring clutch with the help of neat sketch. [CO2][L-2] **10**

PART-B

Q.5 Explain with sketches the following terms and their effects on the vehicle:

i) Castor ii) Camber
iii) Toe in iv) Toe out [CO2][L-2]**5x4**

Q.6 a) Illustrate the need and working of the following two systems:

i) Anti lock braking system ii) Air brake [CO4][L-4]**5x2**

b) With the help of a neat sketch, explain the necessity and process of bleeding of hydraulic brakes. [CO2][L-2]**10**

Q.7 a) Explain the term aspect ratio. What are the advantages of low aspect ratio? [CO2][L-2]**10**

b) A tyre is designated as FR-78-15. Determine the significance of different notations used for specification. [CO3][L-3]**10**

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

AUTO ELECTRICALS AND ELECTRONICS (BAU-DS-501)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions:

a) Differentiate between solenoid and a diode? [CO2][L1]

b) Enlist the various causes of battery failure. [CO2][L3]

c) Discuss the importance of ampere-hour battery rating? [CO1][L2]

d) Discuss the potential of Lead-acid batteries usage in Automobiles? [CO3][L3]

e) What is induction of sine wave? [CO1][L2]

f) What is the significance of cam angle in ignition system? [CO5][L4]

g) What is the significance of Ballast Resistance? [CO5][L4]

h) Discuss the role of energy demand plays in automobiles. [CO6][L3]

i) What is wiring harness? [CO1][L1]

j) Define positive Earth return system? [CO5][L1]**2x10**

PART-A

Q.2 a) What are the advantages and disadvantages of positive and negative earthing? [CO1][L2]**10**

b) Draw and explain the wiring diagram of charging system of an automobile. [CO2][L3]**10**

Q.3 With a neat sketch explain the working, construction details, chemical reactions for a Silver Zinc Battery. [CO5][L3]**20**

Q.4 With an exploded view discuss the working and construction details of an alternator. [CO3][L4]**20**

PART-B

Q.5 Write different types of sensors used in an automobile. Explain in detail crankshaft position and coolant temperature sensors. [CO4][L2]**20**

Q.6 a) What is inlet manifold vacuum advance system? Explain with a neat sketch [CO5][L1]**10**

b) Discuss the working of a Spark Plug with a neat sketch. [CO5][L2]**10**

Q.7 a) Explain wiper system of an automobile with a neat sketch. [CO6][L3]**10**

b) What is trafficator used in automobiles? [CO6][L2]**10**

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

MOBILITY DESIGN AND AESTHETICS (BAU-DS-634)

Time: 3 hrs. Max Marks: **100**

No. of pages: 4

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Multiple choice question:

a) While driving, the driver didn't look at the rear view mirrors before changing the lane. In this case the driver committed _____ error.
[BAU-DS-634.1,6 [L2]

i) Substitutional error ii) Discrimination
iii) Commission error iv) Omission error

b) According to the design guidelines for visual information, all in-vehicle displays and controls should be designed and positioned to be visualized within.
[BAU-DS-634.1 [L2]

i) 0.5 sec ii) 1.0 sec
iii) 2.0 sec iv) 4 sec

c) Ergonomics principle suggests that: [BAU-DS-634.1,5 [L2

i) Monitoring displays should be placed outside peripheral limitations.
ii) Glow-in-the dark dials made of reflective substances are good for viewing in the nights.
iii) Visual systems should be preferred over auditory systems in noisy locations.
iv) All of the above.

d) If Gagan has secured 60th percentile in an examination by scoring 85 marks out of a total 120 marks, in a class of 380 students, it means.
[BAU-DS-634.2[L3

i) 60 students have marks below 85
ii) 60 students have marks above 85
iii) 228 students have marks below 85
iv) 208 students have marks below 85

e) Typically the mean+ 1.96*SD covers the _____ percent of population
[BAU-DS-634.2, 4 [L2]

i) 50 ii) 68
iii) 99 iv) 95

f) Which of the following characteristics of a Normal distribution curve is/are correct? [BAU-DS-634.2[L2

i) Bell shaped and symmetrical.
ii) Bell shaped and unsymmetrical.
iii) Mean, median and mode are equal coincide.
iv) Mean median and mode lies at 1 standard deviation from the central axis.
v) Curve is concave at centre and convex at the ends.
vi) Curve is convex at centre and concave at the ends.

a) 1,3,5 b) 1,3,6

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

VEHICLE MAINTENANCE (BAU-DS-701)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer in brief:

a) A vehicle gets a knocking problem, which type of maintenance we should consider and why?
b) Explain the importance of a job-card for transit damage and shortage report.
c) Under what conditions the piston ring compressor can be used?
d) Discuss the importance of corrugation on asbestos material of a spark plug.
e) Highlight the tapper adjustment steps.
f) What could be the possible causes of engine starting problem related to fuel supply?
g) What is the role of throw out bearing?
h) Why are synchronizer rings used in a gear box?
i) Draw the tyre rotation pattern followed in a four wheeler vehicle.
j) How bleeding of brakes can be done? **2x10**

PART-A

Q.2 Design a layout of a service station in a space of 30x35 metres with description of all essential operations and machinery procedures. Write about all the departments and planned workflow in detail. **20**

Q.3 Illustrate the importance of static and dynamic balancing of tyres related to road safety. Explain how a tyre and wheel assembly is dynamically balanced on a wheel balancing machine and steering angles corrected on a wheel alignment machine? **20**

Q.4 a) An engine was found to have compression leakage from valve side. Discuss and examine how the problem can be solved using valve seat reconditioning. **10**

b) A diesel engine is showing sign of excessive pollution from tailpipe investigate and examine the various faults and possible cause in a diesel injection system. **10**

PART-B

Q.5 Examine the various symptoms and possible faults in a petrol injection system. Discuss the procedure for testing and cleaning of petrol injectors in detail. **20**

Q.6 Why pressure plate and clutch needs to be replaced in pair? Discuss in detail the procedure to service the clutch disc, pressure plate and throw out bearing for modern vehicles. **20**

Q.7 Evaluate the safety consideration of a cross ply tyre in comparison to a radial tyre and also design a process flow diagram to manufacture it in a manufacturing setup. **20**

End Semester Examination, Dec. 2021

B.TECH – Seventh Semester

EMERGING AUTOMOTIVE TECHNOLOGY (BAU-DS-721/AU-817)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.*

Q.1 Answer the following questions:

a) Define the function of the constantly variable transmission system. [CO1][L

b) What are Regenerative braking systems? [CO2][L

c) How is ultra-capacitor beneficial for the electric automobile? [CO2][L

d) What is the function of the variable valve timing? [CO3][L

e) Name the different types of electrolytes used in Fuel Cell. [CO2][L

f) How is the fuel cell different from the battery? [CO2][L

g) How are hybrid vehicles differing from conventional cars? [CO2][L

h) What are the limitations of hybrid vehicles? [CO1][L

i) Enlist 5 types of sensors used in Automobiles. [CO2][L

j) State globalization and regionalization in context to automotive Industry. [CO1][L1] **2x1**

PART-A

Q.2 Integrate the challenges for designing the 21st-century vehicle. [CO1][L4]**2**

Q.3 a) Select an alternative energy system that produces electrical energy through chemical reaction and does not impact the environment. [CO2][L4]**1**

b) Select fuel cell systems that generate energy from other conventional sources, ar through the electrolysis process, water split into oxygen and hydrogen fuel. [CO2][L6]**1**

Q.4 a) Evaluate the performance of the engine without a throttle butterfly valve. [CO3][L6]**1**

b) Examine the function of the gasoline fuel injection system and how it enhances th engine's performance. [CO3][L4]**1**

PART-B

Q.5 Select the best architecture of electric hybrid electric vehicle for low power requireme and explain with neat sketch. [CO4][L6]**2**

Q.6 Propose the energy storage system for large-scale energy storage in tiny portab devices. [CO5][L5]**2**

Q.7 a) Select and explain the appropriate suspension system with a diagram for passeng vehicle. [CO6][L6]**1**

b) Examine the function of the constant variable transmission system and how it will b helpful for present vehicles. [CO6][L4]**1**

End Semester Examination, Dec. 2021

B. Tech. – Third Semester

CELL BIOLOGY (BBT-DS-301)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer briefly:

a) Recall the basic properties of cell.
b) Discuss the functions of ribosomes.
c) Differentiate between cytoplasm and cytosol.
d) Define the concept of fluidity of membrane.
e) Write the name of biggest and smallest organelle of the cell.
f) Define 'secondary messengers'.
g) Differentiate between convergence and divergence in cell signaling.
h) Recall the process of apoptosis.
i) Name the structural proteins of muscles.
j) What is extracellular matrix? **2x10**

PART-A

Q.2 Classify the semi-permeable nature of cell membrane with diagram. [CO3][L-4]**20**

Q.3 a) Categorize the functions of intermediate filament and microfilaments. [CO1][L-4]**10**

b) Analyze the structure of endoplasmic reticulum. [CO1][L-4]**10**

Q.4 a) Summarize the structure and functions of mitochondria. [CO1][L-2]**10**

b) Explain the cell cycle with diagram. [CO1][L-2]**10**

PART-B

Q.5 What is meant by cell signaling? Distinguish various types of cell signaling with the neat diagram. [CO4][L-4]**20**

Q.6 a) Illustrate different types of cell-cell junctions. [CO5][L-2]**10**

b) Compare the process of necrosis and apoptosis. [CO5][L-4]**10**

Q.7 Explain with the help of diagram the changes occur in the sarcomere during muscle contraction. [CO6][L-5]**20**

End Semester Examination, Dec. 2021

B. Tech. - Third Semester

MICROBIOLOGY (BBT-DS -302)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q1. Answer the following questions:

a) Illustrate Louis Pasteur contributions in Microbiology. [CO1][L-3]
b) Explain Whittaker's five kingdom classification. [CO1][L-2]
c) What do you understand by the term aseptic techniques? [CO2][L-2]
d) Contrast between selective media and differential media. [CO2][L-5]
e) Enlist different types of mode of nutrition of bacteria. [CO3][L-1]
f) Why would cells that are vigorously growing when inoculated into fresh culture medium have a shorter lag phase than those that have been stored in a refrigerator? [CO3][L-4]
g) Compare aerobic and anaerobic cellular respiration. [CO4][L-5]
h) Analyze net gain of ATP from one molecule of glucose after glycol sis. [CO4][L-4]
i) Discuss the process of conjugation in bacteria. [CO5][L-3]
j) Outline different methods of heat sterilization. [CO6][L-4]**2x10**

PART-A

Q.2 a) Explain enumerate the contribution of Edward Jenner and Robert Koch. [CO1][L-3]**10**

b) Outline different criteria for the classification of microorganisms. [CO1][L-4]**10**

Q.3 a) Explain in detail about the cell walls of gram-positive bacteria and gram negative bacteria. [CO2][L-2]**10**

b) Evaluate the distinguishing characteristics of Archaebacteria and Mycoplasma. [CO2][L-6]**10**

Q.4 Define the generation or doubling time and the mean growth rate constant. Illustrate the four phases of the growth curve in a closed system and discuss the causes of each. [CO2][L-3]**20**

PART-B

Q.5 a) What chemical intermediate links pyruvate to the TCA cycle? Explain TCA cycle and calculate the ATP formed after the TCA cycle. [CO5][L-4]**15**

b) Evaluate the difference between cyclic and noncyclic photophosphorylation. [CO5][L-5]**5**

Q.6 a) Compare between Generalized transduction and specialized transduction. [CO5][L-5]**10**

b) Analyze the properties of Simple transposition and replicative transposition. [CO5][L-4]**10**

Q.7 a) Describe the principle and procedure for an autoclave also mention the indicators used for checking the functioning of an autoclave. [CO6][L-3]**10**

b) Explain depth filters and membrane filters, and how are they used to sterilize liquids? [CO6][L-2]**10**

End Semester Examination, Dec 2021

B.Tech – Third Semester

BIOCHEMISTRY (BBT-DS-303)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.*

Q.1 Answer the following questions.

a) Describe the ionic state of an amino acid when it is dissolved in water. [CO-1] [L-2]

b) Determine the number of ATP molecules that would be generated from ten glucose molecules at the end of glycolysis pathway. [CO-6] [L-5]

c) What are the basic assumptions to explain Michaelis-Menten kinetics? [CO-5] [L-1]

d) What is φ, ψ, ω bonds in a protein? [CO-1] [L-1]

e) What are the different classes of enzymes as per the IUBMB classification system and the type of reactions catalyzed by each class? [CO-4] [L-1]

f) How do pH, temperature and substrate concentration affect enzyme activity? [CO-4] [L-2]

g) How is acetyl CoA produced from pyruvate? [CO-3] [L-2]

h) During long starvation or when glycogen storage is completely depleted, how glucose is supplied to the brain and what precursors are utilized in this process. [CO-3] [L-2]

i) You have found an inhibitor for your enzyme. This inhibitor does not change the V_{max} but increases the K_m of your enzyme. Also, inhibition could be reversed by increasing the substrate concentration. Could you identify the class of this inhibitor based on these evidences? [CO-5] [L-3]

j) What are simple lipids and their examples? [CO-3] [L-1]**2x10**

PART-A

Q.2 a) Which residues will get glycosylated on a protein that is destined for N-linked glycosylation? What type of bond will be formed? [CO-2] [L-2]

b) Compare trehalose and maltose. [CO-1] [L-5]

c) Glucose does not give 2,4-DNP and Schiff's tests, despite having aldehyde group. Why? [CO-1] [L-4]

d) Glycogen, starch and cellulose are all made up of glucose. What makes these polysaccharides different from each other? [CO-2] [L-4]

e) Glycosaminoglycans display characteristic properties due to their charged groups. What are those properties? [CO-2] [L-2]**4x5**

Q.3 a) What are phospholipids? Discuss their types and composition? [CO-2] [L-2]**10**

b) What is saponification and how would you make hard soap? [CO-1] [L-6]**10**

Q.4 a) When titrated, tryptophan shows pk_a values of 2.5 and 9.4. These pk_a values correspond to which ionizable groups of tryptophan? Determine its pI. Tryptophan would show good buffering power at what pH range? [CO-1] [L-3]**5**

b) What is a peptide bond and what are its properties? [CO-1] [L-1]**3**

c) Why do proteins fold? [CO-2] [L-1]**3**

d) What are various types of secondary and super secondary structures in proteins? [CO-2] [L-1]**3**

End Semester Examination, Dec. 2021

B. Tech. - Third Semester

BIOINFORMATICS AND COMPUTER APPLICATIONS
(BBT-DS-305)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.*

Q.1 Answer the following questions.

a) What is Computational Biology? Comments on its importance and applications? [CO1][L1]

b) How internet is different from intranet? [CO1][L2]

c) Illustrate which algorithm is used for local alignment? [CO2][L4]

d) Compare between local and global sequence alignment. [CO2][L5]

e) Enlist the applications of MSA. [CO3][L1]

f) Contrast between motif and protein domain. [CO3][L2]

g) Define BLOCKS. [CO4][L1]

h) Determine the uses of hidden Markov model. [CO5][L3]

i) State the applications of synthetic Biology. [CO6][L1]

j) Discuss about different types of protein structure. [CO4][L2]**2x10**

PART-A

Q.2 a) Determine different types of file formats and mention some Genome specific databases. [CO1][L2]**10**

b) Define DBMS? List different types of Database models. [CO2][L1]**10**

Q.3 a) Discuss about the Dynamic programming with an example. [CO3][L2]**10**

b) Illustrate different types of blast and their applications. [CO2][L3]**10**

Q.4 a) Determine the methods to generate the information of motif and profiles analysis. [CO4][L3]**10**

b) Illustrate UPGMA method in detail explaining the method by which distance is calculated. [CO4][L4]**10**

PART-B

Q.5 a) Evaluate different types of protein structures. Compare different methods for structure determinations. [CO5][L5]**10**

b) Analyze the challenges faced in the integration of biological data. [CO4][L4]**10**

Q.6 a) Explain how the secondary structure of protein is predicted? [CO5][L2]**10**

b) Discuss about the Support Vector Machines and Decision trees. [CO5][L2]**10**

Q.7 a) Design an appropriate example to explain the application of genomics. [CO6][L6]**10**

b) Develop an assay to show the application of peptide mass fingerprinting. [CO6][L6]**10**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

RECOMBINANT DNA TECHNOLOGY (BBT-DS-501)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions:

a) What is the significance of methylation of bases in DNA?
b) What is the probe used in Southern blotting?
c) Name the probes used in real time PCR.
d) Name any two bacteriophages.
e) Which enzyme removes nucleotides one at a time from the end of the DNA?
f) What is the function of His tag in an expression vector?
g) Expand TALENS.
h) Which protein is responsible for establishment of lysogenic life cycle in lambda phage?
i) Which vectors are used for cloning very large pieces of DNA?
j) How does calcium chloride help the transformation process? **2x10**

PART-A

Q.2 a) Restriction enzymes are extensively used in molecular biology. Below are the recognition sites of two of these enzymes, BamHI and BclI.

i) BamHI, cleaves after the first G:
5′ GGATCC 3′
3′ CCTAGG 5′
Does cleavage by BamHI result in a 5′ or 3′ overhang? What is the sequence of this overhang?

ii) BclI cleaves after the first T:
5′ TGATCA 3′
3′ ACTAGT 5′
Does cleavage by BclI result in a 5′ or 3′ overhang? What is the sequence of this overhang?

iii) Given the DNA shown below
5′ ATTGAGGATCCGTAATGTGTCCTGATCACGCTCCACG 3′
3′ TAACTCCTAGGCATTACACAGGACTAGTGCGAGGTGC 5′ i)I
If this DNA was cut with BamHI, how many DNA fragments would you expect? Write out the sequence of these double-stranded DNA. **6**

b) In cloning human growth harmone in bacteria, several different enzymes are used. List down the same and explain their role in the cloning process. [CO2][L-3]**14**

Q.3 a) Insertional inactivation of antibiotic resistance gene and then identifying the recombinants is a very complex process. Justify the same and suggest the alternative screening process for recombinant plasmid vectors. [CO2][L-3]**10**

b) How nutritional factors govern the development of lytic or lysogenic life cycle in lambda phage? Also explain the molecular basis of the same. [CO4][L-4]**10**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

FOOD BIOTECHNOLOGY (BBT-DS-502)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Define D value and ERH. Mention their significance in food industry.
b) List out the disadvantages of membrane filter method.
c) Briefly explain the DEFT technique.
d) Distinguish between thermophilic and thermoduric bacteria.
e) What is process waste?
f) Name any two organisms involved in spoilage of poultry meat.
g) Why is blanching of vegetables necessary?
h) Briefly explain the mechanism of benzoate in food preservation.
i) Analyze the role of Lacto bacillus in food industry.
j) What is the role of protease in cheese production? **2x10**

PART-A

Q.2 Enlist the primary sources of microbes found on food in detail. [CO1][L-1]**20**

Q.3 a) How does water activity and concentrated gases affect the growth of microbes on food? [CO2][L-3]**10**

b) Describe any two methods use for microbial examination of surfaces. [CO2][L-2]**10**

Q.4 a) What are the various types of spoilage in vegetables induced by bacteria and yeast? [CO3][L-2]**10**

b) Discuss the factors that bring spoilage of fermented foods such as beers and wine. [CO3][L-2]**10**

PART-B

Q.5 a) Differentiate between radappertization, radicidation and radurization by citing examples for each. [CO3][L-4]**10**

b) How are IMF foods prepared? Explain using suitable examples. [CO3][L-3]**10**

Q.6 a) Write the various steps involved in the preparation of single cell proteins. Add a note on the advantages and disadvantages of SCP. [CO4][L-3]**10**

b) Appraise on lactic acid fermentation and ethanol fermentation used in food industry. [CO4][L-2]**10**

Q.7 a) Explain the roles of various enzymes used in bakery industry. [CO6][L-3]**10**

b) Summarize the various methods to utilize food waste. [CO5][L-2]**10**

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

VIROLOGY (BBT-DS-523)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer in brief:

a) Which scientists made important contributions to the development of virology? What were their contributions? [CO1][L-1]

b) Define 'Plaque forming unit'. [CO1][L-1]

c) Determine the advantage would an RNA virus gain by having its genome resemble eukaryotic mRNA. [CO2][L-3]

d) Explain cytopathic effects in a cell. [CO2][L-2]

e) Compare killed and attenuated vaccine. [CO3][L-5]

f) Explain adjuvant and its use in vaccine delivery. [CO4][L-2]

g) State the properties and use of binary vectors. [CO5][L-1]

h) Outline the requirements for a virology laboratory. [CO6][L-1]

i) Discuss the epidemiology of Ebola Virus. [CO6][L-2]

j) Illustrate the scientific name and types of Dengue virus. [CO6][L-4]**2x10**

PART-A

Q.2 a) Discuss the ways that viruses can be cultivated. [CO1][L-2]**10**

b) Examine how can one find the virus concentration, both directly and indirectly, by particle counts and measurement of infectious unit concentration. [CO1][L-3]**10**

Q.3 a) Illustrate the strategy use by positive stranded Viruses and negative RNA stranded Viruses for replication. [CO2][L-4] **10**

b) How does a viroid differ from a virus? Evaluate in what way does a prion appear to differ fundamentally from viruses and viroids. [CO2][L-5]**10**

Q.4 a) Compare between DNA Vaccine and sub unit vaccine. [CO3][L-5]**10**

b) Illustrate modern approaches for virus control. [CO3][L-4] **10**

PART-B

Q.5 Explain gene cloning. Discuss the vectors use for the gene cloning in detail. [CO4][L-2] **20**

Q.6 a) Determine containment facility in biosafety. Explain different levels of containment. [CO5][L-3]**10**

b) How lab animals could be handled and maintained for experimental study? [CO5][L-4]**10**

Q.7 a) Discuss about causative agents, vectors, symptoms, epidemiology, diagnosis, treatment and recent strategies for combat Severe acute respiratory syndrome (SARS). [CO6][L-2]**10**

b) Outline the symptoms, diagnosis and recent strategies for combat Human Papilloma Virus (HPV). [CO6][L-4]**10**

End Semester Examination, Dec. 2021

B. Tech. — Seventh Semester

STEM CELL TECHNOLOGY (BBT-DS-701)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer in brief:

a) What do you understand by the term stem cells? State the properties of stem cells.
b) Analyze the way by which stem cell niches affect the differentiation of stem cells?
c) Discuss the role of micro RNA in the development of pleuripotent cells.
d) Summarize ion channels in stem cell.
e) Illustrate the role of WNT signaling pathway.
f) State the function of Notch –Delta signaling.
g) Determine the importance of somatic nuclear transfer.
h) Explain Bone marrow transplantation.
i) Analyze the requirement for stem cell therapy for cardiac repair.
j) Evaluate the technical issues of stem cell therapy. **2x10**

PART-A

Q.2 a) Evaluate the difference between embryonic stem cells and adult stem cells. **10**
b) Illustrate the role of hypoxia in regulation of cancer stem cell niche. **10**

Q.3 Describe different types of epigenetic modifications that have impact on the molecular basis of pluripotency. **20**

Q.4 a) Determine notch signaling pathway and its functions in stem cell development and differentiation. **10**
b) Outline the significance and pathway of Hedgehog Signaling. **10**

PART-B

Q.5 Evaluate the process, requirements and applications of somatic cell nuclear Transfer. **20**

Q.6 a) Define 'therapeutic cloning technology'. Discuss how therapeutic cloning is used with an example. **10**
b) State Gene therapy with an example and also mention its applications in detail. **10**

Q.7 a) Outline different sources and requirements for the stem cell therapy in nervous system repair. **10**
b) Illustrate the intellectual property right in stem cell therapy and regenerative medicines. **10**

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

BIOREMEDIATION TECHNOLOGY (BBT-DS-723)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions.

a) Define lagoons and their role in wastewater treatment. [CO1][L-1]

b) Name three most important fungi used for Myco-remediation. [CO4][L-1]

c) How can metagenomics play an important role in understanding the diversity and functional aspects of the microbial consortia? [CO2][L-2]

d) Discuss the oligodynamic effect of metals. [CO1][L-2]

e) What do you mean by activated sludge? [CO2][L-1]

f) What are meisenheimer complexes? [CO1][L-1]

g) Which genes are responsible for microbial degradation of PCBs? [CO5][L-1]

h) Summarize the low cost adsorbents for waste water treatment. [CO1][L-2]

i) What are allochthonous microorganisms? [CO4][L-1]

j) Differentiate between phyco-volatization and Myco-remediation. [CO3][L-3]**2x10**

PART-A

Q.2 a) Are biodegradation, biotransformation and bio-mineralization different? Critically analyze and comment on the statement. [CO3][L-4]**7**

b) Classify the physicochemical techniques for the removal for toxic substances from water and soil in detail with suitable examples. [CO1][L-12**13**

Q.3 a) Dissimilarly metal reduction has the potential to be a helpful mechanism for both intrinsic and engineered bioremediation of contaminated environments. Justify the statement with proper examples. [CO1][L-5]**10**

b) How is the mechanism of dissimilarly metal reduction different from indirect metal reduction? [CO3][L-1]**10**

Q.4 a) How alkanes can be degraded by bioremediation process? [CO4][L-2]**15**

b) Outline the role of genetic engineering to enhance bioremediation of hydrocarbons and derivatives. [CO5][L-2]**5**

PART-B

Q.5 Discuss the general microbial pathways of biodegradation of halogenated aromatic hydrocarbons in detail. [CO2][L-2]**20**

Q.6 a) High chlorinated PCB congeners typically have relatively high octanol-water partition coefficients (Kow). Justify the statement. [CO1][L-5]**10**

b) Differentiate between intradiol and extradiol cleavage in the lower metabolic pathway of dioxygenase enzyme. [CO3][L-3]**10**

Q.7 a) Why are Nitroaromatics toxic? [CO3][L-1]**5**

b) What are the different bacterial pathways reported for the degradation of nitrobenzene? [CO6][L-1]**15**

End Semester Examination, Dec. 2021

B. Tech. – Third Semester

COMPUTER-AIDED CIVIL ENGINEERING DRAWING (BCE-DS-301)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions.

a) How many types of sheets layout exists? [CO1][L1]

b) Describe the use of IS-1444-1989. [CO1][L1]

c) Explain the principle of projection. [CO2][L1]

d) Define 'reference plan'. [CO2][L2]

e) What is straight line? [CO1][L1]

f) By what symbol we show the snap point to the closest point. [CO3][L2]

g) Which state grid is used to design perspective? [CO3][L1]

h) Which is the latest version of AutoCAD software? [CO4][L2]

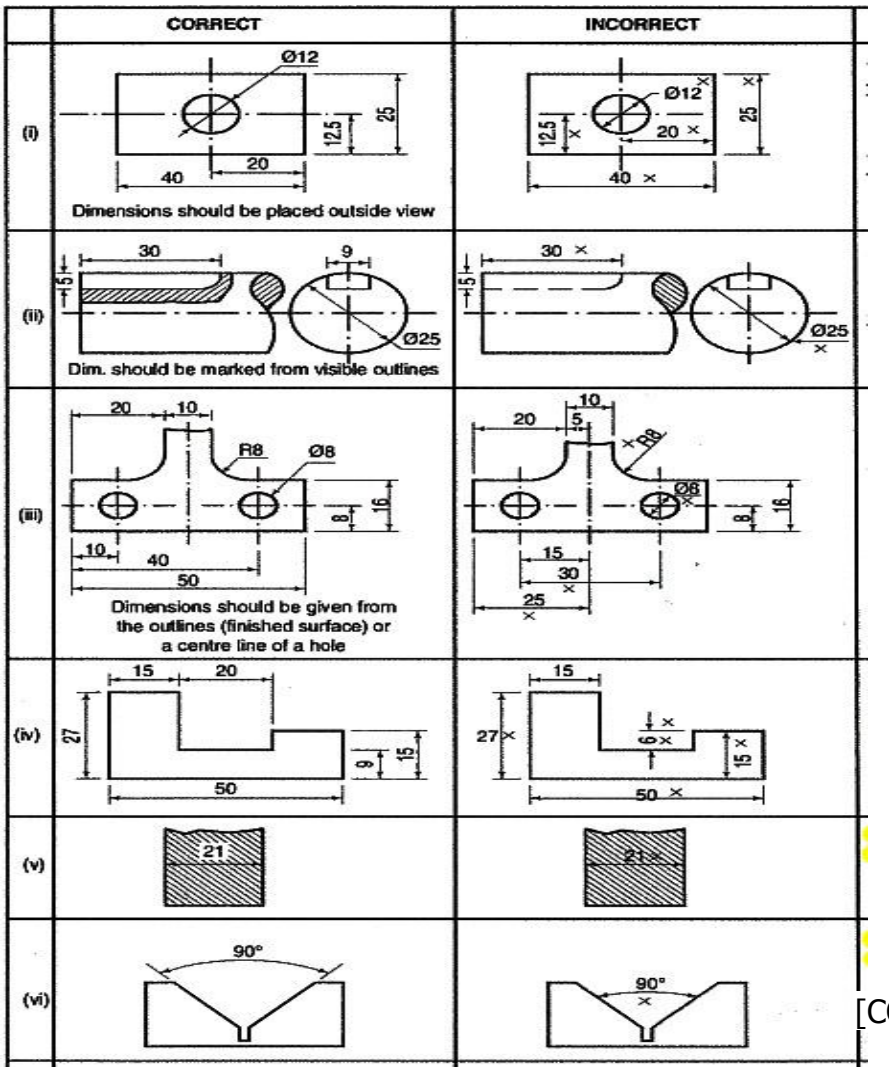
i) Which key is used to obtain properties palette in AutoCAD? [CO5][L1]

j) Discuss the Fundamentals of BIM. [CO5][L1]**2x10**

PART-A

Q.2 a) Describe the different type of lines? Draw their symbols and explain their uses. [CO4][L1]**10**

b) Explain the reasons.



[CO4][L1]**10**

P.T.O.

End Semester Examination, Dec. 2021

B. Tech.–Third Semester

DISASTER PREPAREDNESS AND PLANNING (BCE-DS-303)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Give the definition of disaster as outlined by American Red Cross. [CO1][L-1]

b) List any five countries who participated in the world conference on disaster reduction held in Kobe from 18th-22nd January 2005. [CO4][L-3]

c) Differentiate between a physical and socio-economic vulnerability. [CO2][L-3]

d) List the impacts of flooding on housing and small buildings. [CO4][L-3]

e) Poor design and construction of buildings is attributed to which factors. [CO5][L-2]

f) State true or false for the given statement "Disasters not only reveal underlying social, economic, political and environmental problems, but unfortunately contribute to worsening them." [CO1][L-2]

g) Give examples of any two structural measures for disaster risk reduction includes. [CO2][L-2]

h) Give the advantages of early warning systems. [CO4][L-3]

i) The National Disaster Management Authority is headed by. [CO6][L-2]

j) The term which describes the situation "when a large number of people in a community get a disease at the same time". [CO41][L-3]**2x10**

PART-A

Q.2 a) Differentiate between a disaster and hazard. Give any two examples of hazard. [CO1][L-3]**10**

b) Construct a flowchart of disaster classification system on type and time basis citing relevant examples and explain the different components of the same.[CO3][L-3]**10**

Q.3 Differentiate between natural and man-made disasters citing relevant examples. The Chernobyl disaster will be grouped in which of these categories. Describe the reason of same and give an over-view of the extent of damage inflicted onto the system during this catastrophe. [CO2][L-4]**20**

Q.4 Write notes on:

a) Climate change and its relation with disasters citing relevant examples. [CO4][L-4]

b) Demography and its correlation with disasters citing relevant examples. [CO4][L-4]**10x2**

PART-B

Q.5 With the help of an appropriate figure explain the disaster management cycle and its different stages citing example of a relevant natural or man-made disaster and the challenges posed by them. [CO5][L-4]**20**

Q.6 a) Discuss the responsibilities of National Disaster Management authority in combating disasters. [CO6][L-4]**10**

b) How are constitutional provisions different from common law? [CO6][L-3]**10**

Q.7 a) Discuss the impacts of disaster on environment. [CO3][L-4]**10**

b) How do local communities play an active role in combating disasters? Cite at least one example in support of your answer. [CO5][L-4]**10**

End Semester Examination, Dec. 2021

B. Tech. – Third Semester

INTRODUCTION TO CIVIL ENGINEERING (BCE-DS-304)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 a) Explain the importance of civil engineering in the society. [CO1][L-2]

b) Write down the name of any two ancient monuments and modern marvels. [CO2][L-2]

c) Explain the role of aesthetic in Civil Engineering in brief. [CO2][L-2]

d) Define the term "LEET" and also explain the purpose of LEET rating. [CO3][L-2]

e) Write down the name of various temporary structures required in construction industry. [CO3][L-2]

f) Explain the term Faults and list its classifications. [CO4][L-2]

g) Explain the need of rehabilitation of structures and also mention some simple system of rehabilitation. [CO5][L-3]

i) Explain the advantages of modern techniques of surveying over traditional methods. [CO6][L-1]

j) Define the term "intelligent transportation system".Also mention the name of some technologies related to the same. [CO6][L-1]**2x10**

PART-A

Q.2 a) Explain broad discipline of civil engineering with its importance in brief. [CO1][L-2]**10**

b) Explain various methods of construction from conventional to modern stage in brief. [CO3][L-2]**10**

Q.3 a) Does 3D concrete printing affect the concrete durability? [CO6][L-3]**10**

b) Briefly discuss the term building Services and its importance in construction of buildings. [CO3][L-1]**10**

Q.4 a) Describe the characteristics and behaviors of someone you believe to be an ethical person. How could the types of decisions and actions this person engages to affect the in a workplace and its environment? [CO2][L-4]**10**

b) Explain the various challenges faced while doing project management. [CO4][L-2]**10**

PART-B

Q.5 a) Explain various sustainable building material specifications in detail and compare it with conventional materials specifications. [CO5][L-2]**10**

b) Explain detailed procedure of effluent treatment system. [CO4][L-2]**10**

Q.6 a) Explain briefly the important feature of coal handling system. [CO5][L-2]**10**

b) Explain the importance of hydro power projects in meeting power demand of today's world. [CO3][L-2]**10**

Q.7 a) Explain the term ITS in brief and also discuss its uses in modern world. [CO6][L-2]**10**

b) Illustrate some examples of sustainable and resilient pavement materials with its features. [CO6][L-3]**10**

End Semester Examination, Dec. 2021

B. Tech. – Third Semester

ENGINEERING GEOLOGY (BCE-DS-305)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions:

a) State the mineral with the hardness of 5 in Moh's scale. [CO4][L-3]
b) With the help of a neat sketch, define faults and folds. [CO1][L-1]
c) List the optical properties of minerals. [CO5][L-1]
d) Explain the terms: epicenter and hypocenter of earthquake. [CO5][L-1]
e) Give two examples of sedimentary rocks. [CO2][L-1]
f) Define 'petrology'. [CO1][L-1]
g) State any two effect of faulting. [CO5][L-2]
h) State the objectives of engineering geology. [CO1][L-2]
i) Summarize the factors affecting mechanical weathering. [CO3][L-2]
j) Most common methods of soft tunnelling is _____. [CO6][L-1]**2x10**

PART-A

Q.2 a) With the help of a neat sketch, write a detailed note on the Interior of the earth. [CO1][L-3]**10**

b) Explain "geological time scale" giving specific importance to epoch, period and Eons. [CO1][L-3]**10**

Q.3 a) Describe the formation of igneous, sedimentary and metamorphic rocks with suitable examples. [CO2][L-2]**10**

b) List the physical properties, specific gravity and hardness of granite and gabbro. [CO2][L-2]**10**

Q.4 Explain in details:

a) Types of soil found in India.
b) Factors affecting soil formation. [CO3][L-2]**10x2**

PART-B

Q.5 a) Write a well – detailed note on "elastic rebound theory". [CO5][L-3]**5**

b) With the help of a neat sketch, explain "artificial recharge of groundwater." [CO5][L-3]**15**

Q.6 With the help of a neat sketch, describe the following:

a) Classification of folds.
b) Hanging wall, foot wall, heave and throw of a fault. [CO4][L-3]**10x2**

Q.7 a) Summarize the conditions and influence on selection and location of tunnels. [CO6][L-2]**10**

b) Illustrate the geological problems after dam construction. [CO6][L-4]**10**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

HYDRAULIC ENGINEERING (BCE-DS-501)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.*

Q.1 Answer the following questions.

a) Define 'mass density'. [CO1][L-1]
b) Explain specific volume. [CO3][L-1]
c) Describe viscosity. [CO1][L-1]
d) Explain dimension analysis. [CO2][L-2]
e) Write Rayleigh's Method. [CO2][L-2]
f) Explain 'steady flow'. [CO3][L-1]
g) Define 'Chezy's formula'. [CO3][L-1]
h) Describe Notch and its classification. [CO3][L-2]
i) Discuss 'hydraulic jump'. [CO5][L-1]
j) Categorize major energy losses in a pipe. [CO6][L-4]**2x10**

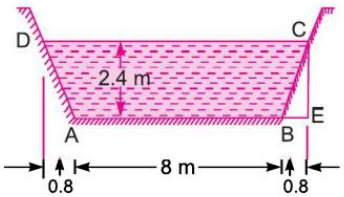
PART-A

Q.2 A plate 0.025 mm distant from a fixed plate, moves at 60 cm/s and requires a force of 2 N per unit area i.e., 2 N/m^2 to maintain this speed. Determine the fluid viscosity between the plates.

[CO1][L-1]**20**

Q.3 Find an expression for the drag force on smooth sphere of diameter D, moving with a uniform velocity V in a fluid of density **r** and dynamic viscosity μ. [CO2][L-5]**20**

Q.4 Find the discharge through a trapezoidal channel of width 8 m and side slope of 1 horizontal to 3 verticals. The depth of flow of water is 2.4 m and value of Chezy's constant, C = 50. The slope of the bed of the channel is given 1 in 4000.



[CO2][L-2]**20**

PART-B

Q.5 The discharge of water through a rectangular channel of width 8 m, is 15 m/s when depth of flow of water is 1.2 m. evaluate:

a) Specific energy of the flowing water,
b) Critical depth and critical velocity,
c) Value of minimum specific energy. [CO3][L-5]**10**

Q.6 Derive the expression for loss of energy due to hydraulic jump in a open channel.[CO6

Q.7 Evaluate the head lost due to friction in a pipe of diameter 300 mm and length 50 m, through which water is flowing at a velocity of 3 m/s using

a) Darcy formula
b) Chezy's formula for which C = 60. [CO6][L-5]**20**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

GEOTECHNICAL ENGINEERING (BCE-DS-502)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions.

a) A wet soil sample weighing 23 N had a volume of 1150 cm^3. After oven drying, the weight is reduced to 19.6 N. Determine water content. [CO1][L-3]

b) Differentiate between 'bulk' and 'dry density'. [CO1][L-2]

c) What is the relation between seepage velocity and discharge velocity? [CO2][L-2]

d) How presence of adsorbed water reduces permeability of the soil? [CO2][L-2]

e) On what factors value of shear resistance depends? [CO6][L-2]

f) What is failure envelope of the soil? [CO6][L-2]

g) Write mathematical relation between coefficient of volume compressibility and coefficient of compressibility. [CO5][L-2]

h) What do you understand by geostatic stresses? [CO2][L-3]

i) Explain the reason of reduction of volume of soil after achieving MDD. [CO2][L-3]

j) Which method of compaction will you prefer for compacting layers of small thickness in base course of cohesionless soil? [CO2][L-3]**2x10**

PART-A

Q.2 a) Explain grain size distribution curve in detail. [CO1][L-2]**10**

b) A soil has a porosity of 30%, the specific gravity of 2.7. Calculate a) dry density weight of sand b) unit weight of sand if degree of saturation is 56% c) degree of saturation of sample at a moisture content of 14%, d) submerged unit weight of sand. [CO1][L-3]**10**

Q.3 a) What is Darcy's law? How do you know that the flow through a soil obeys Darcy's law? [CO2][L-2]**5**

b) Calculate the horizontal and vertical permeability of a soil deposits consisting of three layers 4 m, 2 m, 1.5 m and 3 m thick with permeabilties 0.1, 3 x 10^{-4}, 0.07, and 5 x 10^{-7} cm/sec resp. [CO2][L-3]**15**

Q.4 a) Discuss the factors that affect compaction. [CO3][L-6]**10**

b) Describe Standard Proctor Test. [CO3][L-3]**10**

PART-B

Q.5 a) State the assumptions made in computing stresses below the ground surface due to a point load acting on it. [CO4][L-2]**10**

b) Vertical point load on surface=800 kN. Find incremental vertical pressure at depths 5m and 10m directly under the load and at a distance 5 m radially away from the load axis on these depths. [CO4][L-6]**10**

Q.6 a) Explain the phenomenon of consolidation of clays by Terzaghi's spring analogy, and discuss its limitations. [CO5][L-3]**10**

b) What is coefficient of consolidation? How it is used to do settlement analysis? Explain with example. [CO5][L-5]**10**

Q.7 a) What is Mohr circle? Discuss its important characteristics. [CO3][L-3]**10**

b) Explain direct shear test in detail. [CO3][L-3]**10**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

STRUCTURAL ENGINEERING (BCE-DS-503)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

- *Usage of **IS 456:2000 is allowed.***
- *Usage of **Scientific Calculator is allowed.***

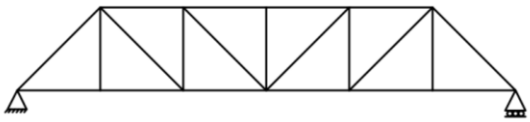
Q.1 Answer the following:

a) What do you understand by the term "Characteristic Load"? [CO3][L-2]

b) With context to the structural engineering, illustrate the importance of design and analysis of structural elements. [CO1][L-2]

c) Explain Geophysical Source of building loads. [CO2][L-2]

d) Evaluate the Static Indeterminacy for the following Pratt Truss:



[CO1][L-4]

e) State the IS code for determining the Wind and Earthquake Loads on a structure. [CO4][L-1]

f) As per IS 800:2007, correlate ISWB 750. [CO4][L-2]

g) Summarize the concept of one – way slab in transferring the loads to beam sections. [CO5][L-2]

h) With the help of a neat sketch, quote the expression of "internal stresses" introduced in the concrete during prestressing of concrete member. [CO6][L-3]

i) List the assumptions considered in the design of pre – stressed concrete structural element. [CO6][L-1]

j) Elaborate the advantages of prestressed concrete over reinforced cement concrete. [CO6][L-2]**2x10**

PART-A

Q.2 a) "Sustainable Development plays a vital role in the discipline of structural engineering". Explain in detail. [CO1][L-2]**10**

b) Summarize the role of structural engineer and architects in design. [CO1][L-4]**10**

Q.3 a) With regards to codal provisions, what are the various loads and load combinations considered on building structure. [CO2][L-2]**10**

b) A rectangular beam of size 500 mm X 660 mm is used for simply supported, effective span of 7.5 m. Calculate what maximum load can be applied over the beam, if the beam is provided with 3 bars of 16 mm dia. Use M30 and Fe415, effective cover = 60 mm (by using WSM). [CO2][L-5]**10**

Q.4 a) Elaborate the design philosophies in structural design. [CO3][L-4]**10**

b) Compare static and kinematic degree of indeterminacy for the following figure given below: [CO3][L-3]**10**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

PROFESSIONAL PRACTICE, LAW AND ETHICS (BCE-DS-504)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is Compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer ***(any four)*** of the following:

a) Criticize the concept of right understanding. [CO2][L-4]

b) Analyze the needs of Self ('I') and 'Body'. [CO2][L-4]

c) List the differences between intention and competence. [CO3][L-1]

d) List the differences between society and crowd. [CO5][L-1]

e) Analyze the need of natural acceptance of human values. [CO2][L-4]

f) Discuss the learning from the "story of stuff". [CO6][L-2]**4x5**

PART-A

Q.2 Discuss the basic requirements for the fulfillment of your aspirations with their correct priority in detail. [CO1][L-2]**20**

Q.3 Illustrate the steps involved in correct appraisal of the physical needs in detail. [CO2][L-4]**20**

Q.4 Discuss how Universal Order; from family to world family can be attained in detail? [CO4][L-2]**20**

PART-B

Q.5 Discuss the equivalence of existence with co-existence in detail. [CO4,4][L-2]**20**

Q.6 Illustrate the steps involved in living in harmony at all the levels of being in detail. [CO4][L-4]**20**

Q.7 Reflect on your own notion of happiness and your program for happiness. Is your program similar to the program of the people shown in the video of "story of stuff"? [CO6][L-5]**20**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

CONCRETE TECHNOLOGY (BCE-DS-506)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) With suitable examples, define argillaceous compounds. [CO1][L1]

b) Explain the function of "Lime" in cement. [CO1][L1]

c) In a laboratory experiment, if the consistency of the cement measured is 28 percent, determine the percentage of water to be added into the sample of cement to determine the soundness of cement. [CO1][L4]

d) Illustrate the usage of fineness modulus of aggregates. [CO2][L1]

e) Define 'Duff – Abram's Law'. [CO3][L1]

f) Correlate the standard values of slump test and compaction factor test. [CO3][L4]

g) Relate the significance of 'target mean strength of concrete' as per IS 10262: 2019. [CO6][L4]

h) As per IS 10262: 2019, correlate M 35. [CO6][L4]

i) Summarize the commonly used retarders in concrete industry. [CO5][L2]

j) Recognize the Indian Standard Codal Provisions for the following: [CO6][L1]

   i) Compressive strength of hydraulic cement.

   ii) Methods of sampling and analysis of concrete (slump test). [CO6][L1]**2x10**

PART-A

Q.2 Explain in detail, the following laboratory experiments performed on cement:

a) Consistency test.

b) Setting time test.

c) Compressive strength test.

d) Tensile strength test. [CO1][L1]**5x4**

Q.3 a) Classify aggregates on the basis of their size. [CO2][L2]**10**

b) Evaluate the Fineness Modulus of the given sample of aggregates for the following data:

- The total weight of the sample : 18 Kg
- Weight retained on 40 mm IS Sieve : 1.75 Kg
- Weight retained on 20 mm IS Sieve : 2.50 Kg
- Weight retained on 10 mm IS Sieve : 4.00 Kg

What do you infer from the result obtained? [CO2][L5]**10**

Q.4 What do you understand by "Hardened Concrete"? Explain in detail the various laboratory experiments which are conducted on the concrete sample to determine its strength. [CO3][L1]**20**

PART-B

Q.5 Correlate the following in terms of concrete making process:

a) Retarders

b) Accelerators

c) Air – Entraining Admixtures

End Semester Examination, Dec 2021

B. Tech (Civil Engineering) – Fifth Semester

ENGINEERING MATERIALS FOR SUSTAINABILITY (BCE-DS-523)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.*

Q.1 Answer the following questions:

a) With suitable examples, define Sustainability. [CO1][L1]
b) In present scenarios, illustrate the need of Sustainable Buildings. [CO1][L1]
c) Define some of the by – wastes from industries that can be used as a partial replacement of cement in making of Sustainable Concrete. [CO2][L1]
d) Correlate "Bamboo" as one of the Sustainable Building Material. [CO2][L4]
e) Explain "Green Building Rating Tools". [CO3][L1]
f) Compare the parameters of IGBC and LEEDs towards measuring of Sustainability of any structure. [CO3][L2]
g) Relate the significance of "Life – Cycle Assessment" and Sustainable Development. [CO4][L4]
h) State the three types of Construction Specifications. [CO5][L2]
i) Summarize the importance of Sustainable Development Goals (SDGs) 2030. [CO1][L2]
j) Explain in brief, the concept of sustainability at Societal Level. [CO1][L1]**2x10**

PART-A

Q.2 a) Correlate the Sustainable Development Goals 2030 as from Civil Engineering Perspective. [CO1][L4]**10**
b) Explain the Three Pillars of Sustainability in detail. [CO1][L1]**10**

Q.3 Illustrate the application of Sustainability in the following sub – disciplines of Civil Engineering:

a) Building and Construction Industry
b) Structural Engineering [CO2][L4]**20**

Q.4 Correlate IGBC as one of the measures of Green Building Rating Tools. [CO3][L4]**20**

PART-B

Q.5 a) Write a well – detailed note on "Five Phases of Life – Cycle Assessment". [CO4][L2]**10**
b) Describe the various steps involved in the Life – Cycle Assessment of a concrete beam of size 400 mm x 450 mm. [CO4][L4]**10**

Q.6 a) Illustrate the importance of Material Specification and Sustainable Development. [CO5][L4]**10**
b) Relate the concept of Material Specification in Sustainable Civil Engineering Approach in context with Highways and Expressways. [CO5][L4]**10**

Q.7 Plan the various parameters that must be taken into consideration to make the following buildings "sustainable":

a) Residential Complex
b) Commercial Complex [CO6][L5]**20**

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

CIVIL ENGINEERING SOCIETAL AND GLOBAL IMPACTS (BCE-DS-701)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **Two** questions from **PART-B**. Each question carries equal marks.*

Q.1 Answer the following:

a) Give the purpose of cotton gin. [CO2][L-1]

b) Write down atleast one advantage of the Great Britain had during the industria revolution. [CO3][L-2]

c) Briefly explain the criteria for quantifying a city as a Mega city. [CO5][L-3]

d) What is the purpose of screening in EIA? [CO1][L-2]

e) The share of construction sector in India's GDP is _____. [CO4][L-2]

f) On basis of which factors the fibre is considered useful as a construction material? [CO5][L-2]

g) How is water logging related with aesthetics? [CO4][L-4]

h) Citing relevant examples explain the external causes of failure of a structure. [CO1][L-3]

i) Define 'sound transmission loss'. [CO3][L-2]

j) What inference can be made from TL 15? [CO3][L-3]**2x10**

PART-A

Q.2 a) "Industrial revolution brings us where we are today", Justify the statement. [CO2][L-4]**10**

b) Citing relevant examples explain how global warming is a matter of concern for civil engineers. [CO2][L-4]**10**

Q.3 Describe the role of civil engineers in shaping the society in detail. [CO1][L-4]**20**

Q.4 a) Describe the three core functions of a smart city with the help of an illustrative figure. [CO3][L-3]**10**

b) Draw an illustrative figure representing the model to compute the liveability index. [CO4][L-3]**10**

PART-B

Q.5 Write notes on:

a) Desalination by evaporation.

b) Applications of treated wastewater. [CO5][L-4]**10x2**

Q.6 a) Explain how the light-weight double leaf walls help in sound transmission from one room to another. [CO4][L-4]**10**

b) Describe the role of DUAC in maintaining the aesthetic beauty of a national capital. [CO4][L-4]**10**

Q.7 a) Construct a flowchart of the EIA process and explain the salient its features of each component. [CO3][L-4]**10**

b) Discuss the different type of fibres used in construction and their applications in detail. [CO3][L-4]**10**

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

HIGHWAY CONSTRUCTION AND MANAGEMENT (BCE-DS-722)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 a) Briefly outline the historical development of road construction. [CO1][L-1]

b) Write down the name of current road projects in India. [CO1][L-1]

c) Define the term "super elevation" and also write down the formula for the same. [CO6][L-1]

d) Differentiate between channelized and un-channelized intersections. [CO3][L-2]

e) Explain the concept of level of service and its effects on capacity of road. [CO2][L-2]

f) Write down the name of different types of bituminous materials used in the pavement and under what circumstances each of these materials is preferred. [CO4][L-3]

g) A circular load of radius 20 cm with uniform contact pressure of 8.5 kg/cm^2 is applied on the surface of a homogenous elastic mass. Determine the vertical stress under the center of the load at a depth of 50 cm from the surface. [CO5][L-3]

h) Explain the objects of providing contraction joints in cement concrete pavement. [CO5][L-2]

i) Calculate the values of i) Head light sight distance and ii) Intermediate sight distance for a highway with a design speed of 65 kmph. Assume suitably all the data required. [CO6][L-3]

j) Explain the requirement of road patterns in highway engineering. [CO2][L-2]**2x10**

PART-A

Q.2 a) Explain with sketches the various factors controlling the alignment of road. [CO1][L-2]**10**

b) Explain current road projects status in India and their features in detail.[CO1][L-2]**1**

Q.3 a) Define sight distance and factors causing restrictions to sight distance. Also explain the significance of stopping, intermediate and overtaking sight distances in detail. [CO6][L-2]**10**

b) A vertical summit curve is formed at intersection of two gradients + 3.0 and -5.0 percent. Design the length of summit curve to provide a stopping sight distance for a design speed of 80 kmph. Take value of t= 2.5 sec, f = 0.35. [CO6][L-6]**10**

Q.4 a) The traffic volume studies is necessary for design of any geometric feature of road. Justify this statement. [CO2][L-5]**10**

b) Draw a neat sketch of full cloverleaf and show the movement of traffic.[CO3][L-3]**1**

PART-B

Q.5 a) Propose the best practicable measures for selection of highway materials for construction of dense graded bituminous mixes pavement. [CO4][L-6]**10**

b) Explain the principle of the various tests on road stones; specify the desirable values of the test results. [CO4][L-2]**10**

End Semester Examination, Dec. 2021

B. Tech. (Civil Engineering) – Seventh Semester

BRIDGE ENGINEERING (BCE-DS-728)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks. Usage of **Scientific Calculator is allowed.***

Q.1 Answer the following questions:

a) Compare Superstructure and Substructure in a typical Bridge. [CO2][L2]

b) As per Indian Road Congress (IRC) Bridge Code, define Section III and Section VII. [CO1][L1]

c) Evaluate the Impact Factor for a bridge with span length 8 m, subjected to IRC Class AA Tracked Vehicle Loading Condition. [CO1][L5]

d) With the help of a neat sketch, explain the following loading conditions on a typical section of Box Culvert:
   - Uniformly Distributed Load.
   - Earth Pressure on Vertical Side Walls. [CO3][L3]

e) Describe the structural components of Box Culvert.

f) Compare the different arrangements of transfer of forces from cable to pylon in a Cable – Stayed Bridge. [CO3][L1]

g) Summarize the advantages of Prestressed Concrete Bridge. [CO4][L2]

h) Illustrate the Empirical Formula to determine the Economical Depth of the Plate Girder in Plate Girder Bridges. [CO6][L1]

i) Describe the features of a Composite Bridge. [CO6][L1]

j) Compare Piers and Abutments. [CO5][L2]**2x10**

PART-A

Q.2 With the help of a neat sketch, explain in detail the various components of a bridge structure. [CO2][L3]**20**

Q.3 As per Section II of Indian Road Congress (IRC) Bridge Code, write a note on:

a) IRC Class AA Loading. [CO1][L2]**12**

b) Impact Effect for IRC Class A or Class B Loading. [CO1][L2]**8**

Q.4 Design the Deck Slab for a Reinforced Concrete Slab Culvert, having following data:

- Clear Span of bridge: 8 m
- 2 – Lane width Roadway
- 1.0 m footpaths on either side of roadway
- Wearing Coat: 90 mm
- Width of bearing: 450 mm
- IRC Class AA – Tracked Vehicle
- M 25 grade concrete and Fe 415 Steel [CO3][L6]**20**

PART-B

Q.5 a) With the help of neat sketches, explain the different types of Cable Stays in a typical Cable – Stayed Bridge. [CO4][L3]**10**

b) Summarize the concept of Pretensioning in a Prestressed Concrete Bridge.[CO4][L2

End Semester Examination, Dec. 2021

OPEN ELECTIVE - COMMON FOR ALL BRANCHES

SOLID WASTE MANAGEMENT (BCE-OE-001)

Time: 2 hrs. Max Marks: **5**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against question:*

Q.1 a) List the environmental impacts of improper waste disposal. [CO5][L-

b) A landfill has _____ number of essential components. [CO1][L-

c) The residential refuse generation rate can be taken as per recommendations CPHEEO manual. [CO4][L-

d) What is the purpose of providing a liner in the landfill? [CO4][L-

e) Give the formula for calculating the moisture content of waste. [CO2][L-2]**2x**

PART-A

Q.2 Explain the classification system of solid waste. (CO1/L3) **1**

Q.3 Write short notes on:

a) Need of waste transformation.

b) Role of density in planning and designing of SWM system. (CO2/L3) **5x**

Q.4 Compute the residential refuse generation from the following given data for eac locality. Also estimate the total waste generation.

S. No	Locality Name	No. of Households	Average No. of persons/household
1	A	425	5
2	B	348	4
3	C	268	6
4	D	685	4
5	E	425	5
6	F	395	5
7	G	461	4
8	H	396	3
9	I	403	4
10	J	561	4

(CO3/L4) **1**

PART-B

Q.5 Discuss the best waste management practices adopted by Sweden in managing th generated municipal solid waste. (CO4/L4) **1**

Q.6 Outline the site selection criteria for finalizing the location of a landfill site. (CO5/L4) **1**

Q.7 Compile a list of vehicles to be used for waste transportation at door-to-door level an at advanced levels and describe them. (CO6/L4) **1**

End Semester Examination, Dec. 2021

OPEN ELECTIVE – COMMON FOR ALL BRANCHES

DISASTER MANAGEMENT (BCE-OE-005)

Time: 3 hrs. Max Marks: **10**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions fro **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer ***(any four)*** of the following:

a) Discuss the components of disaster management. [CO-5][L-

b) Recall vulnerability analysis of hazards. [CO-3][L-

c) List the types of disaster mitigation strategies. [CO-2][L-

d) Discuss the importance of disaster preparedness. [CO-5][L-

e) Recall the tasks of state disaster response force (SDRF). [CO-4][L-

f) List the importance of public awareness in disaster management. [CO-4][L-1] **5×**

PART-A

Q.2 Elaborate the types of disasters with their causes. [CO-1][L-2] **2**

Q.3 Evaluate the role of control process in disaster management. [CO-5][L-4] **2**

Q.4 Summarize the emerging trends in disaster mitigation. [CO-2][L-2] **2**

PART-B

Q.5 Elaborate the steps and organizational structure for disaster preparedness. [CO-6][L-2] **2**

Q.6 Analyze the importance of community - based approach to disaster management.[CO-5][L-4] **2**

Q.7 Evaluate the health problems common to all the disasters. [CO-4][L-4] **2**

End Semester Examination, Dec. 2021

OPEN ELECTIVE - COMMON FOR ALL BRACHES

EVERYDAY CHEMISTRY (BCH-OE-001)

Time: 3 hrs Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against question.*

Q.1 Answer the following questions:

a) Calcium phosphate, Ca3 (PO4)2, is an ionic compound and a common anti-cakin agent added to food products. What is the molecular mass of calcium phosphate? [CO1][L-4]

b) How a buffer solution manages to stabilize the pH with the addition of acid/base? [CO1][L-3]

c) How to reduce loss of nutrients during cooking? [CO2][L-2]

d) Enlist the steps of domestic water treatment. [CO3][L-2]

e) Why are Chemicals Preservative added to food? [CO4][L-3]

f) Compare biodegradable and Non Biodegradable plastics. [CO4][L-2]

g) The image in a classic television set is created by focused beam of _____. [CO6][L-1]

h) Name any two green solvents. [CO5][L-2]

i) State pilling bed worth rule. [CO6][L-2]

j) Give any two applications of green chemistry in everyday life. [CO6][L-2]**2x1**

PART-A

Q.2 a) Discuss the role of carbon, nitrogen, calcium, potassium and sodium in human bod [CO-1, L2] **10**

b) 355 ml sample of soft drink if contains 0.133 mol of sucrose (table-sugar). What the molar concentration of sucrose in soft drink? [CO-1, L4] **1**

Q.3 a) How human body can get omega fatty acids? What are omega-3, omega- 6 ar omega- 9? [CO-2, L3] **1**

b) Water sample on analysis was found to contain the following in mg/L Calciu sulphate 0.5, magnesium chloride 0.7, magnesium sulphate 0.6. Identify the type hardness and calculate it. [CO-2, L4] **1**

Q.4 Select any personal care product that you use every day and comment on the toxici of chemicals present in it. [CO-3, L2] **2**

PART-B

Q.5 a) Compare LCD and PLASMA display technology. [CO-5, L3] **1**

b) Explain the electrochemical theory of corrosion. [CO-4, L2] **1**

Q.6 a) Mention major chemical changes during composting. [CO-5, L3] **1**

b) Illustrate any five problems caused by non-biodegradable waste. [CO-5, L2] **1**

Q.7 a) Elaborate the traditional and green method of synthesis of adipic acid. [CO-6, L3] **1**

b) Identify the 7 Principles of green chemistry. [CO-6 L2] **1**

End Semester Examination, Dec. 2021

OPEN ELECTIVE – COMMON FOR ALL BRANCHES

CONCEPTS AND FUNDAMENTALS OF NANOMATERIALS (THEORY)

(BCH-OE-002)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.*

Q.1 a) Analyze the role of nanotechnology for improving the outlook of medical patie with serious disease. [CO1] [L

b) How does size change affect the optical properties of nanoparticles? [CO3] [L

c) Write one example of each 0D, 1D, 2D and 3D nanomaterials. [CO2] [L

d) Briefly explain the effect of size on melting point of nanoparticles. [CO3] [L

e) Evaluate the role of nanotechnology in solar cell. [CO5] [L

f) Write any two advantages and disadvantages of AFM. [CO4] [L

g) Highlight the differences between SEM and AFM techniques. [CO4] [L

h) What do you mean by risk assessment of nanoparticles? [CO6] [L

i) Which forms of TiO2 nanoparticles are nontoxic for DNA? [CO6] [L

j) What do you mean by Quantum Dots? [CO5] [L1] **2×1**

PART-A

Q.2 a) Discuss the future applications of nanotechnology in electronics, material scienc and biomedical fields. [CO1] [L3] **1**

b) Summarize the background of nanomaterials year by year. [CO1] [L3] **1**

Q.3 a) How do you classify nanomaterials on the basis of their origin? Explain the properties. [CO2] [L3] **1**

b) Compare nanomaterials on the basis of their compositions. Explore the properties. [CO2] [L3] **1**

Q.4 a) Calculate SVR (surface area to volume ratio) of 30 and 60 nm particles. If the colo of 30 nm particles is blue then what would be the expected colour of 60 n particles explain? [CO3] [L4] **1**

b) Write short notes on following:

i) Quantum confinement.

ii) Specific heat capacity of nanoparticles. [CO-3] [L-2] **5×**

PART-B

Q.5 a) Make a neat diagram of TEM setup and explain its principle and use in analyzin nanostructures.

b) Discuss principle and working conditions of SEM techniques with suitable diagran Write any two advantages and disadvantages of SEM. [CO4] [L3] **1**

Q.6 a) What are the biosensors? Describe its main components, working principle an applications in healthcare? [CO5] [L4] **1**

b) Write short notes on following:

i) Solar and Photovoltaic devices.

ii) Nanoparticles in drug delivery system. **5×**

Q.7 a) Demonstrate various routes of exposure of nanomaterials. How physiochemic properties determinants the toxicity? [CO6] [L3] **1**

b) Explore the five main stages of risk assessment of metal oxid nanoparticles. [CO6] [L3] **1**

End Semester Examination, Dec. 2021

OPEN ELECTIVE - COMMON FOR ALL BRANCHES

USEFUL APPLICATION OF CHEMICAL SCIENCE (BCH-OE-003)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) List two advantages of solid fuel. [CO-1, L-1]

b) Define calorific value. Summarize different units of calorific value. [CO-1, L-2]

c) Differentiate between 'chemisorption' and 'physisorption'. (Two points) [CO-4, L-4]

d) Write down two reactions where value of quantum efficiency is 1. [CO-2, L-1]

e) The glutathione is _____. [CO-5, L-1]

i) Anti-oxidant ii) Anti-depressant iii) Catalyst iv) None of them.

f) _____ catalyze the hydrolysis of fats to fatty acids and glycerol. [CO-5, L-2]

i) Amylase ii) Lipases iii) Protease iv) All of them.

g) Differentiate between 'essential' and 'non-essential' amino acids. (Two points) [CO-4, L-4]

h) Write down two applications of thin layer chromatography. [CO-4, L-3]

i) Enlist toxic effects of mercury and nitrate. [CO-6, L-1]

j) Write down two applications of thermosetting and thermoplastic polymers. [CO-3, L-3]**2x10**

PART-A

Q.2 a) Construct the diagram of Bomb calorimeter and discuss its salient features. [CO-1, L-5]**10**

b) Define 'cracking'. Why catalytic cracking is better technique than thermal cracking? [CO- 1, L-2]**10**

Q.3 a) Discuss first and second law of photochemistry in detail. Interpret Einstein's Law in terms of quantum efficiency. [CO-2, L-2]**10**

b) Construct the Jablonski diagram along with radiative and non-radiative path. [CO-2, L-5]**10**

Q.4 a) Define natural and synthetic polymers. Classify the different kinds of polymers on the basis of molecular force and mode of polymerization. [CO-3, L- 3]**10**

b) Distinguish between polymer blend and polymer alloys along with examples. **10**

PART-B

Q.5 a) Evaluate salient features of gas chromatography. [CO-4, L-5]**10**

b) Analyze the ion exchange chromatography with special emphasis on its advantages and applications. [CO-4, L-4]**10**

Q.6 a) Evaluate the adverse effects of chemicals in air and soil and its control. [CO-5, CO-L5]**10**

b) Define 'toxicity'. Illustrate the toxic effects of water pollution in detail. [CO-5, L3]**10**

Q.7 a) Summarize the general standard for discharge of environmental pollutants in the environment. [CO-6, L4]**10**

b) Examine the toxic effects of heavy metals on human being and environment. [CO-6, L-2]**10**

End Semester Examination, Dec. 2021

B Tech. – Third Semester

DATA STRUCTURES & ALGORITHMS (BCS-DS-301)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.*

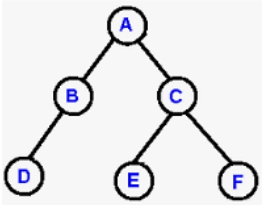
Q.1 Answer the following questions.

a) Differentiate between static and dynamic data structure.

b) Define self-referential structure with its usage.

c) Convert infix expression A+(D*Z/H)^T to postfix notation.

d) Find the in-order pre-order and post-order traversal of following tree.



e) Explain collision in hashing with example. **4X5**

PART A

Q.2 a) Write an algorithm for Binary-search (non-recursive) and also drive its time complexity. [CO4][L6]**10**

b) Write a C program to insert an element to specific location in array of 10 integers. [CO2][L3]**10**

Q.3 a) Design an algorithm to reverse a singliy- linked list; take the necessary assumptions. [CO2][L6]**10**

b) Write a C program to demonstrate deletion operation in a doubly linked list. [CO2][L3]**10**

Q.4 a) Write algorithm to convert expression from infix to postfix using stack. Also write the steps to convert expression ((a*c/d)+p-q) using stack. [CO3][L3]**10**

b) Write a C program to demonstrate various operations in a circular queue. [CO3][L3]**10**

PART B

Q.5 a) Write a C program to demonstrate insertion in a BST with supporting diagram. [CO3][L3]**10**

b) Explain treaded binary tree with its node representation also draw the diagram for understanding. [CO3][L3]**10**

Q.6 a) Define following terms with respect to graph with supporting diagram.

i) Pendent node ii) Euler path iii) Planner graph

iv) Degree of graph v) path matrix. [CO2][L2]**10**

b) Writhe prim's algorithm to find minimum spanning tree. Apply same algorithm on following graph to find MST. [CO2][L2]**10**

Q.7 a) Write a C program to demonstrate Quick sort algorithm for a given list. [CO2][L2]**10**

b) Explain hashing. Describe various hash function with example. [CO6][L2]**10**

End Semester Examination, Dec. 2021

B. Tech. – Third Semester

INTRODUCTION TO IT INFRASTRUCTURE LANDSCAPE (BCS-DS-303)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Define 'RAID'.
b) Relate data mining with data warehouse.
c) Define 'virtual machine'.
d) Differentiate between data warehouse and data mart.
e) Mention the various types of DBMS.
f) Introduce JDBC.
g) Define 'indexes'.
h) Define 'hypervisor'.
i) Compare switches and routers.
j) List the various types of certificates. **2x10**

PART-A

Q.2 a) Create a table of Student data. Apply insertion, deletion and update operations using SQL. [CO4][L-3]**10**

b) Explain JDBC components and architecture. [CO4][L-21]**10**

Q.3 a) Discuss Storage Network technology. Differentiate between SAN and NAS. [CO1][L-4]**10**

b) Write notes on:
i) Switched Fabric. ii) Storage virtualization. [CO1][L-2]**5x2**

Q.4 a) Elaborate virtualization and its benefits. Illustrate the role of hypervisors. [CO5][L-2]**10**

b) Discuss the steps carried out for server deployment and server management. [CO3][L-2]**10**

PART-B

Q.5 a) Categorize the replication topologies in LDAP and explain each. [CO4][L-4]**10**

b) Draw LDAP architecture and explain LDAP protocol. [CO4][L-2]**10**

Q.6 a) Write notes on:
i) Firewalls. ii) Data security. [CO4][L-2]**5x2**

b) Define 'routing'. How different types of routing methods are useful in networking? [CO3][L-2]**10**

Q.7 a) Compare synchronous and asynchronous interaction. Introduce common messaging system. [CO3][L-4]**10**

b) Discuss the role of middleware. Give a detailed description of message oriented middleware. [CO4][L-2]**10**

End Semester Examination, Dec. 2021

B. Tech. – Third Semester

APPLIED STATISTICAL ANALYSIS (BCS-DS-304)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions fro **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against eac question.*

Q.1 Answer the following:

a) How correlation is different from regression technique?
b) Differentiate between 'census' and sampling'.
c) How does linear regression works? Explain.
d) What is Mann-Whitney U test?
e) How Z test is performed? Explain with an example. **4x5**

PART-A

Q.2 a) Explain different steps of research methodology. [CO3][L-2]**1**

b) What do you understand by statistic analysis? Explain different types of statistics. [CO2][L-2]**1**

Q.3 a) Calculate Mean, Median, Mode of the following marks
Student's marks: 65, 80, 90, 5, 10, 15, 40. [CO1][L-3]**1**

b) i) If a student randomly guesses at five multiple choice questions, find th probability that the student gets exactly three correct. Each question has fiv possible choices.
ii) In an urn are 5 blue, 3 red, and 2 yellow marbles. If you draw 3 marbles, wha is the probability that less than 2 will be red if:
a) You draw with replacement?
b) You draw without replacement. [CO1][L-1]**1**

Q.4 a) What is hypothesis testing? Explain null hypothesis? Which test do we use fo small and large sample? Explain them in detail with the help of example. [CO3][L-2]**1**

b) What are sampling errors? Differentiate between 'Type-I' and 'Type-II' error. [CO2][L-2]

PART-B

Q.5 a) Is gender independent of education level? A random sample of 395 people wa surveyed and each person was asked to report the highest education level the obtained. The data that resulted from the survey is summarized in the followin table:

	High School	Bachelors	Masters	Ph.D.	**Total**
Female	60	54	46	41	**201**
Male	40	44	53	57	**194**
Total	**100**	**98**	**99**	**98**	**395**

End Semester Examination, Dec. 2021

B. Tech. – Third Semester

INFORMATION SECURITY FUNDAMENTALS (BCS-DS -305)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Define 'internal audit'. [CO1][L-1]
b) Discuss the data in motion. [CO2][L-1]
c) Define 'authentication'. [CO21][L-1]
d) Discuss the network security. [CO3][L-1]
e) Describe the SAS 70 audits. [CO5][L-1]
f) Explain the vulnerability scanning. [CO5][L-1]
g) Define 'virus'. [CO3][L-1]
h) Discuss the benefits of GRC. [CO6][L-1]
i) Define 'database security'. [CO4][L-1]
j) Define 'sarbanes–oxley'. [CO6][L-1]**2x10**

PART-A

Q.2 a) Define 'information security'. What are issues associated with it? Discuss demming cycle. [CO1][L-1]**10**
b) Define 'CIA'. Discuss the operation security. [CO1][L-1]**10**

Q.3 a) Differentiate the vulnerabilities, threats and risk analysis threats. [CO2][L-4]**10**
b) Define physical security and also discuss categories of physical security controls. [CO2][L-5]**10**

Q.4 a) Discuss the secure network administration principals in details. What are security issues. [CO3][L-2]**10**
b) Explain different types of threats and vulnerabilities. [CO3][L-1]**10**

PART-B

Q.5 a) Discuss the need of O.S. protection control and explain how to harden the O.S. [CO4][L-2]**10**
b) Discuss the secure software development phases. [CO4][L-2]**10**

Q.6 a) Discuss the information security. How this can be implemented? [CO5][L-2]**10**
b) Define the log management. Discuss different sources of log in detail. [CO51][L-1]**10**

Q.7 a) Discuss the tools for GRC. [CO5][L-2]**10**
b) Explain the GRC pillars. [CO5][L-1]**10**

End Semester Examination, Dec. 2021

B. Tech. – Third Semester

INTRODUCTION TO COMPUTER ANIMATION ALGORITHM TOOLS AND TECHNIQUES (BCS-DS-307)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Discuss the use of frame buffer. [CO1][L-1]
b) Differentiate between interactive and non interactive graphics. [CO1][L-2]
c) Illustrate history of typography. [CO2][L-1]
d) Discuss the use of color wheel. [CO3][L-1]
e) Differentiate between back-end and front-end with example. [CO3][L-2]
f) Illustrate the purpose of rotation command in blender. [CO4][L-2]
g) Discuss the minimum system requirements of GIMPS graphics tool. [CO5][L-1]
h) Briefly explain the features of blender graphics tool. [CO61][L-2]**$2^{1/2}$x8**

PART-A

Q.2 a) Differentiate raster scan and random scan system display in detail. [CO1][L-4]**10**
b) Discuss the major application areas of computer graphics. [CO1][L-1]**10**

Q.3 a) Illustrate in detail the anatomy of a typeface and explain the typeface classifications [CO2][L-4]**10**
b) Design a web page using the following style.
i) Heading-1 text should be times new Roman,
ii) Paragraph must be center aligned and text family must be arial and size should be 160%.
iii) Paragraph must be left aligned and text family must be Veranda and color should red. [CO2][L-6]**10**

Q.4 Apply boundary fill and flood fill algorithm for filling the polygon/region. [CO3][L-3]**20**

PART-B

Q.5 a) What do you understand by key frame animation? Define facial animation. Explain various methods by which the facial movements are done. [CO4][L-2]**10**
b) Compare bender with other open source graphics tools. How blender is better than other software justify. [CO4][L-5]**10**

Q.6 a) Discuss the following terms of graphics and animation:
i) Physical based animation. b) Flocking.
iii) Tensor visualization. d) Vector visualization. [CO5][L-2]**5x4**

Q.7 a) Define animation production. Explain various principles of animation in detail. [CO6][L-2]**10**
b) Describe various data representation technique. Explain the best way to represent such data. [CO6][L-2]**10**

End Semester Examination, Dec. 2021

B. Tech – Fifth Semester

BUSINESS ANALYTICS (BCS-DS-308)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions.

a) Discuss the scope of business analytics. [CO1][L-2]
b) Define data science. [CO1][L-2]
c) Define addition law. [CO3][L-2]
d) Discuss the data wrangling. [CO3][L-2]
e) Define 'data mining'. [CO4][L-2]
f) Discuss the Baye's theorem. [CO2][L-2]
g) Define the predictive analytics. [CO5][L-1]
h) Discuss the types of data. [CO5][L-1]
i) Discuss the data visualization. [CO5][L-1]
j) Discuss the data analytics. [CO6][L-1]**2x10**

PART-A

Q.2 a) Explain the business analytics and also explain the scope of business analytics. [CO1][L-2]**10**

b) Discuss the application of business analytics. [CO1][L-2]**10**

Q.3 a) Solve the probability of wrist watches in a box of 100. If 10 watches are selected at random, find the probability that

i) 10 are defective ii) 10 are good
iii) At least one watch is defective iv) at most 3 are defective [CO2][L-4]**10**

b) Discuss the Poisson distribution. [CO2][L-2]**10**

Q.4 a) Discuss the Z-test with the help of diagram. [CO3][L-2]**10**

b) Discuss the tools for data wrangling. [CO3][L-2]**10**

PART-B

Q.5 a) Explain the KDD process. [CO4][L-1]**10**

b) Explain the OLAP process. [CO4][L-1]**10**

Q.6 a) Explain the tools of data visualization. [CO5][L-1]**10**

b) Discuss the non-numeric data. [CO5][L-2]**10**

Q.7 a) Design the frame work of building machine learning. [CO6][L-2]**10**

b) Differentiate between supervised and unsupervised learning. [CO6][L-1]**10**

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

DESIGN AND ANALYSIS OF ALGORITHMS (BCS-DS-501)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer in brief:

a) Write and explain Theta asymptotic notations with graph.
b) Does greedy approach always give optimal solution? Discuss.
c) Sort the following list of no. using insertion sort: 5,2,7,6,1,3,9,8,0,4.
d) Explain 8 queens problem.
e) Explain spurious hit in Rabin Karp algorithm. **4x5**

PART-A

Q.2 a) Differentiate between worst case, average case and best case analysis of an algorithm in detail with the help of suitable example. [CO1][L-2]**10**

b) Solve the following recurrences by Master Theorem if applicable:
T(n)= 3T(n/2) + n2 and T(n)= 2T(n/2) + n log n [CO2][L-3]**10**

Q.3 a) Explain Naive String matching algorithm and apply it on the following string:
TEXT= AABAACAADAABAABAABAA
PATTERN= AABAA [CO3][L-3]**10**

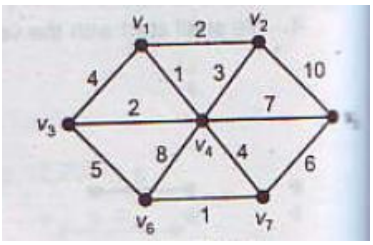
b) Explain finite automata algorithm for pattern searching and apply it to the following string:
TEXT= AAAABCBBBCCCAABCBAABC
PATTERN= ABC [CO3][L-3]**10**

Q.4 a) Explain the algorithm and its time complexity (worst case, average case and best case) to find the minimum and maximum element in an array using minimum comparisons with the help of suitable example. [CO2][L-5]**10**

b) Explain Selection sort algorithm and compare its performance in best, average and worst case. [CO2][L-5]**10**

PART-B

Q.5 a) Explain prim's algorithm and find the minimum spanning tree using Kruskal's algorithm for the following graph. **10**



[CO4][L-3]

b) Explain Knapsack algorithm. Consider a Knapsack instance:
Number of objects n=6
Weights Wi=(15,10,9,5,4,10)
Profits Pi=(1,5,3,4,6,2)
Knapsack capacity m=9
Use Greedy approach to find the solution [CO2][L-2]**10**

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

FORMAL LANGUAGE AND AUTOMATA THEORY (BCS-DS-502)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer in brief:

a) State Post correspondence problem. Explain with an example.
b) Define PDA with its block diagram.
c) Show that the set L={$a^i b^i$ || i>0} is not regular.
d) Show that the grammar S-> a|abSb|aAb, A-> bS|aAAb is ambiguous.
e) State and prove Arden's Theorem. **4x5**

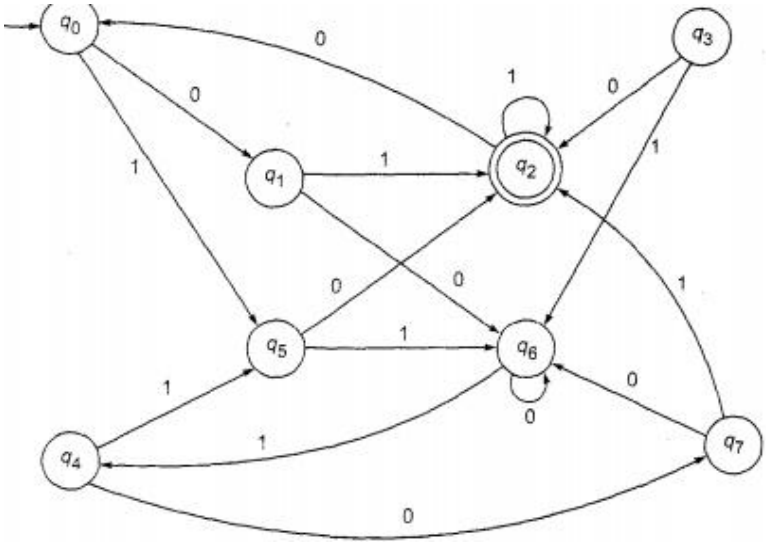
PART-A

Q.2 a) Give Chomsky classification of Grammar and also give the relation between languages and automata. [CO1][L-1]**10**

b) Define Grammar with its tuples. Construct a grammar G such that L(G) = {w € {a,b}* || w has an equal number of a's and b's}. [CO1][L-5]**6**

c) If G = ({S}, {0, 1}, {S→0S1, S→**^**}, S). Find L(G). [CO1][L-4]**4**

Q.3 a) Construct a minimum state automation equivalent to the DFA whose transition table is defined by:



[CO2][L-5]**10**

b) Define Finite state Machine and explain its types with example. Construct a Moore machine equivalent to the Mealy machine M defined by the Table.

Present state	Next state			
	a = 0		a = 1	
	state	output	state	output
→q_1	q_1	1	q_2	0
q_2	q_4	1	q_4	1
q_3	q_2	1	q_3	1
q_4	q_3	0	q_1	1

[CO2][L-5]**10**

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

ARTIFICIAL INTELLIGENCE (BCS-DS-503)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer in brief:

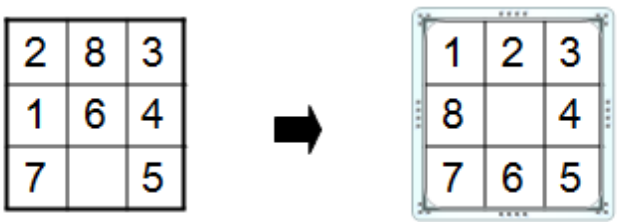
a) List four advantages of AI over natural intelligence.
b) Explain the importance of heuristics in AI.
c) Differentiate between simple hill climbing and steepest ascent hill climbing.
d) What is a Commutative production system?
e) Differentiate between "is-a" and "instance" relationship using suitable examples.
f) Given that P(A)=0.2, P(B)=0.4, P(B|A)=0.5. Find P(A|B).
g) Discuss the challenges of semantic analysis process.
h) Briefly discuss the utility of certainty factor.
i) How over estimation is handled in A* algorithm?
j) Explain the characteristics of abductive reasoning. **2x10**

PART-A

Q.2 a) Discuss the significance of programming language in artificial intelligence. Elaborate the characteristics of any two programming languages used. [CO1][L2]**10**

b) Formulate the state space representation approach for solving the 8-queens problem. [CO1][L3]**10**

Q.3 Apply hill climbing technique to solve the following 8-puzzle problem by defining suitable heuristic function. Write the sequence of steps and all the intermediate states.



[CO2][L3]**20**

Q.4 a) Translate these sentences into formulas in predicate logic:

i) John likes all kinds of food
ii) Apples are food
iii) Chicken is food
iv) Anything anyone eats and isn't killed by is food
v) Bill eats peanuts and is still alive
vi) Sue eats everything Bill eats. [CO3][L3]**10**

b) Define 'knowledge'. Explain how a semantic network is used to represent knowledge? Draw the semantic network for the statement: John gave book to Marry. [CO3][L2]**10**

PART-B

Q.5 a) Illustrate the limitations of monotonic reasoning systems. Also, state the importance of Fuzzy-based systems. [CO3][L1]**10**

b) The following table presents the number of patients with pancreatic cancer having a certain symptom per 100,000 people.

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

CLOUD COMPUTING ARCHITECTURE AND DEPLOYMENT MODEL (BCS-DS-527)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer in brief:

a) Illustrate an example why an organization is moving towards a cloud.

b) Differentiate the terms self configuration and self optimization in terms of autonomic computing.

c) Give some example of PAAS vendor.

d) Differentiate between integrated lifecycle platform and anchored lifecycle platform.

e) Differentiate between distributed computing and parallel computing in terms of Cloud.

f) State and Justify: Is Netflix is an example of SAAS or PAAS.

g) Differentiate between the Windows OS and Linux OS. Can an openstack be installed on Windows OS?

h) Name any two Virtual Machine Monitor Platforms.

i) Discuss the role of CMDB (Configuration Management Database) in anatomy of Cloud.

j) Discuss multi-tenancy in terms of cloud computing environment. **2x10**

PART-A

Q.2 a) Discuss the scenario. If an organization is planning to transform their infrastructure to cloud through three stages of evolution. **10**

b) Discuss the cloud delivery service model of cloud computing. **10**

Q.3 a) Differentiate between the characteristics of IAAS and PAAS services. **10**

b) Discuss the PAAS architecture in cloud computing environment. **10**

Q.4 a) Differentiate between CCRA and CCRA2.0, as a cloud computing architecture. **10**

b) Discuss the different actors of NIST cloud computing architecture model. **10**

PART-B

Q.5 a) Differentiate between the advantages and disadvantages of public cloud and private cloud. **14**

b) Discuss the role of SLA between cloud provider and cloud consumer. **6**

Q.6 a) Discuss the journey into hybrid cloud implementation. **10**

b) Discuss the challenges faced while implementing hybrid cloud. **10**

Q.7 a) Discuss the openstack architecture in detail. **10**

b) Differentiate between openstack and devstack in terms of cloud implementation. **10**

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

BUSINESS STRATEGY AND ANALYTICS (BCS-DS-528)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer in brief:

a) Difference between strategic management with strategic planning.
b) Define a Corporate strategy.
c) Differentiate between department mission and vision.
d) Give an example of a good strategic objective.
e) How to perform an internal audit in the business and why it has been carried out?
f) Differentiate between liquidation and divestment.
g) Illustrate the need of good balanced scorecard for an organization.
h) Explain Input KPI with the help of an example.
i) Diagrammatically explain analytics metrics lifecycle.
j) Write the characteristics of a well-designed dashboard. **2x10**

PART-A

Q.2 a) Explain strategic management framework with the help of a diagram. **10**
b) Design a SWOT matrix by taking a suitable business example. **10**

Q.3 a) Determine the need of cross functional collaboration planning. **10**
b) Explain the key elements of a strategic business plan. **10**

Q.4 a) Explain life cycle of KPI with diagram. **8**
b) Determine the need of performance measures. Explain the common ways of selecting performance measures. **12**

PART-B

Q.5 a) Categorize the reports required for monitoring of KPIs by taking suitable examples. **10**
b) Explain steps in identification of KPIs. **10**

Q.6 a) Define 'metrics'. Explain the guidelines for choosing metrics. **6**
b) Diagrammatically explain balance score card strategy implementation. **14**

Q.7 a) Explain different types of dashboards with suitable examples. **10**
b) Discuss the rules for designing a dashboard. **10**

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

MACHINE LEARNING (BCS-DS-602)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions fro* ***PART-A*** *and **TWO** questions from **PART-B**. Marks are indicated against eac question.*

Q.1 Answer the following:

a) 80% of people those who purchase pet insurance are women. If the owners of pet insurance are randomly selected, then find the probability that exactly 6 out c them are women.

b) Differentiate between feature selection and feature extraction.

c) Write down the conditions for binomial distribution.

d) Explain quantitative variables with the help of an example.

e) Explain significance of ROC curve.

f) List down the methods of parameter optimization in neural network.

g) Give the example of cognitive modeling.

h) Explain significance of k fold cross validation.

i) Compare classification techniques with clustering techniques.

j) When do we use supervised learning techniques? **2x1**

PART-A

Q.2 a) The local authorities in a certain city install 10000 electric lamps in the streets c the city. If these lamps have an average life of 1,000 burning hours with standard deviation of 200 hours, assuming normality, what number of lamps migh be expected to fail.

i) In the first 800 burning hours.

ii) Between 800 and 1200 burning hours? (use value 0.34134) [CO2][L-3]

b) Evaluate the mean, mode and median for the following data:

Class	0-10	10-20	20-30	30-40	40-50	Total
Frequency	8	16	36	34	6	100

[CO2][L-5]**1**

Q.3 a) Write down various graph based techniques supported by deep learning mode with the help of example. [CO1][L-2]**10**

b) Given data = {2, 3, 4, 5, 6, 7 ; 1, 5, 3, 6, 7, 8}.Compute the principal componen using PCA Algorithm. [CO1][L-3]**1**

Q.4 a) The values of independent variable x and dependent value y are given below:

X	Y
0	2
1	3
2	5
3	4
4	6

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

SECURITY IN CLOUD (BCS-DS-701)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.*

Q.1 Answer the following:

a) Differentiate between program threat and system threat. [CO1][L2]

b) Differentiate between single tenant and multiple tenant in a cloud environment. [CO1][L2]

c) Differentiate between risk and threat. [CO2][L2]

d) Discuss the concept of cloud account hijacking. [CO2][L2]

e) Differentiate between federated identity management and isolated identity management. [CO6][L2]

f) Difference between encryption and decryption. [CO5][L2]

g) Discuss some core-technology vulnerability in cloud security. [CO1][L2]

h) Differentiate between 'TSL' and 'SSL'. [CO5][L2]

i) Discuss the role of one time password in security system of banking. [CO1][L2]

j) Discuss the steps how to secure data center for DOS attack. [CO1][L2]**2x10**

PART-A

Q.2 a) Describe how an operating system authenticates its users? [CO1][L2]**10**

b) Explain the factors that contribute to a data centre security. [CO2][L2]**10**

Q.3 a) Discuss any four security concerns with the virtualized systems. [CO3][L2]**10**

b) Discuss, how multi-tenant environment can be secured in cloud computing. [CO3][L2]**10**

Q.4 a) Discuss the AAA workflow when a client attempts to gain access to the network. [CO3][L2]**10**

b) Give atleast five differences of authentication an authorization. [CO3][L2]**10**

PART-B

Q.5 a) State the challenges faced by IAM in the cloud. [CO6][L2]**10**

b) Explain the benefits of identity Management. [CO6][L2]**10**

Q.6 a) Differentiate between digital signatures and digital certificates on the basis of any five parameters. [CO5][L2]**10**

b) Give atleast five differences of symmetric and asymmetric encryption. [CO5][L2]**10**

Q.7 Discuss the steps of SSL authentication (server – client) with a suitable diagram. [CO4][L2]**20**

End Semester Examination, Dec. 2021

B. Tech. — Seventh Semester

3D COMPLEXITY TECHNIQUES FOR GRAPHICS MODELING AND ANIMATION (BCS-DS-704)

Time: 3 hrs. Max Marks: **10**

No. of pages: .

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions fro **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each questio*

Q.1 Answer the following:

a) What is phi phenomenon?
b) There are how many basic principles of 3D animation? Explain them.
c) What gives objects and characters the illusion of moving within the laws of physics Discuss.
d) Why Storyboard is useful?
e) Discuss the main reason to use sculpting tools.
f) Is Extrude is used to duplicate properties of objects? Discuss.
g) Identify a container that has either a shader-texture-etc.
h) What do we call the basic shapes (spheres-cubes-cylinders) that act as buildi blocks to create a project? Why are they called so?
i) Identify image or colour that wraps around the model.
j) Describe the main reason to use sculpting tools. **2×1**

PART-A

Q.2 a) Discuss the role of digital media in the entertainment industry. [CO1][L-2]**1**
b) List various reading visuals and describe how do we read visuals. [CO1][L-1]**1**

Q.3 a) Compare between the following terms:
i) Production and production gates.
ii) Graphics and printing. [CO2][L-5]**1**
b) Create a visual communication design to promote your LAN Gaming Event in yo college. Also explain all the details. [CO3][L-6]**1**

Q.4 a) Outline the steps to create animation phase-1, phase-2 and phase-3 with the help a simple example. [CO3][L-4]**1**
b) Differentiate between 2D animation and 3D animation. Categorize different types animation as 2D or 3D. [CO2][L-2]**1**

PART-B

Q.5 a) Explain the steps to create animation in phase 3 in detail. [CO4][L-2]**1**
b) Explain 'rigging'. Also discuss rigging syntax and rigging workflow . [CO4][L-2]**1**

Q.6 a) Explain the terms: Shading, Texturing and Materialization. Also discuss the steps f creating animation with Blender. [CO5][L-2]**1**
b) Illustrate the purpose of Object Physics, Rendering and Compositing in Blender. [CO5][L-4]**1**

Q.7 Write short notes on:

a) Real Time Animation.
b) Virtual Studio Work.
c) Stereoscopic 3D.
d) Time Rendering. [CO6][L-1]**5×**

End Semester Examination, Dec. 2021

B. Tech. — Seventh Semester

SOCIAL, WEB AND MOBILE ANALYTICS (BCS-DS-705)

Time: 3 hrs. Max Marks: **10**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions fro **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each questio*

Q.1 Answer the following:

a) What is the role of community managers in social media?

b) Explain different drill-down capabilities of a dashboard.

c) How sentiments analysis is done on social media?

d) How campaign optimization is implemented? Explain.

e) What do you mean by Referrer tracking? How behavior of a specific user is tracked through this? **4×**

PART-A

Q.2 a) What are the different analytics platforms used for social media and web analytics? [CO1][L-1]**1**

b) What is the impact of social media on business? How social media can be used f better services? [CO1][L-1]**1**

Q.3 a) Explain different tactics to find out best web and social media metrics. [CO2][L-1]**1**

b) What is metrics? How does a standard metric differs from a critical web metrics? [CO2][L-2]**1**

Q.4 a) How social media strategy can be optimized? Explain in detail. [CO3][L-2]**1**

b) How social media content creation process works? And how it can be tracked? [CO3][L-2]**1**

PART-B

Q.5 a) What is Mobile analytics? Explain its need. And how is it different from we analytics? [CO4][L-4]**1**

b) Explain the need of WAP gateway with GGSN support. [CO4][L-2]**1**

Q.6 a) How mobile applications, contents and handsets are categorized? Explain the facto that impact the categorization. [CO6][L-2]**1**

b) What is a multi-channel campaign optimization? What are the challenges involved in it? [CO6][L-2]**1**

Q.7 a) What do you mean by data recording timeframe and data archiving time fram Explain with a comparison chart. [CO5][L-6]**1**

b) What do you mean by cold callers report? Why and how is it generated? [CO5][L-5]**1**

End Semester Examination, Dec. 2021

B. Tech. — Seventh Semester

SIMULATION AND MODELING (BCS-DS-721)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Explain the different characteristics of a queuing system. [CO2][L-1]

b) Enumerate any four terms related to managing stocks in a shopping mall. [CO1][L-2]

c) Why a number series is called a pseudo random number series? [CO3][L-2]

d) The classes in a tuitions class happens between 3:40 PM-7:30 PM daily. What kind of probability distribution can be used to simulate the arrival of students and their learning? [CO5][L-3]

e) Why an entrepreneur look towards simulation? List down the steps in simulation study. [CO2][L-2]

f) List the factors to be considered before the selection of simulation package/software. [CO1][L-4]

g) Differentiate between verification and validation in simulation and modeling. [CO3][L-4]

h) Any simulation can be termed as terminating or non-terminating depending on the objective of simulation. Explain with the help of a suitable example. [CO3][L-4]

i) Enumerate the input parameters to be considered in the simulation of the water reservoir system. [CO5][L-4]

j) Define 'multivariate analysis'. Explain its two methods in detail.[CO2][L-2]**2x10**

PART A

Q.2 a) A team of software developers have been asked to develop an online portal for online pizza booking and delivery. What kind of queuing system exists in this system? What all factors need to be taken care of while designing the software for parallel booking, so that it is never overstressed? [CO4][L-4]**10**

b) A vendor provides a software to simulate inventory management. How can you analyze the efficiency and applicability of this software? [CO3][L-1]**10**

Q.3 a) Explain any one method to generate random number, which follow a probability distribution defined by a function. [CO1][L-1]**10**

b) In a game, there is a requirement to generate random number sequence. Provide any two methods to generate the same. [CO1][L-2]**10**

Q.4 Write a short note on: frequency test, run test and auto correlation test. [CO4][L-1]**20**

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

DISTRIBUTED OPERATING SYSTEMS (BCS-DS-726)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Describe the role of group communication.
b) Discuss clock synchronization in DOS.
c) Explain the working of Ostrich algorithm.
d) What is release consistency? Compare eager release and lazy release consistency.
e) Explain different goals of MACH. **4x5**

PART-A

Q.2 a) Enumerate are the pros and cons of distributed systems. Also discuss the design issues of distributed systems in detail. **10**

b) What is asynchronous transfer mode (ATM)? Elaborate ATM reference model with functions of its each layer. **10**

Q.3 a) Why do we need atomic transactions? Explain primitives and properties of atomic transactions. **8**

b) How mutual exclusion in distributed system is handled? Explain its implementation also. **12**

Q.4 a) What do you mean by a fault tolerance? Explain different types of system failures. **10**

b) What are the different models which are used to organize different processors in a distributed system? **10**

PART-B

Q.5 a) Describe file system in distributed system. How can one implement semantics of file sharing in a distributed file system? **10**

b) Summarize how the client cache is being handled in a distributed file system? **10**

Q.6 a) What do you mean by page based distributed shared memory? Explain the methods that can improve the performance of shared memory. **10**

b) Discuss the following issues in context of page-based distributed shared memory:
i) Granularity. ii) Finding the copies. **10**

Q.7 a) Interpret how process management is achieved in MACH. Also state the various primitives used by the process management. **15**

b) Explain memory management in Mach. **5**

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

DATA SCIENCE (BCS-DS-727)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.*

Q.1 *Answer the following questions:*

a) List any two applications of NLP. [CO1][L
b) Explain recasting operation in data frames. [CO1][L
c) Define 'optimization'. [CO1][L
d) Define linear regression and how does it work? [CO2][L
e) Discuss the role of cross validation. [CO2][L
f) Outline the need of clustering. [CO1][L
g) Explain Gradient descent algorithm. [CO2][L
h) Write a R program to extract specific column from a data frame using column nam [CO5][L
i) Write a R program to count number of values in a range in a given vector. [CO5][L
j) Define Random variable. [CO2][L

2x1

PART-A

Q.2 a) Discuss data science life cycle with the help of suitable example. [CO1][L2
b) Create a data frame with 10 observations and 3 variables and add new rows ar columns to it using 'rbind' and 'cbind' function. [CO1][L3
c) Illustrate data visualization in R using scatter plot, bar plot and line plot. [CO1][L4]**1**

Q.3 a) Determine if the given system of equations has either unlimited number of solutio or no solutions. If there is an unlimited number of the solutions, find one of them?
8x + 8y -3z=2
3x – y + z=7
X – 11y + 6z=-13 [CO2][L5]**1**
b) Demonstrate the process of 'Hypothesis Testing'. [CO2][L3]**1**

Q.4 a) Illustrate multivariate optimization process. Apply multivariate optimizatio technique to solve the optimal solution.
Problem: min $x_1^2 - 2x_1x_2 + 4x_2^2$ [CO3][L6]**1**
b) Categorize and explain multivariate optimization in different categories. [CO3][L4]**1**

PART-B

Q.5 a) Illustrate the process of building linear regression model. [CO4][L3]**1**
b) Discuss first level model assessment for linear regression. [CO4][L2]**1**

Q.6 a) Compare and contrast between 'logistic regression' and 'linear regression'.[CO5][L4
b) Illustrate the steps to perform logistic regression. Also explain different performan measures used for evaluating logistic regression. [CO6][L3]**1**

Q.7 a) Design the mechanism to perform K-means clustering. Also discuss the need f clustering. [CO6][L5]**1**
b) Write R-code to implement and explain the steps on K-Nearest Neighbors algorithm.[CO5

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

ADVANCED GAME PROGRAMMING (BCS-DS-729)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Write truth table for the Boolean operators OR and NOT.
b) Identify the characteristics which make an individual a great programmer.
c) Explain the significance of asymptotic notation.
d) Compare synchronous function parallel model with asynchronous function parallel model.
e) What does the following statement representing? k=*ret(ar)
f) Explain rendering pipeline with the help of an example.
g) Describe Z-buffer.
h) State Snell's Law.
i) Name any two post handling impacts of computer games in present day.
j) Explain focal point flare. **2x10**

PART-A

Q.2 a) Build a flowchart and algorithm for finding whether the number is Armstrong or Not. **10**

b) Explain two different ways to find the algorithm efficiency with the help of examples. **10**

Q.3 a) Compare different parameter passing techniques with the help of suitable examples. **10**

b) Illustrate different types of game loop models. Also explain why game loop is important in the games. **10**

Q.4 a) Differentiate between 'low dynamic range colors' and 'high dynamic range colors'. **8**

b) Write any two different ray tracing techniques in detail. **8**

c) Define 'quaternion rotations'. **4**

PART-B

Q.5 a) Discuss about the following mappings:

i) Displacement mapping.
ii) Light mapping.
iii) Particle frameworks.
iv) Reflection mapping.
v) Shadow mapping. **2x5**

b) Analyze the following picture formats:

i) BMP
ii) JPG
iii) PNG **2x3**

c) Explain Bilinear separating in brief. **4**

End Semester Examination, Dec. 2021

B. Tech. – Seven Semester

INTRODUCTION TO IOT (CC) (BCS-DS-731)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions:

a) Discuss various security issues in IoT.
b) Explain M2M service connection procedure based on TLS-PSK.
c) Elaborate IoT security framework.
d) What do you understand by wearable devices?
e) Illustrate the statement smart objects as building blocks of IoT.
f) Elaborate the features of RF-wireless sensor node.
g) Enlist different security threats for IoT.
h) Explain functions of RFID.
i) Describe distance vector routing protocols.
j) Illustrate different IoT network configurations. **2x10**

PART-A

Q.2 a) Explain the process of IoT application development with suitable diagrams. **10**
b) Describe the layered architecture of IoT systems in detail. **10**

Q.3 a) Discuss Next-Generation Kiosks self-service technology in detail. **10**
b) Summarize main components of hardware and software design of IoT system with diagrams. **10**

Q.4 a) Write a short note on 'IoT sensors'. **10**
b) Compare and contrast between USIM card and SIM card. **10**

PART-B

Q.5 a) Explain different software platforms available for M2M applications. **10**
b) Describe all the procedures to perform secure booting. Also mention its advantages and drawbacks. **10**

Q.6 a) Compare and contrast between the specifications of 3G and 4G communication technologies. **10**
b) Draw block diagram of a basic IoT device. Explain its major components in detail. **10**

Q.7 a) Design a framework of RFID application in healthcare. **10**
b) Identify various challenges faced in IoT connectivity. Also discuss the ways to manage these challenges. **10**

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

IT NETWORK SECURITY (BCS-DS-733)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question*

Q.1 Answer the following:

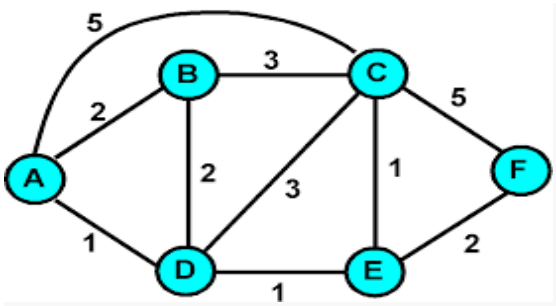
a) Determine the use of DHCPOFFER.
b) Summarize the functions of a network layer.
c) Define 'SNA'.
d) Evaluate the process of recursive resolution in DHCP.
e) Discuss the need of IPX/SPX OSI protocols.
f) List the functions of AAL layer.
g) Discuss SLIP protocol.
h) Describe use of S- frame.
i) List out features of HSSI.
j) Discuss the process of reservation merging. **2x10**

PART-A

Q.2 a) Define TCP/IP network model in detail. [CO1][L-1]**10**

b) Categorize wireless LAN. Also explain packet format in brief. [CO1][L-3]**10**

Q.3 a) Design the routing table according to RIP for the under-mentioned example:



[CO2][L-6]**10**

b) Elaborate Domain Name System in detail. [CO2][L-3]**10**

Q.4 a) Differentiate between router and gateway and their importance in a network in detail. [CO3][L-2]**10**

b) Explain the working of firewall. Determine types of firewall. [CO3][L-3]**10**

PART-B

Q.5 a) Create a network supporting flow based QOS using ISDN. What type of flow specifications need to define? Explain RSVP protocol. [CO4][L-6]**10**

b) Elaborate SMDS architecture. Define ISSI, SIP and DXI. [CO4][L-3]**10**

Q.6 a) Give benefits of IBM Netview Automation. List the capabilities of Netview tool. [CO5][L-2]**10**

b) Briefly explain the network management via HPOpenView. [CO5][L-2]**10**

Q.7 For which aim, penetration testing is done on given network? What will be deliverable? Present your views for using a tool which is always recommended. Discuss any two ways for penetration testing. [CO6][L-5]**20**

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

IT APPLICATION SECURITY (BCS-DS-529)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer in brief:

a) What is "Buffer overflow attack"? [CO1][L1]
b) How would an HTTP program handle state? [CO2][L2]
c) How to defend against multiple login attempts? [CO1][L1]
d) How can you defend against phishing attempts? [CO2][L2]
e) Which protocol should be implemented on a login page? [CO3][L3]
f) What is port scanning? [CO3][L3]
g) Mention some factors that can cause vulnerabilities. [CO4][L1]
h) What is file enumeration? [CO4][L1]
i) What is Intrusion Detection? [CO5][L2]
j) Name the two standard techniques used to protect a password file. [CO6][L2] **2x10**

PART-A

Q.2 a) Explain SQL injection and ways to mitigate the attack. [CO1][L1] **10**

b) When bogus reconfiguration commands are used, to affect routers and switches, to degrade network performance", which type of Wireless network threat would you classify this under? Specify its mitigation. [CO1][L2] **10**

Q.3 a) What is the process of breaking a password protected system or server, by simply and automatically entering every word in a dictionary as a password? What are the other ways of breaking the password? [CO2][L3] **10**

b) Illustrate factors that can cause vulnerabilities. [CO2][L3] **10**

Q.4 a) Illustrate the parameters that define an SSL session connection. Justify the importance of each. [CO3][L4] **10**

b) How does Man-In-The-Middle-Attack work? How it can be prevented? [CO3][L1] **10**

PART-B

Q.5 a) How can one deploy cryptography? How can it be used to secure the confidential information and data of an organization? [CO4][L3] **10**

b) Compare public-key cryptography and a private key for encrypting and signing content. [CO4][L4] **10**

Q.6 a) Design the best practices for hardware in an IT audit checklist. [CO5][L6] **10**

b) How Do You Prevent HTTP Interception? [CO5][L5] **10**

Q.7 a) What are the security vulnerabilities that an IT audit can identify? [CO6][L2] **10**

b) Are access privileges in an organization granted adequately? Design methods used to protect the data. [CO6][L6] **10**

End Semester Examination, Dec. 2021

OPEN ELECTIVE – COMMON FOR ALL BRANCHES

CYBER SECURITY (BCS-OE-003)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions fro **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) How sneakers are different from script kidders? [CO-2][L-
b) How can browser be secured from any intrusion? [CO-3][L-
c) Write down the measures, taken to protect from cyber-crime. [CO-1][L-
d) Differentiate bid, shielding and shill bidding auction frauds. [CO-1][L-
e) Differentiate between class-full and classless IP addressing. [CO-3][L-
f) Discuss "Network utilities". [CO-3][L-
g) List various Malwares. [CO-3][L-
h) Discuss "Secure browser settings". [CO-2][L-
i) What is crisis management? [CO-3][L-
j) Explain forensics in cyber security. [CO-2][L-4] **2×1**

PART-A

Q.2 a) What is meant by networking? Explain the network architecture. [CO-1][L-1] **1**
b) Convert IP address 172.16.2017 into binary and also write its class. [CO-1][L-2] **1**

Q.3 Write short notes on the following:

a) Session hijacking. [CO-2][L-4] **1**
b) Viruses, worms and malware. [CO-2][L-3] **1**

Q.4 a) Explain importance of information and its security. [CO-3][L-2] **1**
b) Explain denial of service attack and DNS poisoning with proper example. [CO-3][L-3] **1**

PART-B

Q.5 Explain the following terms in detail:

a) Active scanning techniques. [CO-4][L-4] **1**
b) Passive scanning techniques. [CO-4][L-2] **1**

Q.6 a) Explain Phishing and its types. How one can protect himself from it? [CO-5][L-3] **1**
b) Explain auction fraud and its types in detail. [CO-5][L-2] **1**

Q.7 a) Explain general guidelines for forensics in detail. [CO-6][L-4] **1**
b) Explain the procedure of finding evidence on the computer system. [CO-6][L-5] **1**

End Semester Examination, Dec. 2021

B. Tech. - Third Semester

ELECTRONIC DEVICES (BEC-DS-301)

Time: 3 hr. Max Marks: 1

No. of page

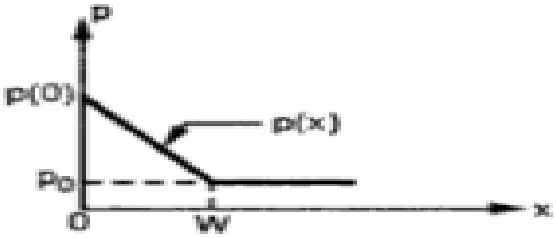
Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions f*
*__PART-A__ and **TWO** questions from **PART-B**. Marks are indicated against each questior*

Q.1 Answer the following:

a) Describe switching time of PN Diode. [CO1][
b) Give reason of selecting Silicon over Germanium. [CO1][
c) Distinguish, transition and space charge capacitance of diode. [CO2][
d) Define dark current in photodiode. [CO2][
e) The pinch off voltage for a n – channel JFET is 4 V, when VGS = 1 V, the pinch –
occursfor VDS equal to _____. [CO4][
f) Justify why one terminal of transistor is made common between input and output?
[CO3][
g) Define α and β of a transistor and derive the relationship between them. [CO1][
h) Differentiate bipolar junction transistor over field effect transistor. [CO4][
i) Give reason to use DC power supply in electronic circuits. [CO5][
j) Draw the pin configuration for 3 terminal IC regulators. [CO5][L-5]**2x**

PART-A

Q.2 a) The hole concentration in semiconductor specimen shown in the figure. De
expression and sketch hole current density when no external potential is applied.



[CO1][L-

b) Explain physically the meaning of the following statement: An electron and a h
recombine and disappear. [CO1][L-
c) Restate and derive Hall Effect. Also write its application. [CO1][L-

Q.3 a) The current flowing in PN junction diode at room temperature is $2x10^{-7}$ amp, whe
large reverse biased voltage is applied. Evaluate the current flowing when 0.1vo
applied. (Given V_T = 26mV at room temperature) [CO2][L-5

OR

b) Derive PN diode current equation. [CO2][L-
c) Explain the following – Tunnel diode and LED. [CO2][L-

Q.4 a) A full wave centre tapped rectifier uses diode 1N4002 each having forward resista
of 25ohm. The value of secondary value fed between centre tap to each enc

End Semester Examination, Dec. 2021

B. Tech. – Third Semester

DIGITAL ELECTRONICS (BEC-DS-302)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following in brief:

a) Convert the following into minterms:
   i) A'B+CD+ A'B'C ii) ABC+C'D'+AB'C [CO2][L-4]
b) List various advantages of digital signals. [CO1][L-2]
c) Write the BCD and excess-3 code for $(62)_{10.}$ [CO2][L-1]
d) Convert the following hexadecimal number $(4BA5.F)_{16}$ into its equivalent for the following:
   i) Binary ii) Decimal iii) Octal number[CO2][L-1
e) Discuss with an example showing positive and negative logic systems. [CO2][L-2]
f) Design OR gate using NOR gate. [CO2][L-6]
g) Differentiate between decoder and demultiplexer. [CO2][L-2]
h) Design half sub tractor circuit using ROM. [CO2][L-6]
i) Differentiate between barrel shifter and normal shifter. [CO3][L-2]
j) Define resolution (step size) & % resolution of a D/A converter. [CO4][L-1]**2x10**

PART-A

Q.2 a) Prove that
   i) $(A+\overline{B}+\overline{C})\,(A+\overline{B}\overline{C}) = A+\overline{B}\overline{C}$ ii) $AB+A\overline{B}+\overline{A}B = A+B$ [CO2][L-3]**8**
b) The seven bit hamming code is received as 0010001. Assume that even parity has been used, check whether it is correct or not. If not, find the correct code. [CO2][L-2]**5**
c) Subtract the following decimal numbers using 1's complement:
   i) 22 from 45 ii) 16 from 10 [CO2][L-3]**7**

Q.3 a) Minimize the following function using K-map & QM method:
   F(A,B,C,D)= ∑m(0,2,3,8,9,11)+d(5,14) [CO2][L-4]**10**
b) Design full adder using i) ROM ii) PAL iii) PLA. [CO2][L-6]**10**

Q.4 a) Design the following using 4:1 Multiplexer.
   F(A,B,C,D)= ∑m(1,3,5, 6) [CO2][L-6]**6**
b) Design BCD-7 segment decoder using gates. Mention its applications.[CO2][L-6]**14**

PART-B

Q.5 a) Convert the following flip flop:
   i) SR to JK ii) D to T [CO3][L-4]**4**
b) Design synchronous Decade counter using:
   i) T Flip Flop ii) SR Flip Flop [CO3][L-6]**6**

End Semester Examination, Dec. 2021

B. Tech. - Third Semester

BASIC ELECTRONICS (BEC-DS-312)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions.

a) Differentiate between emitter, base and collector.
b) List the applications of LEDs.
c) The voltage gain of an amplifier without feedback is 3000.calculate the voltage gain of the amplifier if the negative feedback is introduced in the circuit. Given that feedback fraction =0.01.
d) Describe silicon controlled rectifiers.
e) What is the role of rectifier?
f) Distinguish between BJT and FET.
g) Define conductor, insulator and semiconductor with energy band diagram.
h) Tabulate difference between centre-tap and bridge type full wave rectifier.
i) Draw the block diagram of an oscillator.
j) Define CMRR and slew rate in op-amps. **2x10**

PART-A

Q.2 a) Illustrate the V-I characteristic of PN junction diode along with its working and construction. [CO1][L-3]**10**

b) Discuss breakdown mechanism in zener diode with its operation and applications. [CO1][L-2]**10**

Q 3 a) Draw input and output characteristics of common emitter configuration of a PNP transistor and explain in detail. [CO1][L-2]**12**

b) Classify various types of amplifiers. [CO3][L-3]**8**

Q.4 a) Demonstrate the working of field effect transistors. [CO2][L-2]**12**

b) Illustrate the working principle of LEDs. [CO1][L-3]**8**

PART-B

Q.5 a) Derive the relationship between A and ß coefficients of feedback in amplifiers. [CO4][L-6]**10**

b) What is the role of an Oscillator? Discuss RC phase shift oscillator in detail. [CO5][L-2]**10**

Q.6 a) Describe the construction and configuration of op-amps IC-741. [CO5][L-2]**10**

b) Analyze the characteristics of ideal op-amps. [CO5][L-4]**10**

Q.7 Write short notes on:

a) Types of oscillators
b) Advantages of negative feedback
c) Concept of virtual ground.
d) Various topologies in feedbacks [CO4,5][L-2]**5x4**

End Semester Examination, Dec 2021

B. Tech. – Fifth Semester

ELECTRONIC FUNDAMENTALS (BEC-DS-315)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions.

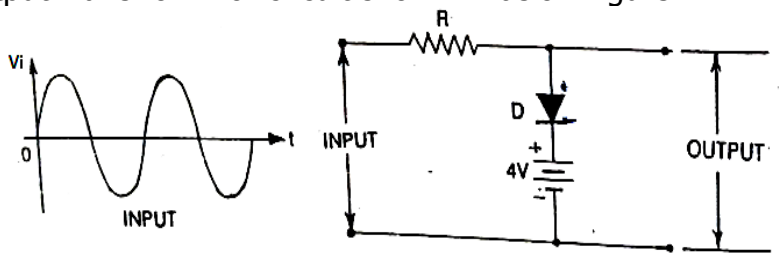
a) Silicon and Germanium are preferred to other semiconductors, why?
b) It is said that an ideal diode acts like an electronic switch, why?
c) Why LEDs are not made of silicon or germanium?
d) The operating point should lie preferably at the centre of the load line, why?
e) Define α and β of a transistor and derive the relationship between them.
f) What do you mean by race around condition? How it can be removed?
g) Draw the circuit diagram of astable multivibrator.
h) Evaluate CMRR if differential gain is 10^6 and common mode gain is 10^5.
i) Justify reason of using 3-RC network in RC Phase shift oscillator.
j) Write Barkhausen criteria of oscillation. **2x10**

PART-A

Q.2 a) What do you understand by an 'ideal diode'? Draw its V-I characteristics. Explain its switching action. [CO1][L-2]**10**

b) Draw the circuit diagram of bridge rectifier. How it is different from centre-tap full-wave rectifier. [CO1][L-3]**10**

Q.3 a) Show output wave form for circuit shown in below figure.



[CO1][L-3]**10**

b) Illustrate the working Principle of Photodiode. [CO1][L-4]**10**

Q.4 a) Illustrate the typical CB Input characteristic curves for an npn transistor. Label all variables. Explain how will you calculate the input resistance of the transistor from these curves? [CO2][L-3]**10**

b) What do you mean by faithful amplification? Determine the conditions to be fulfilled to achieve faithful amplification in a transistor. [CO2][L-3]**10**

PART-B

Q.5 a) Draw the circuit for a single-ended class-A amplifier. Explain its working. Derive expression for efficiency of class A amplifier. Show that its maximum value is 50%. [CO4][L-3]**10**

End Semester Examination, Dec. 2021

B. Tech. – Third Semester

DIGITAL ELECTRONICS AND CIRCUITS (BEC-DS-322)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 a) Describe the need of digital signals and their applications. [CO1][L-1]

b) Why NAND and NOR are known as Universal Gates? Justify your answer with suitable circuit realizations. [CO1][L-1]

c) Comparethe functioning of decoder and demultiplexer. [CO2][L-2]

d) Perform the following using BCD addition:
$(18)_{10} + (5)_{10}$ [CO1][L-1]

e) Categorize Programmable Logic Devices in terms of their programmable connections, cost, complexity, types of Boolean functions. [CO2][L-2]

f) Discuss the need of analog to digital conversion and digital to analog conversion in real world applications with the help of necessary block diagrams. [CO4][L-2]

g) Enlist various applications of shift registers and counters. [CO6][L-1]

h) Highlight the significance of Totem Pole configuration of bipolar logic families.

i) A parallel in – parallel out shift register can be used to introduce delay in digital signal transmission. Is this statement true or false, comment? [CO5][L-1]

j) In JK- flip flop, J=K=1 causes the occurrence of race around condition. Illustrate all the possible remedies to remove this condition. [CO3][L-2]**2x10**

PART-A

Q.2 a) Four bit message 1101 is required to be encrypted and transmitted. Formulate even parity hamming codefor transmission. [CO1][L-3]**6**

b) Implement XOR and XNOR gates using only NAND gates.Evaluate their Boolean expressions also. [CO1][L-3,4]**6**

c) Represent hexadecimal number $(C8.F)_{16}$ and Octal number $(37)_8$ in binary form using:
i) Binary code ii) Gray code [CO1][L-2]**8**
iii) BCD code iv) Excess-3 code

Q.3 a) Minimize the following functions using K-maps and realize the Boolean expression using logic gates: [CO2][L-3]**10**
i) $f(A,B,C,D) = \Sigma m(1,3,7,11,15) + d(0,2,5)$
ii) $f(A,B,C,D) = \pi M(0,1,3,5,6,7,14) + d(10,15)$

b) Design and realize the circuit of 4-bit Binary to Gray code converter.[CO2][L-6

Q.4 a) Compare and analyze the operation of following circuits/devices with the help of examples:
i) Combinational and sequential circuits.
ii) Latch and flip flop.
iii) Edge triggered and level-triggered sequential devices.
iv) Asynchronous and synchronous sequential devices. [CO3][L-4]**10**

b) Describe the operation of a positive edge triggered SR flip flop. How it can be converted into SR-flip flop? Assess the truth table to figure out the improvements that JK-flip flop possesses over SR- flip flop. [CO3][L-3,5]**10**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

DIGITAL SIGNAL PROCESSING (BEC-DS-501)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 a) Plot the signals i) y (n) = -u (-n-1) ii) y (n)=u(-n+1) [CO1][L-2]

b) Determine the z-transform of the sequence given by

$$x(n) = \begin{cases} 2^n, n < 0 \\ \left(\frac{1}{2}\right)^n, n = 0, 2, 4 \\ \left(\frac{1}{3}\right)^n, n = 1, 3, 5 \end{cases}$$

[CO2][L2]

c) Calculate DTFT of $e^{j\Omega_0 n}$.

d) State and prove symmetry & periodicity property of phase factor Wn. [CO3][L1]

e) What do you mean by truncation and rounding off error? [CO1][L1]

f) What is frequency warping? Derive the relation between ω and Ω. [CO5][L5]

g) Explain Chebyshev Filters. [CO5][L2]

h) Write down mapping formula for approx. of derivative method for designing of IIR filter. Convert H(S)=1/S+2 into digital filter using approx. of derivative method with T=1sec. [CO5] [L-2]

i) A signal x(n)= $\begin{cases} a^n & n \geq 0 \\ 0 & otherwise \end{cases}$ [CO1][L2]

Obtain interpolated signal with a factor of 3.

j) Check for linearity and time invariance:

y(n)= $x^2(n)$ [CO1][L2]**2x10**

PART-A

Q.2 a) Determine $x(n), if\ x(z) = \dfrac{z+2}{2z^2 - 7z + 3}$ when ROC is given as

i) $|z| > 3$ ii) $|z| < \frac{1}{2}$ [CO2][L4]**12**

b) Find the Z-transform and ROC of $x(n) = n^2 u(n)$. [CO2][L3]**8**

Q.3 a) Use a four point DFT and IDFT to determine the circular convolution of the following sequences: $x_1(n)$ = (1, 2, 3, 1)

$x_2(n)$ = (4, 3, 2, 2 [CO3][L4]**10**

b) Find out 8-point DFT of the following sequence using DIT-FFT algorithm:

x(n) = (-1, 0, 2, 0, -4, 0, 2, 0) [CO3][L3]**10**

Q.4 a) Explain Fourier series method for designing of FIR filter. [CO4][L4]**10**

b) A filter is to be designed with following desired frequency response $H_d\left(e^{j\omega}\right) = \begin{cases} 0 & , -\pi/4 \leq \omega \leq \pi/4 \\ e^{-j2\omega} & , \pi/4 < |\omega| < \pi \end{cases}$

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

VLSI TECHNOLOGY AND CIRCUITS (BEC-DS-502)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1
a) List the advantages of Ion Beam Lithography. [CO1][L-1]
b) Why are ICs more reliable than discrete circuits? [CO2][L-2]
c) Why annealing is used in IC fabrication? [CO3][L-2]
d) Describe VLSI design flow. [CO1][L-3]
e) Define 'EGS'. [CO2][L-2]
f) Define 'figure of merit in MOS'. [CO1][L-1]
g) Discuss the effects of scaling in MOS. [CO4][L-2]
h) Draw the characteristics of P-type Enhancement MOSFET. [CO5][L-2]
i) What do you understand by channel length modulation? [CO4][L-2]
j) How MOSFET can be operated as a switch? [CO4][L-3]**2x10**

PART-A

Q.2
a) Define the Moore's law. Draw and Explain the VLSI design flow? [CO1][L-1]**10**
b) Describe the evolution of integrated circuit technology. [CO1][L-2]**10**

Q.3
a) What are different oxidation techniques for growing oxide layer? Explain any one in detail. [CO2][L-2]**10**
b) Discuss various methods of single crystal growth for silicon. [CO2][L-4]**5**
c) Mention in detail various types of diffusion process. How it is different from ion implantation. [CO2][L-4]**5**

Q.4
a) State and interpret the term Lithography. Describe the steps followed for electron beam lithographic process; also discuss the advantages and disadvantages of electron beam lithographic. [CO2][L-2]**10**
b) Elaborate in the detail the Fabrication process of CMOS. [CO3][L-4]**10**

PART-B

Q.5
a) Elaborate in detail the reactive plasma etching method. [CO4][L-2]**10**
b) Describe any one technique for doing the process of metallization in detail. [CO4][L-2]**10**

Q.6
a) Derive the expression for transconductance and output conductance of MOSFET? [CO5][L-6]**10**
b) Classify different types of MOSFET. Draw the construction and working of N- type depletion MOSFET. [CO1][L-5]**10**

Q.7
a) Design the following gates with the help of CMOS technology.
   i) NAND
   ii) EXOR
   iii) EXNOR
   iv) NOR [CO4][L-6]**10**
b) Design a circuit for the equation given below using CMOS and draw its stick diagram. $\overline{(A+B)*C}$ [CO5][L-6]**5**
c) Draw and explain the I-V characteristics of CMOS inverter. [CO5][L-4]**5**

End Semester Examination Dec. 2021

B. Tech. - Fifth Semester

ANTENNAS - (BEC-DS-503)

Time-3 hrs Max Marks: **10**

No. of Pages.

*Note: Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions fro **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each questio*

Q.1 a) Why does a single linearly polarized antenna receive only half of the flux densi available at its aperture produced from an unpolarized radio astronomical source?

b) Why the majority of antenna measurements operate in the far-field range?

c) The field produced by a subjected antenna is twice that produced by an isotrop antenna.

d) Why is a short antenna likely to be less efficient than one which is quarter wav length long or half-wavelength long?

e) If the minor lobes of a radiation pattern remain constant as the beamwidth of th main lobe approaches zero, show that the directivity of the antenna approaches constant value.

f) At what distance from the dipole is the induction field equal to the radiation field?

g) Show that the refractive index of the ionosphere is less than one whereas that the un-ionized medium is one.

h) Why is it often required to change the frequency of transmission in short-wa broadcasting?

i) What is the condition on phase for the end-fire array with increased directivity?

j) Is the isotropic and Omni-directional radiator same or different? Draw the require radiation pattern for justification. [CO1,3][L-3]**2x1**

PART-A

Q.2 a) Show that the directivity of a small loop antenna is 3/2. [CO3][L-3

b) Design binomially the pattern multiplication of 8 point isotropic source havi separation of each element by λ/2. [CO3][L-2]**1**

c) Calculate D (θ, φ), the directivity for the unidirectional source with following pow pattern. $U(\theta, \varphi) = U_m \sin\theta \sin^2\varphi$ where $0^o \le \theta \le 180^o$, $0^o \le \varphi \le$ [CO3][L-3

Q.3 a) A radio link has a 15W transmitter connected to an antenna of $2.5m^2$ effecti aperture of 5GHz. The receiving antenna has an effective aperture of $0.5m^2$ and located at a 15Km line-of-sight distance from the transmitting antenna. Assumi lossless, matched antennas, find the power delivered to the receiver. [CO2][L-5

b) Explain the following of the parabolic reflector and folded dipole antennas **1**

(i) Basic properties

(ii) structure

(iii) modes

(iv) radiation

(v) Applications [CO3][L-

c) Describe the slotted line technique for impedance measurement. [CO5][L-1

Q.4 a) An antenna has a radiation resistance of 70ohms and is fed with a sinusoidal curre of amplitude 4A rms. The power transmitted in the direction of maximum radiatio is 1.6times that from an omni-directional antenna radiating the same total powe

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

INTRODUCTION TO MEMS (BEC-DS-513)

Time:3 hr Max Marks: 1

No. of page

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions f*
*__PART-A__ and **TWO** questions from **PART-B**. Marks are indicated against each questior*

Q.1 Answer the following:

a) Define MEMS with its MEOMS technology.
b) State applications of micro-gyroscopes.
c) Explain the working principle of photo resist.
d) Distinguish between dry and wet oxidation.
e) What do you understand by wafer bonding?
f) Compare the properties of Gallium arsenide with Silica compounds.
g) Differentiate between 'Active' and 'passive' substrate materials.
h) Describe the process of ion implantation.
i) Summarize chemical and plasma etching.
j) Discuss micro actuation with shape memory alloy. **2x**

PART-A

Q.2 a) Describe in detail the working principle, applications and advantages of microsystems. [CO1][L-2

b) Differentiate between Microsystems and Microelectronics. [CO1][L-

Q.3 a) Illustrate the process of packaging materials in MEMS. [CO2][L-3

b) Classify various silicon compounds that are used as a substrate material" for ME devices. [CO2][L-

Q.4 a) Analyze the CVD process to be utilized during fabrication of micro system. [CO3][L-4

b) Demonstrate the working and salient features of Photolithography. [CO3][L-2

PART-B

Q.5 a) Describe the function of:

i) Acoustic sensors.
ii) Optical sensors. [CO4][L-2]5

b) Categorize various types of Pressure sensors. [CO4][L-2]

Q.6 a) Illustrate the working of micro-pumps and Micro grippers with a neat sketch. [CO4][L-3

b) Paraphrase in detail actuation using thermal forces effect. [CO4][L-2

Q.7 a) Demonstrate the principle of nanofabrication and summarize the applications of na products. [CO5][L-2

b) Conclude various challenges in Nano-scale engineering along with social impac Nano scale Engineering. [CO5][L-5

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

DIGITAL DESIGN USING VERILOG (BEC-DS-514)

Time:3 hr Max Marks: 1

No. of page

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions f*
*__PART-A__ and **TWO** questions from **PART-B**. Marks are indicated against each questior*

Q.1 Answer the following questions:

a) Why Verilog is the most-commonly used HDL? [CO1][
b) Define the stimulus block. [CO3][
c) What do you mean by instance? [CO3][
d) Write the syntax for port declaration. [CO1][
e) Bring out the difference between $display and $monitor. [CO1][
f) Classify the various modeling used in Verilog. [CO4][
g) List all the gate primitives of Verilog. [CO3][
h) Differentiate the logical and bitwise operator. [CO4][
i) List the types of operators used in Verilog. [CO4][
j) What do you mean by sensitivity list? [CO3][L-2]**2**

PART-A

Q.2 a) What are the key differences between Verilog and VHDL? Explain in detail. [CO1][L-

b) Draw and explain the typical HDL-based design flow with a neat flowchart. [CO2][L-4

Q.3 a) How we can call the instance explain all the methods using syntax? [CO3][L-

b) What is stimulus? Explain Design block and stimulus block with suitable example. [CO3][L-2

Q.4 a) How to define the port list for a module and declare it in verilog for 4 bit full adder [CO3][L-

b) Explain different types of Lexical conventions. [CO1][L-2

PART-B

Q.5 a) Design a 4:1 Multiplexer using gate level modeling. [CO4][L-6

b) Explain rise time, fall time and turn off delays in gate level design using an exam also draw waveform for simulation. [CO1][L-2

Q.6 a) Explain assignment delay with waveform for continuous assignment statement. [CO5][L-2,

b) Design a 1 bit comparator using data flow style of modeling. [CO4][L-6

Q.7 a) Explain the initial and always statements in detail. [CO5][L-

b) Design a 1 to 4 Demux using behavioral style of modeling. [CO4][L-6

End Semester Examination, Dec. 2021

B. Tech. - Seventh Semester

SATELLITE COMMUNICATIION (BEC-DS-715)

Time: 3 hrs. Max Marks: 1

No. of page

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions f* ***PART-A*** *and **TWO** questions from **PART-B**. Marks are indicated against each questior*

Q.1 Answer the following questions:

a) Define the terms- Ascending and Descending Nodes

b) Distinguish between pre-assigned and demand assigned traffic related to a sate communication network

c) State Kepler's law of planetary motion .

d) Calculate the EIRP of a satellite downlink which at 12Ghz operates with a trans power of 6W and an antenna gain of 50.2db.

e) Differentiate between analog and digital satellite communication. Mention merits demerits of each

f) Summarize the advantages of FM on satellite communication

g) Differentiate between active and passive satellites .

h) Discuss the role of look angles in satellite communication

i) A satellite in an elliptical orbit has an apogee of 30,000km and a perigee of 1000k Determine the semi-major axis of the elliptical orbit .

j) In a satellite link , thermal noise in an earth station results in a ratio of 25db. A sig is received from a transponder with a carrier to noise ratio of 20db. Find the valu overall (C/N)0 at the earth station. **2x**

PART-A

Q.2 a) Describe the block diagram of satellite communication system and explain each bl in detail. [CO1][L-2

b) Classify the various Frequency bands used in satellite communication. [CO1][L-

Q.3 a) The farthest and the closest points in a satellite's elliptical eccentric orbit from ear surface are 30,000km and 200km respectively .Determine the apogee, the peri and the orbit eccentricity .Assume radius of Earth to be 6370km. [CO2][L-

b) Discuss the various orbital elements which are required to specify the location satellite in its elliptic orbit around the Earth. [CO2][L-2

Q.4 a) Derive the general Link design Equation for satellite communication. Find out expression for C/N and G/T ratios. [CO3][L-5

b) What is System Noise temperature? How does it effect the C/N and G/T ratio. [CO3][L-2

PART-B

Q.5 a) Derive the expression of Signal–to–noise ratio and C/N ratio in Frequency modula considering satellite link. [CO3][L-5

b) Describe the various elements of digital satellite communication system. [CO3][L-

Q.6 a) Justify, Why TDM is the only option for digital satellite link and why Inter-modula products are not present in TDM? [CO4][L-3

b) Analyze demand assignment Multiple access techniques (DAMA). [CO4][L-

Q.7 Write short notes on ***(any four):***

a) GPS b) VSAT c) Laser Satellite Communication d) Earth Sensing Satellite

e) SARSAT [CO5][L-2]5

End Semester Examination, Dec. 2021

OPEN ELECTIVE - COMMON FOR ALL BRANCHES

SOLAR TECHNOLOGY (BEC-OE-003)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) An energy of 200Wh is consumed in 1 hour. Evaluate is consumed power. (BEC-OE-003.1)(L-2)

b) List three energy sources that are considered to be inexhaustible. (BEC-OE-003.1) (L-1)

c) State MPPT. (BEC-OE-003.3) (L-2)

d) Define principle of solar cell with pictorial diagram. (BEC-OE-003.2) (L-1)

e) Identify fault detection steps in PV module. (BEC-OE-003.2) (L-2)

f) Explain types of charge controllers. (BEC-OE-003.3) (L-2)

g) Input DC power of an inverter is 500 W. Output AC power efficiency of is 250 W. Calculate the efficiency of the inverter. (BEC-OE-003.4) (L-3)

h) State components of grid connected solar PV system. (BEC-OE-003.4) (L-2)

i) Define role of tachometer in solar setup design. (BEC-OE-003.5) (L-1)

j) State safety taken in installation of solar PV systems. (BEC-OE-003.5) (L-3)

2x10

PART-A

Q.2 a) Differentiate between 'renewable' and 'non renewable' energy sources. (BEC-OE-003.1)(L-2)**12**

b) A solar cell having Fill Factor 60% gives 2.5 A current at maximum power point at STC. The cellgives 3A short circuit current and 0.5V open circuit voltage. What is the voltage at maximum power point of the solar cell? (BEC-OE-003.1)(L-3)**8**

Q.3 a) Write a note on 'solar PV module array connections series, parallel, series parallel'. (BEC-OE-003.2) (L-2)**12**

b) Calculate the number of modules to be connected in series to obtain the open circuit voltage of the array as 40 V and / or maximum power point voltage of 32 V. The modules available for connection are having the following parameters.Voc=20 V, Vm = 16V, Isc = 4A and Im= 3A. (BEC-OE-003.2)(L-3)**8**

Q.4 a) Explain all types of power converter in detail. (BEC-OE-003.3)(L-2)**10**

b) Evaluate Factors Affecting Electricity and its implication in country development in 250 words. (BEC-OE-003.3)(L-2)**10**

PART-B

Q.5 a) Describe types of solar PV systems. Explain hybrid and standalone PV system in details. (BEC-OE-003.4)(L-2)**12**

b) For a DC to DC converter as shown in fig. below, a battery of 25 V is connected and the input current is 4 A. At the output side, a voltmeter shows 50 V across the load and the output current is 1.8 A.

End Semester Examination, Dec 2021
B.Tech – Third Semester
ELECTRICAL MACHINES-1 (BEE-DS-302)

Time: 3 hrs. Max Marks: 100
No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.*

Q.1 Answer the following questions.
- a) Define magneto motive force.
- b) What is lap winding?
- c) What are functions of a commutator?
- d) Give armature circuit equation for a DC motor.
- e) Draw speed torque curve for DC shunt motor.
- f) Name different losses in a transformer.
- g) How are polarities of a transformer determined?
- h) Give advantages of autotransformer.
- i) What are the uses of tap changing transformer?
- j) What are the effects of using permanent magnets in motor? **2X10**

PART A

Q2 a) Draw and explain B-H curve formed by continuous magnetization and demagnetization. [CO1][L1]**10**

b) Derive an expression for the energy stored in a magnetic field. [CO1][L3]**10**

Q.3 a) Analyze the effect of armature flux on the main field flux of a DC machine. [CO2][L3]**10**

b) A DC generator has an armature emf of 100 V when flux per pole is 20 mWb, and the speed is 800 rpm. Calculate the generated emf i) with the same flux and a speed of 1000 rpm, ii) with a flux per pole of 24 mWband speed of 900 rpm. [CO2][L6]**10**

Q.4 a) Explain speed control of DC shunts motor using armature voltage control. [CO3][L2]**10**

b) A 8 pole DC shunt generator has 778 wave connected armature conductors running at 500 rpm, supplies a load of 12.5 Ω resistance at a terminal voltage of 250 V. Armature resistence is 0.24 Ω and field resistance is 250 Ω. Find the armature current, induced emf and flux per pole. [CO3][L5]**10**

PART B

Q.5 a) Draw and explain equivalent circuit of a transformer. [CO4][L2]**10**

b) Explain how iron losses are determined in a transformer. [CO4][L2]**10**

Q.6 a) Explain the construction and working of an autotransformer. [CO4][L2]**10**

b) Explain tap changing of transformers and analyze on load and off load tap changing. [CO4][L4]**10**

Q.7 Write short notes on **(any two):**
- a) Permanent magnet Brushless DC motor
- b) Reluctance motor
- c) Stepper motor [CO5][L2]**20**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

POWER ELECTRONICS (BEE-DS-501)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1
a) Define 'Latching current'. [CO1][L-1]
b) Why heat sink is required with a thyristor? [CO1][L-2]
c) What are the effects of firing angle on converter? [CO3][L-2]
d) What is duty cycle? [CO5][L-1]
e) What are the types of inverter? [CO4][L-1,2]
f) Define 'dual converter'.
g) What are the different operation regions of the SCR? [CO1][L-1]
h) Why thyristor is considered as charge controlled device? [CO3][L-3]
i) What is hard switching of the Thyristor? [CO1][L-1,2]
j) What are the advantages of freewheeling diode in rectifier circuit? [CO3][L-2]**2x10**

PART-A

Q.2
a) What is power MOSFET? What are the types of power MOSFET? Write the difference between general purpose MOSFET and power MOSFET? [CO1][L-1,3]**10**
b) Draw the V-I characteristics of SCR and explain. [CO1][L-1,2]**10**

Q.3
a) Draw the circuit diagram of a single – phase full wave-controlled rectifier using centre tap transformer with R load and find dc output voltage. [CO2][L-1,2]**10**
b) A single phase fully controlled bridge converter with RL load is supplied from 220 V, 50 Hz ac supply. If the firing angle is 45 degree, determine:
   i) average output voltage, ii) output current iii) input power factor. [CO5][L-5]**10**

Q.4
a) With the help of a neat circuit diagram and associated waveforms, discuss the operation of Buck-Boost converter. [CO3][L-1,2]**10**
b) For Type A chopper Dc source voltage = 230V, load resistance=10 ohms. Assume voltage drop of 2V across chopper in on condition. For a duty cycle of 0.4, calculate
   i) average and rms values of voltage ii) Chopper efficiency. [CO5][L-5]**10**

PART-B

Q.5
a) Explain the operating principle of dc chopper with a suitable diagram. Draw the voltage and current waveforms of chopper. Derive expressions for average output voltage and rms output voltage. [CO3][L-2,5]**10**
b) Explain the different control strategies in DC-DC circuits? [CO-3] [L-2] **10**

Q.6
a) Explain the working of a 1-phase full bridge inverter with RL load. Draw the relevant output waveforms. [CO4][L-2,4]**10**
b) Explain any two modulation techniques available for voltage control of a single-phase inverter. [CO4][L-1,2]**10**

Q.7
a) Discuss in detail about the functioning of three phase voltage source inverter in 120 degree operating mode. [CO4][L-4]**10**
b) With the help of a neat circuit diagram and waveforms, explain the operation of 3-phase bridge inverter with R load. [CO4][L-4]**10**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

CONTROL SYSTEM (BEE-DS-502)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.*

Q.1 Answer the following questions:

a) When will the system is said to be linear? [CO1][L-2]

b) Compare open loop system and closed loop system. [CO1][L-4]

c) What is the need for signal flow graph? [CO2][L-2]

d) List time domain specifications. [CO3][L-1,2

e) Differentiate between type and order of the system. [CO3][L-4]

f) How the system is classified on the basis of damping? [CO3][L-1,2

g) What is the effect of PI controller on the system performance? [CO4][L-5]

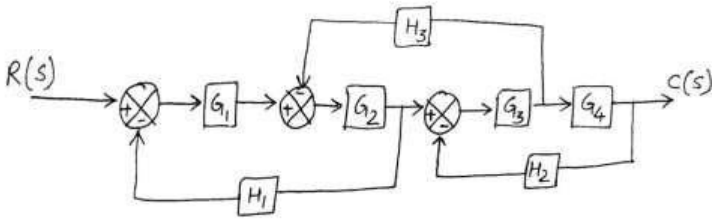
h) Explain significance of corner frequency. [CO2][L-2]

i) The addition of a pole will make a system more stable. Justify your answer. [CO4][L-5]

j) Why do we use lag compensator? [CO4][L-2] **2x1**

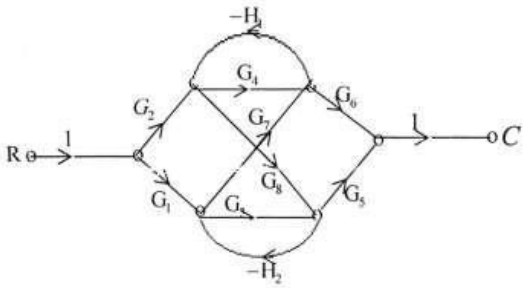
PART-A

Q.2 a) Determine the transfer function $C(s)/R(s)$ from the block diagram:



[CO1][L-5]**1**

b) Obtain the overall transfer function of the signal flow graph, shown below in figur using Mason's gain formula.



[CO1][L-5]**1**

Q.3 a) What are position, velocity and acceleration error constants? Find the value steady state error with unit step and unit ramp input for type 0, 1 and 2 systems? [CO3][L-2,3]**1**

b) Derive an expression for rise time and peak overshoot for second order syste subjected to unit step input. [CO3][L-2,3]**1**

Q.4 a) The characteristic equation of a feedback control system is:

$s^4 + 20s^3 + 15s^2 + 2s + K$

i) Determine the range of K for the system to be stable.

ii) Can the system be marginally stable? If so, find the value of K and frequency sustained oscillation. [CO2][L-4,5]**1**

P.T.O

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

MEASUREMENTS AND INSTRUMENTATION (BEE-DS-523)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1
a) List the advantages and disadvantages of temperature transducer. [CO1][L1]
b) Differentiate thermistor and thermocouple transducer? [CO1][L2]
c) Define terms EMG and EEG, also mention the electrodes used for these biomedical applications. [CO2][L1]
d) What is the purpose of delay line in CRO? [CO3][L2]
e) Draw any two Lissajous patterns. [CO3][L1]
f) Quote different types of distortion. [CO3][L2]
g) Outline the use of the mixer in the analyzer scheme. [CO3][L1]
h) Name the components of time base circuit. [CO4][L1]
i) Classify different types of digital multimeters according to their usage. [CO5][L2]
j) Estimate the resolution of a 7* (1/2) digits display. [CO5][L1] **2x10**

PART-A

Q.2
a) Derive the expression for gauge factor of a strain gauge. [CO1][L5] **10**
b) Explain the operating principle of linear variable differential transformer based upon the position of core. [CO1][L2] **10**

Q.3
a) Draw and explain the block diagram of EEG measurement. [CO2][L4] **10**
b) Discuss the leading system used in ECG monitoring. [CO2][L2] **10**

Q.4 Draw the block diagram of general purpose CRO and explain the functions of the following:
a) Horizontal and vertical amplifiers.
b) Deflection system.
c) X-Y mode of operation.
d) Time base Generator. [CO3][L4] **5x4**

PART-B

Q.5
a) Describe the characteristics and terminology associated with distortion analyzer. [CO3][L2] **10**
b) Analyze the working of Voltage Controlled Oscillator (VCO) with example. [CO3][L4] **10**

Q.6
a) Describe the concept of data acquisition system (DAS) with its applications. [CO4][L4] **10**
b) What is PLL IC 565? Draw its pin diagram and also discuss its applications. [CO5][L2] **10**

Q.7
a) Draw and discuss each block for the measurement of frequency. [CO4][L2] **10**
b) Explain universal counter with its block diagram. [CO5][L4] **10**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

POWER SYSTEM PROTECTION (BEE-DS-525)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) State the types of faults in power system.

b) Define the following terms as related to protective relaying:
   i) Pick-up current ii) Reset value

c) How relays are connected in the power system?

d) Why is speed of protection so important?

e) Define 'aliasing'.

f) What are the hazards of having the CT secondary open-circuited?

g) Why is the setting of earth fault relays kept low as compared to that of phase fault relays?

h) List out the advantages and disadvantages of EMT.

i) How does a PMU work?

j) Why is a power system divided into a number of protective zones and why do adjacent zones overlap? **2x10**

PART-A

Q.2 a) Review in detail power system protection scheme as used for protection of various equipments. **10**

b) Explain the role of instrument transformers in power system protection. **10**

Q.3 a) Sketch the different inverse-time characteristics of over current relays and mention how the characteristics can be achieved in practice for an electromagnetic relay? **10**

b) A three phase 50 MVA, 11 kV generator is subjected to the various faults and the currents so obtained in each fault are: 2000 A for a three phase fault; 1800 A for a line-to-line fault and 2200 A for a line-to-ground fault. Find the sequence impedances of the generator. **10**

Q.4 Explain with sketches their R-X diagrams for any two types of distance relays:

a) Impedance relay.

b) Mho relay.

c) Reactance relay. **20**

PART-B

Q.5 a) How DFT is used for estimation of PMU in power system? **10**

b) Describe the effects of aliasing. How these can be minimized? **10**

Q.6 a) Discuss modeling of current transformer as required for simulation and analysis. **10**

b) Describe any three types of testing done on protective relays. **10**

Q.7 a) Explain guide lines for setting out-of-step tripping relay. **6**

b) Analyzing the two system area, explain power swing and distance relaying perspective of power swings. **14**

End Semester Examination, Dec 2021

B.TECH – Seventh Semester

WIND AND SOLAR ENERGY SYSTEM (BEE-DS-724)

Time: 3 hrs | Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.*

Q.1
a) List the major wind farms in India with their current capacity.
b) Enumerate the advantages of using wind Energy.
c) Determine the need of braking system in wind turbines
d) Why Anemometer are used in the Wind Energy System?
e) Compare fixed speed and variable speed wind Turbine Generators?
f) Enumerate the parameters that affect actual generation from PV modules?
g) What is meant by hour angle
h) Elaborate the concept of Duty ratio.
i) State principle of solar thermo-electric converters.
(j) Outline the challenges and remedies associated in the use of solar energy **2x10**

PART-A

Q.2
a) Discuss the operating characteristics of wind turbine. **10**
b) Determine the Mathematical Expression Governing Wind Power. **10**

Q.3
a) Enumerate the different Components of wind Turbine **10**
b) Analyze the operation of Doubly Fed Induction Generator used in Wind Energy system when fed to the grid. **10**

Q.4
a) Determine the expression of Solar flux reaching Earth's surface. Also analyze the expression for Solar azimuth angle. **10**
b) Enumerate the instruments used for measurement of Solar Flux observation. **10**

PART-B

Q.5
a) Develop the mathematical model of PV Cells and Discuss I-V & PV Characteristics of Solar Cells. **10**
b) What is meant by meant by maximum power point tracking. Discuss the of Perturb & Observe algorithm for maximum power point Tracking. **10**

Q.6
a) Analyse the block diagram of grid connected PV systems and discuss how power condition is done **10**
b) Deliberate the power quality issues encountered in solar and wind power generation **10**

Q.7
a) Discuss the operation and types of flat plate collectors. **10**
b) Enumerate the concept of Solar ponds used for collecting solar energy. **10**

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

ROBOTICS AND AUTOMATION (BEE-DS-726)

Time: 3 hrs | Max Marks: **10**

No. of pages.

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q. 1 Answer the following questions:

a) State two advantages of automation. [CO1][L-
b) What is hard automation? [CO1][L-
c) List any two automation strategies involved in production. [CO2][L-
d) Name the components of manufacturing system. [CO3][L-
e) Describe a prismatic joint. [CO3][L-
f) What is repeatability referred to robots. [CO3][L-
g) Compare revolving joint and twisting joint. [CO3][L-
h) What do you mean by work volume of a robot? [CO3][L-
i) Name any two tactile sensors used in robot. [CO4][L-
j) What are the basic components of a feedback control system? [CO5][L-2]**2x1**

PART A

Q. 2 a) Explain the principles of automation in detail. [CO1][L-3]**1**
b) Differentiate between 'flexible' and 'programmable' automation. [CO1][L-3]**1**

Q. 3 a) Explain the different layouts of flexible manufacturing system. [CO2][L-2] **1**
b) Discuss how automation improves profit in a manufacturing industry. [CO1][L-3] **1**

Q.4 a) Explain the different types of mechanical gripper in detail. [CO3][L-2] **1**
b) Describe the different configuration of robots in detail. [CO3][L-2]**1**

PART B

Q.5 a) Explain P, PI and PID Controller used in Industry in detail. [CO5][L-3]**1**
b) Write a short note on 'resolvers and encoders'. [CO4][L-2]**1**

Q.6 a) Differentiate between 'pneumatic' and 'hydraulic' actuators. [CO5][L-3] **1**
b) Explain the different robot mechanisms and transmission systems in detail. [CO3][L-2]**1**

Q.7 a) Compare the types of locomotion in mobile robots. [CO4][L-2]**1**
b) Explain the different types of sensors used in robots in detail. [CO4][L-2]**1**

End Semester Examination, Dec. 2021

OPEN ELECTIVE – COMMON FOR ALL BRANCHES

HYBRID VEHICLES (BEE-OE-001)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Deliberate the advantages of electric cars.
b) Differentiate between 'IC engine-based vehicle' and 'electric vehicles'.
c) List different types of motors used in EV's.
d) What are the factors considered for selecting electric motors in EV?
e) Enumerate the types of DC motors.
f) Briefly discuss the concept of single phase inverters.
g) List the applications of power converters.
h) What are the different types of batteries used in EV?
i) Write full form of MOSFET.
j) Enumerate the components of charging station. **2x10**

PART-A

Q.2 a) What were the major reasons for the development of electric and hybrid electric vehicles? [CO1][L-1]**10**

b) Draw the block diagram and discuss the major components of hybrid electric Vehicle. [CO1][L-2]**10**

Q.3 a) Discuss four modes of operation of a typical hybrid vehicle. [CO2][L-2]**10**

b) Describe the working of fuel cell based electric vehicle. [CO2][L-2]**10**

Q.4 a) Explain working principle of DC motor. [CO3][L-2]**10**

b) Analyze the Operation of 3-phase induction motor. [CO3][L-2]**10**

PART-B

Q.5 a) Discuss the operation of single phase voltage source inverters. Support the answer with appropriate waveform. [CO4][L-3]**10**

b) Analyse the working of step up chopper and determine the expression of the load. [CO4][L-3]**10**

Q.6 List different types of batteries used for energy storage in EV. Describe the Working principle and applications of Lithium-ion batteries alongwith list its advantages and disadvantages. [CO5][L-2]**20**

Q.7 a) Discuss the factors considered while selection and sizing of charging stations. [CO5][L-2]**10**

b) Enlist the types of charging stations and discuss the features of each. [CO5][L-2]**10**

End Semester Examination, Dec. 2021

OPEN ELECTIVE – COMMON FOR ALL BRANCHES

ROBOTICS AND ITS APPLICATIONS [BEE-OE-002]

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions fro **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions:

a) What is the difference between manipulator and a robot? [CO-1][L-
b) What are the advantages of robots? [CO-1][L-
c) Differentiate between accuracy and repeatability. [CO-2][L-
d) Name different types of joints. [CO-2][L-
e) What is the need of providing more number of sensors in a robot? [CO-3][L-
f) What is meant by sensor noise? [CO-3][L-
g) What is meant by robot workspace? [CO-4][L-
h) Classify different types of errors in robot localization. [CO-5][L-
i) How computer vision improves the capability of robot? [CO-6][L-
j) What are the advantages of using toy robots? [CO-6][L-1] **2×1**

PART-A

Q.2 a) Explain the different characteristics which make a robot intelligent. [CO-1][L-1] **1**
b) Classify the robots as per configuration. [CO-1][L-2] **1**

Q.3 a) Explain the different methods of gripping used by robots. [CO-2][L-1] **1**
b) Explain different types of mechanical grippers. [CO-2][L-1] **1**

Q.4 a) Compare hydraulic and pneumatic drive system. [CO-3][L-3] **1**
b) Explain any two non-tactile sensors. [CO-3][L-1] **1**

PART-B

Q.5 a) Compare legged and wheeled locomotion system in a mobile robot. [CO-4][L-3] **1**
b) State and explain different kinematic pairs. [CO-4][L-2] **1**

Q.6 a) What are different sources of errors in localization? [CO-5][L-1] **1**
b) Draw and explain the architecture for map/localization based navigation. [CO-5][L-3] **1**

Q.7 Explain the applications of robots in healthcare sector and industrial sector. [CO-6][L-2] **2**

End Semester Examination, Dec. 2021

OPEN ELECTIVE – COMMON FOR ALL BRANCHES

AUTOMATION IN INDUSTRY (BEE-OE-003)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Specify the role of rack or chassis in PLC system. [CO3][L-1,2]
b) Explain difference between fixed and modular PLCs. [CO3][L-2]
c) Give examples of I/P and output connected to PLCs. [CO1][L-1]
d) List various steps in scan cycle of PLC. [CO3][L-1]
e) Difference between SCADA and HMI. [CO1][L-1,2]
f) What are the different types of sensors? [CO2][L-1]
g) What are advantages of DCS? [CO3][L-1]
h) Classify various types of industrial robots. [CO4][L-1,2]
i) What is the different programming languages used in PLC? [CO3][L-1,2]
j) Name various types of timers used in PLC? [CO1][L-1]**2x10**

PART-A

Q.2 a) What is Modbus and what are its applications? Explain the working of MODBUS. [CO1][L-1,2]**10**

b) List the advantages and disadvantages of automation. [CO1][L-1]**10**

Q.3 a) Explain in detail with block diagram the architecture of PLC. [CO3][L-2]**10**

b) Write a note on timers and counters used in PLC. [CO3][L-1]**10**

Q.4 a) Explain DC and AC servo drives for motion control. [CO2][L-2]**10**

b) Explain different types of sensors used in automation. [CO2][L-2]**10**

PART-B

Q.5 a) Write a program for traffic light signal. [CO3][L-6]**10**

b) Discuss the steps in PLC scanning process. [CO3][L-2]**10**

Q.6 a) How does communication takes place using DCS? [CO3][L-2,3]**10**

b) Compare DCS with PLC. [CO3][L-4]**10**

Q.7 a) Explain pick and place robot components and movements. [CO4][L-2]**10**

b) Explain arm configuration of:

i) Cartesian coordinate.
ii) Cylindrical coordinate.
iii) Polar coordinate. [CO4][L-2]**10**

End Semester Examination, Dec 2021

OPEN ELECTIVE – COMMON FOR ALL BRANCHES

GREEN ENERGY RESOURCES (BEE-OE-004)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) How many types of renewable energy systems are available? [CO1][L-2]
b) What are the environmental impacts of using geothermal energy? [CO1][L-1]
c) List any four advantages of wind turbine. [CO3][L-2]
d) How is the energy being continuously produced from the sun? [CO2][L-2]
e) Design a solar array of rating 18V, 15 amp with 6V,1.5amp PV cell. [CO2][L-3]
f) How does the production of biomass and ethanol affect the environment? [CO4][L-3]
g) What is the source of heat contained in geothermal energy? [CO1][L-1]
h) Name four gases commonly present in biogas. State two advantages of using this gas over fossil fuels. [CO4][L-1]
i) Define 'tidal energy'. [CO3][L-2]
j) Why a solar cooker painted black from outside? [CO2][L-2]**2x10**

PART-A

Q.2 Describe the main features of various types of renewable energy resources. Also discuss their use as in context of energy requirement in India. [CO1][L-2]**20**

Q.3 a) Explain the construction and working of solar flat plate collectors. [CO2][L-2]**10**
b) Differentiate between flat plate collectors and concentrating collectors. Why orientation is needed in concentrating type collectors? [CO2][L-3]**10**

Q.4 a) Explain the term fill factor and its importance as a performance parameter for a solar cell. [CO2][L-3]**10**
b) Explain Solar cell, array with their working in series and parallel both. [CO2][L-2]**10**

PART-B

Q.5 a) Discuss about different configurations of wind turbines and their advantages and disadvantages. [CO3][L-2]**10**
b) Explain the mechanism of production of local winds. What are the most favorable sites for installing wind turbines? Also, explain the major applications of wind power. [CO3][L-3]**10**

Q.6 a) Describe bio-mass energy resources and how much energy is yield from each of them? [CO4][L-4]**10**
b) Examine the fermentation and Wet process. [CO4][L-2]**10**

Q.7 a) What are the difficulties in large scale utilization of geothermal energy? Discuss the ways to enhance the role of geothermal energy in future. [CO1][L-4]**10**
b) What is OTEC? What is the minimum requirement to operate the OTEC system? [CO1][L-4]**10**

End Semester Examination, Dec. 2021

B. Sc. (Hons.) Geology – Third Semester

SEDIMENTOLOGY PETROLOGY (BGE-DS-301)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.*

Q.1 Answer the following:

a) Draw Grain size scale. [CO6][L-3]
b) Explain compactionof sediments. [CO1][L-3]
c) Differentiate allochemical and orthochemical limestones. [CO1][L-3]
d) Discuss concept of origin of primary porosity in rocks. [CO1][L-4]
e) Comment on evaporite rocks. [CO6][L-3]
f) List common heavy minerals of sedimentary rocks. [CO2][L-5]
g) Describe the paleo current analysis. [CO5][L-4]
h) Differentiate top and bottom of bed. [CO4][L-3]
i) Explain graded bedding. [CO4][L-4]
j) Differentiate current and oscillation ripples. [CO5][L-5]

2x1

PART-A

Q.2 a) Illustrate the formation of sedimentary rock with a flow chart. [CO1][L-3]**1**
b) Define the process of generation of lamination /bedding. [CO2][L-3]**1**

Q.3 a) Classify the sedimentary rocks with help of diagram. [CO1][L-4]**1**
b) Define Framework, matrix and cement with help of diagram. [CO2][L-5]**1**

Q.4 a) Discuss clastic sedimentary rocks formation. [CO2][L-4]**1**
b) Discuss the Concept of formation of Volcanogenic sedimentary rocks. [CO2][L-3

PART-B

Q.5 a) Elaborate the Primary sedimentarystructures and its significance. [CO6][L-6]**1**
b) Discuss secondary sedimentarystructures and its significance. [CO6][L-6]**1**

Q.6 a) Analyze the origin of quart arenite and greywacke. [CO5][L-4]**1**
b) Describe Components of carbonates rocks: crystalline, micritic, Spar. [CO5][L-4]**1**

Q.7 a) Discuss the Processes of sedimentdeposition in marine environment. [CO6][L-5]**1**
b) Analyze the Geological significance of tillites and its occurrence in India. [CO6][L-6]**1**

End Semester Examination, Dec. 2021

B.Sc (Hons) Geology – Third Semester

PALAEONTOLOGY (BGE-DS-304)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.*

Q.1 ***Answer the following questions:***

a) Scientific naming of fossils
b) Petrification
c) Bivalves
d) Glossopteris
e) Ichnofossils.
f) Diatoms
g) Jurassic animals.
h) Age of Trilobites
i) Chordate.
j) Palaeobotany. [CO6][L5]**2x1**

PART-A

Q.2 a) Explain different modes of the preservation of fossils. Name a fossil which is extin now. [CO1][L3]**1**

b) Discuss the applications of paleontology in understanding the past. [CO1][L4]**1**

Q.3 Explain trace fossils? Discuss their importance in paleontology. [CO2][L4]**2**

Q.4 a) Draw a labeled diagrams showing the morphology of typical cephalopod ar gastropod shells. [CO3][L3]**1**

b) Discuss the geological evolution and extinction of Trilobites. [CO3][L6]**1**

PART-B

Q.5 a) Elaborate on origin of the vertebrate? Discuss their evolution [CO4][L4]**1**

b) Discuss the causes of extinction of Dinosaurs during Mesozoic. [CO4][L2]**1**

Q.6 a) Elaborate with suitable diagrams, the characteristic flora of Lower Gondwana time. [CO6][L4]**1**

b) Discuss the distribution of plant fossils in India [CO6][L4]**1**

Q.7 Evaluate different types of microfossils based on the composition of their shells. Discu their application in palaeoviornemental and correlation studies. [CO6][L6]**2**

End Semester Examination, Dec. 2021

B. Sc. (Hons) Geology – Third Semester

RESEARCH INNOVATION AND CATALYST-I (BGE-DS-305)

Time: 3 hrs. Max Marks: **5**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.*

Q.1 Answer the following:

a) Explain citation index.
b) Elaborate i10 index.
c) Discuss importance of DOI.
d) Discuss key words and its use.
e) Evaluate impact factor.
f) Discuss peer reviewing system.
g) Assess self plagiarism.
h) Comment on an indexed journal.
i) Apprise online journal.
j) Expand the system ISSN and ISBN. **1x1**

PART-A

Q.2 a) Discuss about two renowned experiments related to your subject [CO1][L-3
b) Apprise the format of research paper [CO2][L-6

Q.3 a) Compare Abstract and Conclusion of a research paper [CO1][L-3
b) Explain dual affiliation. and corresponding author? [CO2][L-5

Q.4 a) Elaborate on peer review. Comment on an open source journal? [CO2][L-4
b) Discuss type of research journals [CO2][L-4

PART-B

Q.5 a) Elaborate poster presentation and its use [CO6][L-6
b) Discuss Usage of scholarly networking sites like Research Gate, Mendele Academia.edu etc. [CO6][L-6

Q.6 a) Assess the power of literature survey in finding research problem in the relevan research area [CO5][L-4
b) Discuss methodology of categorizing surveyed literature [CO5][L-4

Q.7 a) Explain the role of MS-PowerPoint in demonstrating research idea [CO6][L-5
b) Discuss the do and don't of research [CO6][L-5

End Semester Examination, Dec. 2021

B. Sc. (Hons) Geology – Fifth Semester

ECONOMIC GEOLOGY (BGE-DS-501)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Explain the following

a) Ore and gaunge.
b) Anthracite.
c) Mineral zoning.
d) Kimberlite.
e) Ores of Zinc.
f) Placer deposits.
h) Metalogenic epoch.
i) Epigenetic and syngenetic ores.
j) Gossan capping. [L-5, CO-1-6] **2x10**

PART-A

Q.2 Explain the importance of paragenesis. How it is identified in ore microscopy. [L5][CO-1] **10**

b) Explain three important ore textures and briefly discuss their significance. [L4][CO-1]**10**

Q.3 Discuss the process of contact metasomatism and mineral deposits formed by it. [L6][CO-2]**20**

Q.4 a) Describe the mechanism of Placer formation. Give examples and their mineral resource of placer from India. [L3][CO-3]**10**

b) Discuss how the bauxite deposits of India have formed. Discuss the main locations and mineralogy of aluminum ores in India. [L3][CO-3]**10**

PART-B

Q.5 a) Discuss the process of coal formation What is age of Indian coal, discuss with relevant examples. [L4][CO-4]**10**

b) Draw labeled diagrams of structural and stratigarphic traps. Give an offshore example of oil in India. [L3][CO-4]**10**

Q.6 a) Discuss the applications, advantages and importance of geophysical surveys for mineral prospecting? [L4][CO-5]10

b) Explain two geophysical methods of mineral survey, give their advantages and disadvantages also. [L4][CO-5]**10**

Q.7 Evaluate mineral search in a virgin area. Discuss the type of survey you will suggest after knowing the occurrence of ores and how you will infer the underground shape of the deposit. [L6][CO-6]**20**

End Semester Examination, Dec. 2021

B.Sc. (Hons) Geology – Fifth Semester

GROUNDWATER GEOLOGY (BGE-DS-502)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following quesrions;

a) Define groundwater and explain its source of origin.
b) Differentiate aquifer and aquiclude.
c) Draw sketch of the hydrological cycle.
d) Comment on magmatic water.
e) Explain origin of flowing artesian well.
f) Discuss the static and dynamic groundwater.
g) Evaluate radius of influence of a well.
h) Discuss Bernoulli's equation.
i) List causes of groundwater level fluctuations.
j) Define draw down and its components. **2x10**

PART-A

Q.2 a) Analyze the runoff and groundwater generation process. [L3][CO-1]**10**
b) Describe surface water groundwater interaction. [L4][CO-1]**10**

Q.3 a) Discuss specific yield, specific retention and hydraulic conductivity. [L4][CO-2]**10**
b) Discuss various type of aquifer and explain its significance. [L5][CO-2]**10**

Q.4 a) Analyze Darcy's Law and its applications. [L6][CO-3]**10**
b) Discuss steady, unsteady and radial flow conditions. [L5][CO-3]**10**

PART-B

Q.5 a) Evaluate piper diagram of water quality data. [L6][CO-4]**10**
b) Discuss saline water ingress. [L4][CO-4]**10**

Q.6 a) Illustrate Groundwater development in urban and rural areaof India. [L4][CO-5]**10**
b) Discuss the methods of geophysical investigation of groundwater exploration. [L4][CO-5]**10**

Q.7 a) Evaluate the Ground water problems causes and management in India. [L6][CO-6]**10**
b) Discuss protection of water quality and legislation in India. [L5][CO-6]**10**

End Semester Examination, Dec. 2021

B. Sc. (Hons) Geology – Fifth Semester

BASIC ENGINEERING GEOLOGY (BGE-DS-503)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Explain the following questions.

a) The point where the curvature is maximum is _____.
   i) Hinge ii) Axial surface
   iii) Nucleus iv) Fold point

b) Which of the following is an external factor for failure?
   i) Composition of the mass ii) Role of water
   iii) Geological structures iv) Removal of vegetation

c) In which direction does the displacement of blocks happen?
   i) Horizontal ii) Vertical
   iii) Inclined iv) Any direction

d) Which is the tallest Dam of India?
   i) Hirakud Dam ii) Bhakra Dam
   iii) Krishnarajasagar Dam iv) Nagarjun Sagar Dam

e) Which type of sandstone is more stable?
   i) Cemented with siliceous material ii) Cemented with argillaceous material
   iii) Cemented with ferruginous material
   iv) Cemented with calcareous material

f) Folds develop in which type of rock?
   i) Igneous rock ii) Sedimentary rock
   ii) Metamorphic rock iv) Any type of rock

g) What is the downgrade movement of mass along no definite surface called?
   i) Flowage ii) Sliding
   iii) Subsidence iv) Earthquake

h) The point where the curvature is maximum is _____.
   i) Hinge ii) Axial surface
   iii) Nucleus iv) Fold point

i) To prevent landslide, improving the cultivation in the sloppy region, the root of which prevent
   i) Erosion ii) Coherent
   iii) Cohesion iv) floo

j) Repetitive observation of the same area at equal interval of time are useful to monitor the dynamic phenomena:
   i) Cloud evolution ii) Vegetative cover
   iii) Snow cover iv) All of these [CO1,3,5,6][L-2,4,5]**2x10**

PART-A

Q.2 a) Why used durable rock for road construction? [CO1][L-4]**10**

b) Discuss elastic behavior of the rock. [CO2,3][L-4]**10**

End Semester Examination, Dec. 2021

B. Tech. – Third Semester

MANUFACTURING PROCESSES (BME-DS-304)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) What are the functions of chills and chaplets in casting?
b) List the defects possible in a casting process.
c) Differentiate between 'bulk metal deformation' and 'sheet metal deformation'.
d) What is the principle behind the extrusion process?
e) State the importance of clearance in sharing action of sheet metals.
f) Differentiate between 'progressive' and 'compound dies'.
g) List the operations used in the making of a currency coin.
h) What is the advantage of Fused deposition modeling over stereolithography.
i) Explain blending of metal powder.
j) State the advantage of MiG welding over stick welding. [CO1][L-1]**2x10**

PART-A

Q.2 a) A cylindrical riser of 6 cm diameter and 12 cm height has to he designed for a sand casting mould for producing a steel rectangular plate casting of 12 cm × 10 cm × 2 cm dimensions having the total solidification time of 3 minutes. Find if the riser designed is appropriate for the rectangular steel plate. [CO3][L-5]**12**

b) Explain the working of investment casting and its applications. [CO3][L-2]**8**

Q.3 a) Explain the process of rolling and the types for rolling process with a neat diagram. [CO1][L-2]**10**

b) Explain drop forging and the various operations possible in drop forging with neat diagrams. [CO1][L-2]**10**

Q.4 a) A washer having thickness of 3mm, outer diameter of 25mm and inner diameter of 15mm. The maximum shear stress the washer can take is 500 N/mm^2. Keeping the dimensional tolerance, c = 0.075mm.

i) Which part is being punched and blanked.
ii) Calculate the overall clearance required.
iii) Calculate the dimensions of the tool and punch die for the punching operation.
iv) Calculate the blanking force required to the blanking operations. [CO5][L-4]**14**

b) Explain the various bending processes on sheet metal with a neat diagram. Also State the concept of springback in bending. [CO6][L-1]**6**

PART-B

Q.5 a) Explain the working of selective laser sintering with a neat diagram and the advantages over other additive manufacturing processes. [CO2][L-2]**10**

b) Explain the working of layer laminate modeling with a neat diagram and the advantages over other additive manufacturing processes. [CO2][L-2]**10**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

THEORY OF MACHINES (BME-DS-501)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

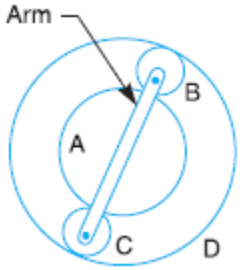
a) Isochronism of Governor.
b) Pressure Angle of Cam.
c) Hammer Blow.
d) Chebychev spacing.
e) Length of arc of contact.
f) Mechanism.
g) Epicyclic gear train.
h) Grashof's Law.
i) Gyroscopic couple.
j) Stability of Governor. **2x10**

PART-A

Q.2 a) Classify the synthesis problem in three categories. [CO1,2][L2]**10**

b) Explain crank and slotted lever quick return motion mechanism with a neat sketch. [CO1,2][L1]**10**

Q.3 a) An epicyclic train of gears is arranged as shown in Fig1. How many revolutions does the arm, to which the pinions B and C are attached, make:1. when A makes one revolution clockwise and D makes half a revolution anticlockwise, and 2. when A makes one revolution clockwise and D is stationary ? The number of teeth on the gears A and D are 40 and 90 respectively. [CO2,3][L4]



15

b) State and prove law of Gearing. [CO1,2][L5]**5**

Q.4 A cam is to give the following motion to a knife-edged follower:

1. Outstroke during 60° of cam rotation;
2. Dwell for the next 30° of cam rotation;
3. Return stroke during next 60° of cam rotation, and 4. Dwell for the remaining 210° of cam rotation.

The stroke of the follower is 40 mm and the minimum radius of the cam is 50 mm. The follower moves with uniform velocity during both the outstroke and return strokes. Draw the profile of the cam when (a) the axis of the follower passes through the axis of the cam shaft, and b) the axis of the follower is offset by 20 mm from the axis of the cam shaft. [CO3][L6]**20**

End Semester Examination, Dec.2021

B. Tech. – Fifth Semester

INDUSTRIAL ENGINEERING (BME-DS-502)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Differentiate between 'fixed cost' and 'variable cost'.
b) Discuss significance of BEP.
c) Discuss the importance of EOQ.
d) Enlist measures of productivity.
e) Differentiate between sampling inspection and 100% inspection.
f) Differentiate between X bar & R chart and P chart.
g) Differentiate between Type-1 and Type-2 error.
h) Describe the significance of inventory control.
i) Discuss master production schedule.
j) Differentiate between 'time study' and 'work measurement'. **2x10**

PART-A

Q.2 a) Discuss the various tools used in method study with help of a case study. [CO1,3,6][L-2]**10**

b) Discuss the term method study and various steps of method study. [CO2,4,5][L-2]**10**

Q.3 a) Derive break even analysis and state its significance. [CO3,5,6][L-4]**10**

b) Classify various types of costs and discuss in detail each with examples. [CO3,5,6][L-5]**10**

Q.4 The annual demand for item is Rs 3200/- parts. The unit cost is Rs. 6/- and the Inventory carrying charges are estimated as 25% per annum. If the cost of one procurement is Rs. 150/-, find

i) Economic order quantity.
ii) Time between consecutive orders.
iii) Numbers of orders per year. [CO4,5][L-4,5]**20**

PART-B

Q.5 What are the objectives and limitations of PPC? In addition, discuss its significance help of conceptual diagram. [CO1,3,6][L-2]**20**

Q.6 Plot the X bar and R Chart for data given below and also comment on the result.

Sub group no	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

IC ENGINE (BME-DS-521)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1	a)	What is flash and fire point?	CO-4	L-2
	b)	Classify different types of cooling systems.	CO-4	L-2
	c)	Define the following (i) BSFC (ii) ISFC	CO-5	L-1
	d)	List various methods available for finding friction power of an engine.	CO-5	L-1
	e)	Draw PV and TS diagram of ideal diesel cycle.	CO-1,5	L-1
	f)	Name the factors which influence the process of carburetion?	CO-2	L-2
	g)	What do you understand by knocking?	CO-3	L-2
	h)	Describe Cetane rating of the fuel.	CO-5,6	L-2
	i)	Classify different types of ignition system.	CO-3	L-2
	j)	State four differences between SI and CI engines.	CO-1	L-2

PART-A

Q.2 An air standard dual cycle has a compression ratio of 10. The pressure and Temperature at the beginning of compression are 1 bar and 27 ℃. The maximum pressure reached is 42 bar and maximum temperature is 1500 ℃ .Determine: CO-1 L-4

a) The temperature at the end of constant volume heat addition.
b) Cut off ratio.
c) Work done per kg of air.
d) The cycle efficiency.

Assume:-Cp = 1.004kJ/kg K and Cv = 0.717kJ/kg K of air.

Q.3 What are the functional requirements of injection system? And With neat sketch explain the different types of injection system. CO-2 L-3

Q.4 Explain stages of combustion in C.I. engine and what are the factors that affect delay period in C.I. engine. CO-3 L-3

PART-B

Q.5 Explain the splash and pressure lubrication system with a neat sketch. CO-4 L-3

Q.6 An eight-cylinder four-stroke engine of 9 cm bore and 8 cm stroke with a compression ratio of 7 is tested at 4500 rpm on a dynamometer which has 54 cm arm. During a 10 minutes test the dynamometer scale beam reading was 42 kg and the engine consumed 4.4kg of gasoline having a calorific value of 44000 kJ/kg. Air 27 °C and 1 bar was supplied to the carburetor at the rate of 6 kg/min. CO-5 L-4

Find:

a) The brake power delivered.
b) The brake mean effective pressure.

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

MECHTRONIC SYSTEMS AND CONTROL (BME-DS-522)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions.

a) Explain active electronic elements.
b) Enlist various applications of mechatronics.
c) Write applications of ultrasonic sensor.
d) Explain working of torque sensor.
e) Illustrate function of control unit.
f) Enlist various applications of microcontroller.
g) Define hydraulic resistance.
h) Enlist various data presentation elements.
i) Define 'autotronics'.
j) Explain serial peripheral interface. **2x10**

PART-A

Q.2 a) Explain different elements of Mechatronics. **10**
b) Differentiate between combinational and sequential circuits. **10**

Q.3 Explain construction and working of the following:

a) Temperature sensor.
b) Electric actuator. **10x2**

Q.4 a) Explain application of 8085 microprocessor in traffic control. **10**
b) Explain application of 8051 microcontroller in domestic washing machine. **10**

PART-B

Q.5 a) Explain the hydraulic system building blocks. **10**
b) Design and explain an electro-mechanical system. **10**

Q.6 a) Define 'filtering'. Explain various types of filters. Write application of filters. **10**
b) Define 'multiplexer'. Explain multiplexer with applications, advantages and disadvantages. **10**

Q.7 a) Design a mechatronics system for digital speedometer and odometer. **10**
b) Explain the construction and working of a pick and place robot. **10**

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

TOOL DESIGN (BME-DS-524)

Time: 3 hrs. Max Marks: **100**

No. of pages: 3

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.*

Q.1 Multiple choice question:

a) The tool body of a twist drill, reamer, milling cutters can be made of:
   i) HSS ii) Carbide
   iii) Cermet iv) Ceramic

b) Which of the following is simple carbide?
   i) 90-95% WC + Cobalt (binder) ii) WC+TiC+ Cobalt (binder)
   iii) WC+TaC+ Cobalt (binder) iv) WC+TiC+TaC+ Cobalt (binder)

c) The composition of SIALON is:
   i) Si_3N_4(77%) + Al_2O_3 (13%) + Y_2O_3 (10%)
   ii) Si_3N_4(77%) + Al_2O_3 (13%) + Y_2O_3 (10%) + AlN
   iii) Silicon Carbide grains (SiC) distributed homogeneously in alumina (Al2O3) matrix.
   iv) Silicon Nitride grains (Si3N4) distributed homogeneously in alumina (Al2O3) matrix

d) A Broach is used for machining:
   i) Keyway ii) Splines
   iii) Gun Riffling iv) All the above

e) Tooth fillet radius on the gullet space of broach provides importantly.
   i) Curling of chip ii) Strengthening of the broach tooth
   iii) Clogging the chips iv) None of the above

f) Total length of the broach.
   i) length of the toothed portion plus length of shank
   ii) length of the rough cutting teeth portion plus length of shank
   iii) length of the toothed portion plus length of shank plus length of rear pilot
   iv) length of toothed portion only

g) Which of the statement is right for Face milling?
   i) Thin entry at entry cut with abrupt exit
   ii) Direction against the cutting force
   iii) Full thickness at entry cut and zero thickness at the exit
   iv) Finished surface is right angle to the cutter axis

h) Which of the following is not a part of Milling Cutter?
   i) Relief Angles ii) Flute
   iii) Web iv) Land

i) The number of teeth on a milling cutter does not depends on:
   i) Work Material ii) Surface Finish Required
   iii) Contact with the work piece iv) Flute space

j) The number of teeth on a milling cutter does not depends on:
   i) Work Material ii) Surface Finish Required
   iii) Contact with the work piece iv) Flute space

End Semester Examination, Dec. 2021

B. Tech. - Fifth Semester

POWER PLANT ENGINEERING (BME-DS-525)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions:

a) Write down the advantages of hydroelectric Power Plant.
b) Write down the emerging sources of energy.
c) Draw the P-V and T-S diagram of Brayton cycle.
d) Give advantages of nuclear power plant over hydroelectric plant.
e) Draw the line diagram of ash handling system.
f) What is the significance of a moderator in nuclear power plant?
g) What do you understand by binding energy?
h) What is economics load sharing?
i) Explain the advantages of combined cycle power plant.
j) Define Incremental rate of theory. [CO2,3,5][L-2,3]**2x10**

PART-A

Q.2 a) The efficiency of a power plant depends on the site location. Discuss the factors on which site selection is being influenced? [CO2,3][L-2,4]**10**

b) Explain briefly the current energy distribution in India. [CO2,4][L-1,3]**10**

Q.3 a) Explain the following:

i) Function of surge tank in hydroelectric power plant.
ii) Function of draft tube [CO5][L-4,5]**5x2**

b) What are the three main factors of power output of hydroelectric plant? [CO4][L-4,5]**10**

Q.4 a) Explain the principle involved in preparation of coal and what are the methods of preparation? [CO4,6][L-2,5]**10**

b) What are the different types of pulverizing mills? Explain with neat sketch. [CO4][L-5]**10**

PART-B

Q.5 a) Draw the layout of Diesel power plant and explain the significance of the each component of Diesel power plant. [CO1,3][L-4,5]**10**

b) With the help of neat sketch, briefly explain the combined cycle power plant. **10** [CO5][L-4,5]

Q.6 a) Write down the different types of nuclear reactors. Explain with a neat sketch "BWR" nuclear reactor. [CO3][L-4,5]**10**

b) Elaborate with neat sketch about Fast Breeder reactor. [CO4][L-4,5]**10**

Q.7 a) A power plant has the following annual factors: load factor = 0.75, capacity factor = 0.60 and use factor = 0.65 Max. Demand = 60 MW. Estimate:

i) The annual energy production.
ii) The reserve capacity over and above the peak load.
iii) The hours during which the plant is not in service per year. [CO5][L-4,5]**10**

b) What are daily, monthly and annual load curves? [CO5,6][L-2,4]**10**

End Semester Examination, Dec 2021

B.TECH – Fifth Semester

PRODUCTION ENGINEERING (BME-DS-526)

Time: 3 hrs. Max Marks:**100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all;**Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.*

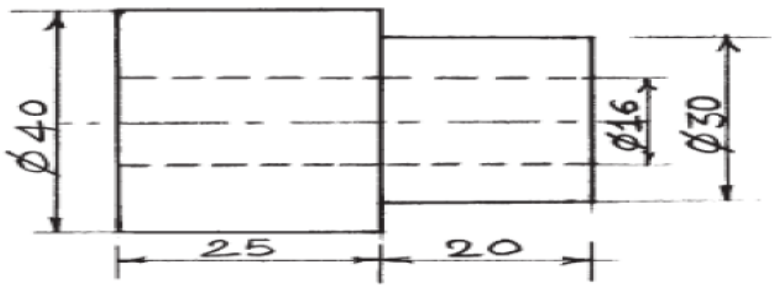
Q.1 Answer the following questions.

a) Explain "part print analysis". [CO1][L2]
b) What is the purpose of Process Planning? [CO1][L1]
c) Name the essential elements which make up a jig or a fixture. [CO2][L1]
d) What is meant by angular location? [CO2][L2]
e) Classify the purpose of machine body? [CO3][L3]
f) Which is the best section for machine body and why? [CO3][L4]
g) List the advantages of thread rolling. [CO4][L1]
h) Under what conditions thread milling is used to produce the threads. [CO4][L3]
i) Differentiate between forming and generating of gear. [CO5][L2]
j) Identify the principal elements of metal machining. [CO6][L4]**2x10**

PART-A

Q.2 a) Discuss the various considerations in determining the sequence of operations. [CO1][L2]**10**

b) A batch of 400 components of mild steel I to be produced from a blank of ø45 ×55mm.Generate the operation process sheet and sequence of operation as shown in figure below:



[CO1][L6]**10**

Q.3 a) What is the six-point location principle? Explain it with the help of suitable sketches. [CO2][L2]**5**

b) Compare the design and features of Jigs and Fixtures. [CO2][L5]**5**

c) What is meant by 'fool proofing' as applied to jigs and fixtures? How it can be achieved? [CO2][L3]**10**

Q.4 a) Explain the factors to be taken into account in selecting the materials for machine tool beds/structures. [CO3][L4]**10**

b) What is the function of machine spindle? Explain the design requirements for machine spindles. [CO3][L6]**10**

PART-B

Q.5 a) Write down the procedure of taping for thread manufacturing and their types. [CO4][L1]**10**

End Semester Examination Dec.-2021

B. Tech. — Seventh Semester

OPERATION RESEARCH (BME-DS-701)

Time: 3 hrs. Max Marks: **100**

No. of pages: 3

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer in brief:

a) Discuss the unique optimum in operation research. [CO1][L-2]

b) Answer the MCQ's

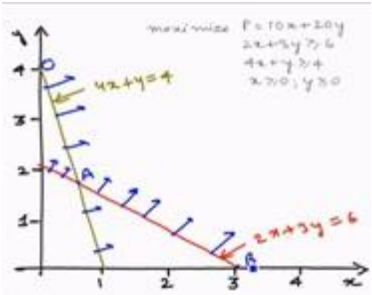
i) For Erlang model the service discipline is:

a) FCFS b) Random c) LCFS d) Priority

ii) The time a customer has to wait in a queue to get serviced:

a) Ws b) Wq c) Ts d) ρ [CO2][L-1]

c) See the picture below and recognize the solution type [CO2][L-3]



i) Unique Optimum Solution ii) Unbounded Solution

iii) Alternative Solution iv) None of the above [CO2][L-3]

d) Summarize critical path in network planning. [CO5][L-2]

e) Differentiate between slack and surplus variables in linear programming problems. [CO2][L-3]

f) Appraise the conditions in transportation problems where the utility of dummy activity is needed. [CO4][L-3]

g) Summarize the balking behaviour of population in Queue models. [CO2][L-2]

h) State whether ***TRUE/FALSE:***

i) For complex problems analog simulation can be used.

ii) Monte Carlo simulation is a probabilistic method of simulation. [CO6][L-1]

i) List the various disadvantages of Graphical method for solving the linear programming problems. [CO2][L-3]

j) List the types of floats in network. [CO5][L-2]**2x10**

PART-A

Q.2 Summarize the following statements in detail. [CO1][L-3]

a) Operation research plays an important role in decision making. **12**

b) Decision making under uncertainty. [CO1,5][L-2]**8**

End Semester Examination, Dec. 2021

B. Tech. - Seventh Semester

DESIGN OF MACHINE TOOL (BME-DS-725)

Time: 3 hrs. Max Marks

No. of pa

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions* ***PART-A*** *and **TWO** questions from **PART-B**. Each question carries equal marks.*

Q.1 Answer the following:

a) How are drives used for transmitting power in machine tools? [CO1
b) What is a gear drive? [CO1
c) What is the purpose of guide ways? [CO1
d) Detail the various gearing devices used for transmitting power in workshop? [CO2
e) What is meant by the term: machine tool? [CO1
f) Enumerate the functions of machine tool. [CO3
g) What are the various elements of machine tools? [CO3
h) What is ray diagram? [CO5
i) What are reversing mechanisms? What is the requirement of reversing mechanism [CO2
j) What are the merits of V-belts over flat belts? [CO1][L-5]

PART-A

Q.2 a) Explain general requirements of machine tools. [CO2][
b) Explain the classification of machine tools based on production capacity. Giv relative advantages with reasons and applications. [CO2][
c) Explain working and auxiliary motion in machine tools with examples. [CO4][L-

Q.3 a) Design the schematically the kinematic diagram of a drilling machine and briefly the working principle of the machine tools. [CO5][L-
b) Discuss the specification of lathe machine. [CO3][

Q.4 a) Discuss kinematic drive. How it is obtained? [CO5][L-
b) Explain stepped drive and stepless drive in machine tools. [CO5][L-

PART-B

Q.5 Discuss the following machine tools mechanism:

a) Norton gear box.
b) Feed gear box. [CO6][L-2]

Q.6 a) Discuss the type of sections used in design of a machine tool bed. [CO5][L-
b) Describe the materials used for construction of guide ways. [CO5][

Q.7 a) Explain the term "chatter" in machine tool. [CO2][
b) Discuss the effects of chatter during machining. [CO3][
c) List the different sources of vibration in machine tools. How that can be eliminated [CO6][L-

End Semester Examination, Dec. 2021

B. Tech. – Seventh Semester

ADDITIVE MANUFACTURING (BME-DS-726)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.*

Q.1 Define the following:

a) Barriers in additive manufacturing.
b) STL file.
c) Drop on demand technique.
d) 4D printing.
e) Sintering.
f) Bio-extrusion.
g) Composite and alloy materials.
h) AM Machine and CNC Machine.
i) FDM.
j) Raw materials used in AM. **2x10**

PART-A

Q.2 a) If a manufacturer is thinking about metal additive application, should they start with plastics or metals directly? Why? **10**

b) Discuss a few diverse applications of additive manufacturing in detail. **10**

Q.3 a) Define CAD modelling and discuss its importance in additive manufacturing. **10**

b) Discuss the concept of DFAM in detail. **10**

Q.4 a) Enlighten the friction additive stir casting manufacturing processes. **10**

b) Elucidate the scope of additive manufacturing in detail. **10**

PART-B

Q.5 What are the future aspects of additive manufacturing using material jetting? **20**

Q.6 Elucidate laminated object manufacturing process step by step with suitable examples. **20**

Q.7 a) Interpret the term 'extrusion process' using additive manufacturing. **5**

b) Discuss 'powder bed fusion process' with a suitable case study. **15**

End Semester Examination, Dec. 2021

OPEN ELECTIVE – COMMON FOR ALL BRANCHES

SIX SIGMA TECHNIQUES (BME-OE-001)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.*

Q.1 Answer the following:

a) Describe the number of defectives in a six sigma process.
b) Describe the aim of six sigma project.
c) Describe the meaning of DMAIC.
d) Describe application areas of six sigma.
e) Describe the type of variations in six sigma process.
f) Enlist the key players in six sigma project.
g) Describe the strategies of reducing variations.
h) What are the characteristics critical for customers?
i) Describe normal curve.
j) Define 'six sigma'. [CO2,6][L-2]**2×1**

PART-A

Q.2 Discuss various phases of six sigma DMAIC methodology with help of a case study. [CO1][L-4]**2**

Q.3 Discuss six sigma organizational structure, key players, and their contribution in detail. [CO4][L-3]**2**

Q.4 Discuss, various tools used in a six sigma process and discuss in detail the tools used define phase. [CO3][L-3]**2**

PART-B

Q.5 Discuss chance causes and assignable causes present in any process with help of case study. [CO1][L-3]**2**

Q.6 Describe the significance of reducing variations in any process. Discuss in detail ar three tools to describe variations in any process. [CO1][L-2]**2**

Q.7 Discuss various methods to stratify the data available with help of an example and dra any two in detail. [CO1][L-3]**2**

End Semester Examination, Dec. 2021

OPEN ELECTIVE - COMMON FOR ALL BRANCHES

MAINTENANCE MANAGEMENT (BME-OE-002)

Time: 3 hrs Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against question:*

Q.1 a) Locate the need of maintenance in the field of technology operated equipments. [CO3][L-

b) Examine the role of maintenance in equipment availability improvement. [CO2][L-

c) Prepare the list for various benefits of an organization might have seen from havi the sound maintenance systems. [CO6][L-

d) Categorize the breakdown maintenance. [CO4][L-

e) Relate the term total productiveness with the efficiency enhancement manufacturing industries. [CO3][L-

f) Appraise the factors that are considered for maintenance planning. [CO1][L-

g) Discuss role of manpower management in maintenance control. [CO1][L-

h) By implementing TPM, list any three tangible benefits to the organization. [CO6][L-

i) Discuss failures and its impact on engineering equipment's. [CO5][L-

j) Recall and discuss the routine maintenance process. [CO2][L-1]**2x1**

PART-A

Q.2 Report and validates the various challenges associated with maintenance functions an organization. BME-OE-002.1,6 [L-4] **2**

Q.3 Point out the importance of creating special department and recruiting the maintenan officials in the manufacturing industries. BME-OE-002.2, 3 [L-6] **2**

Q.4 List out and explain in brief the various factors considered for formulating and designi the maintenance strategies in a cost-effective manner for industrial operations. BME-OE-002.3, 4 [L-2] **2**

PART-B

Q.5 Explain the various types of failures. Also, point out the impacts in terms of bo tangible and intangible on industries. BME-OE-002.1, 5 [L-3] **2**

Q.6 Illustrate the strategies used for logical and sequential fault identification equipments. Also distinguish between RCA and FTA strategy. BME-OE-002.2,5 [L-4] **2**

Q.7 Discuss TPM in detail. Sketch neat diagram for illustrating the TPM Pillars. BME-OE-002.3, 6 [L-2] **2**

End Semester Examination, Dec. 2021

OPEN ELECTIVE - COMMON FOR ALL BRANCHES

RENEWABLE ENERGY AND ENERGY HARVESTING (BPH-OE-001)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against question.*

Q.1 Answer the following:

a) Distinguish between conventional and non - conventional energy resources. [CO1][L-3]

b) Why fossil fuels are not considered as renewable? [CO6][L-4]

c) Briefly discuss different forms of biomass? [CO1][L-2]

d) What can be the problems due to over use of energy resources? [CO3][L-1]

e) Draw a labeled diagram of solar pond. [CO1][L-1]

f) Recall two advantages of wind energy. [CO1][L-2]

g) Show that the power generated by a wind turbine is $\frac{1}{2}\rho A v^3$. [CO2][L-3]

h) What is Betz's limit? [CO1][L-1]

i) Recall four geothermal resources. [CO2][L-2]

j) The lowest and highest parts of a wave are called:

i) Crest and trough ii) Trough and crest

iii) Points of origin iv) Compression pointser effect

[CO1][L-1] **2x1**

PART-A

Q.2 a) Why do we need non-conventional energy resources? Describe in brief propertie formation and uses of petroleum. CO1/L2 **1**

b) Distinguish between nuclear fission and nuclear fusion. Describe the process nuclear fission with a labeled diagram CO1/L2 **1**

Q.3 a) What is tidal energy? How spring and neap tides are formed? CO2/L2 **1**

b) What are two forms of biomass? Discuss the construction and working of floatin gas holder plant for biogas generation. CO2/L2 **1**

Q.4 a) Analyze the principle, construction and working of a solar cell. CO3/L4 **1**

b) Explain the principle, construction and working of solar distillation with the help of labeled diagram. CO3/L3 **1**

PART-B

Q.5 a) Analyze the working of a wind turbine with the help of labeled diagram. CO4/L4 **1**

b) Write brief note on (i) process of wind formation and (ii) Doubly Fed Inductio Generator CO4/L3 **1**

Q.6 a) How does ocean Thermal energy conversion create renewable energy? Explain th working of OTEC technology with the help of a labeled diagram. CO5/L4 **1**

b) What are wave energy devices? Discuss the working of a point absorber f generating electricity. Also give advantages of wave energy. CO5/L2 **1**

Q.7 a) Draw suitable diagrams of dry steam power plant and binary cycle power plant ar hence explain their working. CO5/L3 **1**

b) With the help of a diagram explain the following parts of hydro electric power plan water reservoir, dam, spillways, surge tank and water-hammer effect. Also giv advantages of hydro energy. CO3/L2 **1**

End Semester Examination, Dec. 2021

OPEN ELECTIVE - COMMON FOR ALL BRANCHES

MODERN PERSPECTIVE OF SPACE SCIENCE (BPH-OE-002)

Time: 3 hrs | Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part A** and **TWO** questions **from Part B**. Marks are indicated against question.*

Q.1 Answer the following:

a) Which line divides the earth atmosphere and space and where it is located? [CO1][L-1]

b) What are Baryons and leptons? [CO1][L-1]

c) Explain Kuiper belt and give its range. [CO2][L-1]

d) Differentiate between 'terrestrial planets' and 'Jovian planets'. [CO2][L-2]

e) Explain how the gravity is different from gravitational force? [CO3][L-2]

f) Classify the population–I and population-II stars. [CO4][L-2]

g) Explain the terms red shift and blue shift in terms of spectrum of a star. [CO4][L-1

h) Describe the globular clusters. [CO5][L-1]

i) Which parameters are related with virial theorem? [CO6][L-1]

j) Explain the term big crunch and big freeze. [CO6][L-1]**2x1**

PART-A

Q.2 a) Explain in detail the practical contributions of astronomy to society. BPH-OE-002.1[L-1] **1**

b) Explain the characteristics of main five layers of the atmosphere. BPH-OE-002.1[L-1] **1**

Q.3 a) What makes Earth so wonderful and unique? Explain. BPH-OE-002.2[L-1] **1**

b) Explain nebular theory of formation of our solar system. BPH-OE-002.2[L-1] **1**

Q.4 a) Discuss the variation of g with height and depth. BPH-OE-002.3[L-1] **1**

b) State Kepler's laws of planetary motion and explain the deduction of Kepler's secon law and third law of planetary motion. BPH-OE-002.3[L-2] **1**

PART-B

Q.5 a) Discuss the major processes of nucleosynthesis, hydrogen burning, helium burnin and burning of carbon and heavier nuclei by which elements are synthesized in th stellar core. BPH-OE-002.4[L-1] **1**

b) Illustrate the significance of H – R Diagram? Discuss the salient features of differe groups of stars on the H-R diagram. BPH-OE-002.4[L-1] **1**

Q.6 a) Describe the spiral arms of the Galaxy. Explain how they can persist for a lon time. BPH-OE-002.5[L-2] **1**

b) Write short notes on radio galaxies, seyfert galaxies, quasars and gravitational len BPH-OE-002.5[L-1] **1**

Q.7 a) Write short note on Hubble's law, dark matter and cosmic microwave backgroun radiation (CMBR). BPH-OE-002.6[L-1] **1**

b) Discuss the big bang theory describing its timeline. BPH-OE-002.6[L-1] **1**

End Semester Examination, Dec. 2021

OPEN ELECTIVE - COMMON FOR ALL BRANCHES

WORLD OF MATERIALS (BPH-OE-003)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1
a) Why do we need acoustic insulators? [CO-6, L2]
b) What do you understand by pyro electric materials? [CO-3, L2]
c) List two criteria for the materials to be used in solar cells. [CO-5, L2]
d) Write two disadvantages associated with the use of solar cells. [CO-2, L4]
e) Define 'coercivity' and 'retentivity'. [CO-1, L1]
f) Write two applications each of soft and hard magnetic materials. [CO-6, L1]
g) Justify the need of composite materials in our daily life? [CO-5, L2]
h) Discuss any two limitations of composite materials. [CO-2, L1]
i) Express persistent current in superconductors. [CO-2, L2]
j) Nano materials have larger surface area to volume ratio. Explain. [CO-5, L2]**2x10**

PART-A

Q.2
a) Explain different types of insulating materials in detail. [CO-3, L1]**10**
b) Write a note on liquid insulators and ferroelectric materials. [CO-2, L2]**10**

Q.3
a) Explain how solar energy conversion is unique and novel concept of energy transformation. [CO-5, L2]**10**
b) Explain the difference between direct and indirect band semiconductors with two examples of each. [CO-2, L2]**10**

Q.4
a) Differentiate between soft and hard magnetic materials in detail with suitable examples. [CO-3, L2]**10**
b) Explain the difference between diamagnetic, paramagnetic and ferromagnetic materials with two examples of each. [CO-3, L2]**10**

PART-B

Q.5
a) Discuss the various applications of composites materials in daily life. [CO-6, L3]**10**
b) Explain matrix and reinforcement in composite material with suitable example. Discuss the properties of matrix and reinforcement materials. [CO-2, L1]**10**

Q.6
a) Explain Meissner effect in detail and show that superconductors are diamagnetic in nature. [CO-5, L3]**10**
b) Discuss the relation between temperature and magnetic field. Give some applications of superconducting materials. [CO-6, L2]**10**

Q.7
a) What are carbon nano tubes? What are their different types? Discuss four properties of naontubes. [CO-2, L2]**10**
b) Explain the various applications of nano materials. [CO-6, L2]**10**

End Semester Examination, Dec. 2021

OPEN ELECTIVE – COMMON FOR ALL BRANCHES

GREEN TECHNOLOGY (BT-OE-001)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory.** Attempt any **TWO** questions fro **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions:

a) Define "Bioplastics". [CO-6][L-

b) What do you mean by Biomimicry? [CO-1][L-

c) How we can measure 5 ☐ of Reverse Logistics? [CO-2][L-

d) What are cover crops? [CO-4][L-

e) How does the bioleaching works? [CO-3][L-

f) Enlist the advantages of composting. [CO-3][L-

g) The most popular bioplastic is _____ which is typically made from _____. [CO-6][L-

h) Summarize a basic sustainable design criterion. [CO-5][L-

i) Differentiate between vermi-culture and vermin-composting. [CO-6][L-

j) Bamboo is used as a green material for construction. Justify the statement. [CO-5] [L-

2×1

PART-A

Q.2 a) What do you mean by green technology? [CO-1][L-1]

b) Discuss the objectives, challenges and criteria for selection of green technologies green technology. [CO-1][L-6] **1**

Q.3 a) Differentiate between sludge and scum. [CO-2][L-4]

b) Explain the green technologies for waste water management. [CO-3][L-2] **1**

Q.4 a) How does crop rotation affect the environment? [CO-4][L-1] **1**

b) There is a need of crop diversification in India. Justify the statement with suitab examples. [CO-4][L-5] **1**

PART-B

Q.5 a) Compare the process of forward and reverse logistics in detail with the help of flow chart. [CO-2][L-2] **1**

b) Differentiate between inbound and outbound logistics. [CO-2][L-4]

Q.6 a) Evaluate the characteristics of fly ash bricks as a green material. [CO-5][L-5] **1**

b) List the factors considered for determining the IGBC Rating for a particul building. [CO-5][L-2] **1**

Q.7 a) Is biofuel better than the fossil fuel? Analyze critically and discuss. [CO-6][L-1] **1**

b) What are the characteristics of good compost? Discuss the process composting. [CO-6][L-1] **1**

End Semester Examination, Dec. 2021

OPEN ELECTIVE – COMMON FOR ALL BRANCHES

HEALTH CARE AND WELLNESS (BT-OE-002)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.*

Q.1 Answer the following in brief:

a) Define 'health and wellness'. [CO1] [L
b) Enlist the determinants of health. [CO1] [L
c) Illustrate the causation of disease. [CO2] [L
d) Contrast between physical dimension and mental dimension of Health. [CO2] [L
e) Outline the information that could be obtained from periphral blood smear. [CO4] [L
f) Determine the components of en epidemic triads. [CO3] [L
g) Summarize the tests included in LFT. [CO4] [L
h) Define the term yoga and meditation. [CO6] [L
i) Describe the benefits of a balanced diet. [CO5] [L
j) Analyze how yoga is influence the health and wellness? [CO6] [L4] **2×1**

PART-A

Q.2 a) State the ways by which health and wellness are associated with each othe Mention and compare the concepts of health. [CO1] [L1] **1**

b) Illustrate the indicators of health with detailed explanation. [CO2] [L3] **1**

Q.3 a) Describe prevention and different levels of prevention of a disease. [CO3] [L3] **1**

b) Analyze different types and sources of infection that could occur. [CO4] [L4] **1**

Q.4 Evaluate the objectives and types of Surveillance. How the data is analyzed als mention their uses. [CO3] [L5] **2**

PART-B

Q.5 a) Discuss the tests and interpretation of the result for the liver functio test (LFT). [CO4] [L2] **1**

b) Illustrate the conditions in which doctor advice for ECG. Explain angiography an stents. [CO3] [L4] **1**

Q.6 a) Evaluate various factors that affect the balanced diet .Explain the components of balanced diet and their sources. [CO5] [L5] **1**

b) Compare between the diet for a youth and diet for an old age person. [CO4] [L5] **1**

Q.7 Discuss the strategy that you will make with the help of different yoga aasana an medication to fight against life style disease. Also design a yogic diet plan for a goo health care and wellness. [CO6] [L6] **2**

End Semester Examination, Dec. 2021

B. TECH – Seventh Semester

IT BUSINESS CONTINUITY AND DISASTER RECOVERY PLANNING (CS-704)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions:

a) Discuss the different Phases of disaster?
b) Define BC/DR Team?
c) Discuss the need of Event logs?
d) Discuss the Risk Assessment?
e) List the best course of action to take during a medical emergency?
f) Discuss the key elements of Business Continuity?
g) Discuss the Project Close out?
h) Discuss the Disaster Recovery?
i) Describe the Business Impact Analysis?
j) Classify the different techniques to identify earthquake risk Assessment? **2x10**

PART-A

Q.2 a) Explain the different Backup Techniques? **10**
b) Discuss the Disaster in IT industry? What are the different types of disaster? **10**

Q.3 a) Explain the different between incremental differential backup? **10**
b) Describe Project and also discuss the elements of project Success? **10**

Q.4 a) Describe RTO and RPO in detail? **10**
b) Discuss the threat and vulnerability assessment methodology? **10**

PART-B

Q.5 a) Discuss the Phases of Business continuity and Disaster Recovery? **10**
b) Explain the role of communication Plans? **10**

Q.6 a) Explain the Testing the BC/DR Plan? **10**
b) Discuss the performing IT systems and security Audits? **10**

Q.7 a) Discuss the activity of plan maintenance? **10**
b) Explain describe the different activities involved in BCM and DRP? **10**

End Semester Examination, Dec. 2021

B. Sc. (Data Science) – Fifth Semester

MACHINE LEARNING-II (DS-501)

Time: 3 hrs. Max Marks: 7

No. of pages:

Note: *Attempt **FIVE** questions in all. **Q.1 is compulsory**. Taking atleast **ONE** question fi each **UNIT.** Marks are indicated against each question.*

Q.1 a) Support vector machines (SVMs) are the supervised learning algorithms. H Support vectors helps in the construction of hyperplanes(s)? [Co 1,2][L

b) State the difference between undirected and directed graphical models. Justify y claim by giving suitable real life example. [Co 1,3][L 1

c) Which condition is used to influence a variable directly by all others? [Co 1,2][L 4]**5**

UNIT-I

Q.2 Consider the two dimensional patterns (2,1),(3,5),(4,3),(5,6),(6,7),(7,8). Compute principal components using PCA Algorithm. [Co 1,2][L 3]

Q.3 a) What is the goal of Support Vector Machine? [Co 1,3][L

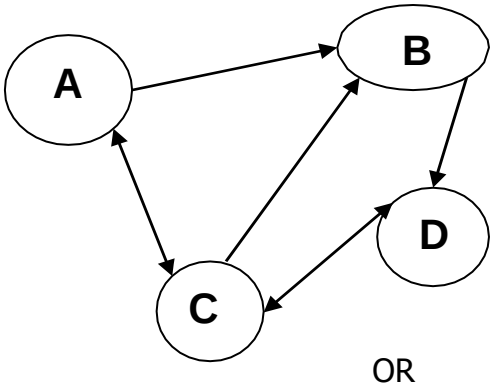
b) Explain is it supervised orunsupervised. [Co 1,3][L

c) Why SV Misagood Classifier? [Co 1,3][L

d) What is Kernel Trick in SVM? Write few commonly used Kernels. [Co 1,3][L

UNIT-II

Q.4 Calculate the Page Ranks for a given network of web pages. Here A, B, C, D are f web pages and connections represents the links.



[Co 1,3][L 5]

OR

Q.5 State and prove Ada-boost Algorithm for Classification Method. [Co 1,3][L 5]

UNIT-III

Q.6 From the following confusion matrix:

	True Positive	True Negative
Predictive Positive	8	3
Predictive Negative	2	7

Compute recall and Specificity.

End Semester Examination, Dec. 2021

B. Sc. (Data Science) – Fifth Semester

GRAPH THEORY (DS-502)

Time: 3 hrs. Max Marks: **7**

No. of pages:

Note: *Attempt **FIVE** questions in all. **Q.1 is compulsory**. Marks are indicated against ea question.*

Q.1 a) Define Induced Graph and Clique with an example of each. [CO:1][L:1

b) Explain Isomorphism of graphs, give an example in support of your definitio [CO:1][L:2

c) Calculate the Trace of Adjacency Matrix of a simple graph. [CO:1][L:1

d) Write the least number of edges in a connected graph with n vertices. Also state if is a Tree or not, give reason to verify your answer. [CO:2][L:1

e) Write four characteristics of a binary tree. [CO:2][L:2

f) Explain following with illustrations:

i) Edge Cut

ii) Vertex Cut

iii) Separating Set

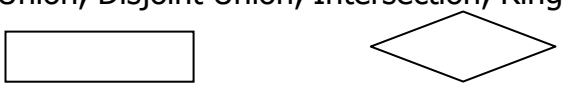
iv) Disconnecting Set [CO:3][L:1

g) Define a One-Isomorphic and Two-Isomorphic Graph. [CO:3][L:2

Q.2 a) State and Prove Handshaking Lemma. [CO: 1][L:3]**7**

b) Demonstrate the following operations on Graph G1(A,B,C,D) and G2(C,D,E,F):

Union, Disjoint Union, Intersection, Ring Sum



[CO: 1][L:4]**7**

Q.3 a) Explain the constants of a graph with an example of each. [CO: 2][L:3]**7**

b) Prove that every connected graph has a spanning tree. [CO: 2][L:4]**7**

Q.4 a) Prove that a connected graph is an Euler Graph if and only if it can be decompose into circuits. [CO: 1][L:5]**7**

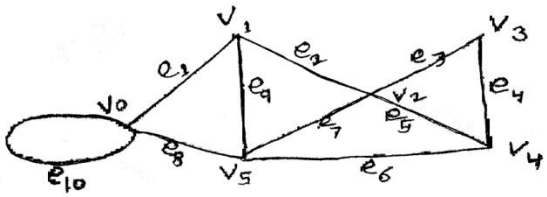
b) Prove that a graph is a tree if and only if it is minimally connected. [CO: 2][L:5]**7**

Q.5 a) Explain the difference between an Edge Cut and Disconnecting set. Justify using example. [CO: 3][L:4]**7**

b) Prove that K_5 is a Non-Planar graph. [CO: 3][L:3]**7**

Q.6 a) Prove that a connected simple planar graph has atleast one vertex whose degree atmost. [CO:4][L:3]**7**

b) In the graph given below, create dual graph.



[CO: 4][L:4]**7**

Q.7 a) Explain Greedy Coloring Algorithm and Brook's Theorem. [CO: 3][L:3]**7**

b) Write an algorithm to find a shortest path (minimum weight) from vertex u to [CO:4][L:4]**7**

End Semester Examination, Dec. 2021

B. Sc. (Data Science) – Fifth Semester

SOCIAL NETWORK ANALYTICS (DS-503)

Time: 3 hrs. Max Marks: **7**

No. of pages:

Note: *Attempt **FIVE** questions in all. **Q.1 is compulsory**. Marks are indicated against ea question.*

Q.1 a) Illustrate the Global structure of networks with an example. [CO1][L-

b) Classify the datasets available for news feeds on social media with one example. [CO2][L-

c) Explain how to extract face book page dataset including emoticons? [CO3][L-

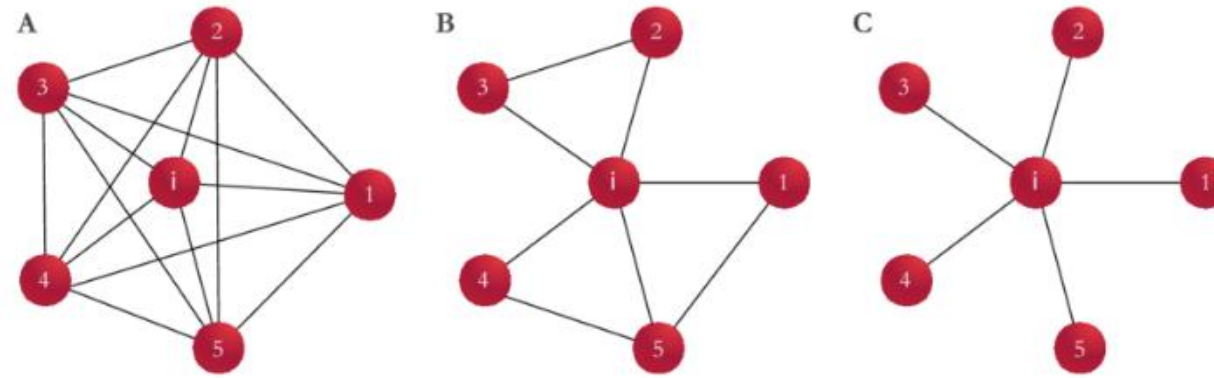
d) How do you do Sentiment Analysis on Historical Twitter data in R? [CO3][L-3

e) Explain tools used for "social media optimization". [CO4][L-2]**3x**

Q.2 Briefly explain the development of Social Network Analysis.What are the datase available for news feeds on social media? [CO1][L-2]**1**

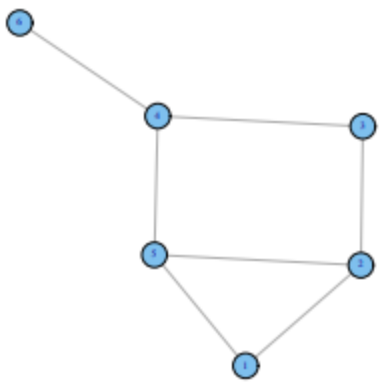
Q.3 Explain Balanced Networks and the Cartwright-Harary Theorem. [CO1][L-3]**1**

Q.4 Find the clustering coefficients of all the graphs A, B, C given below:



[CO2][L-2]**1**

Q.5 Explain the concept of Girvan Newman technique and apply the same on the netwo given below:



[CO2][L-3]**1**

Q.6 Distinguish the tools used for "social media optimization". [CO3][L-2]**1**

End Semester Examination, Dec. 2021

B. Tech. — Fifth Semester

FRENCH - I (HM-506)

Time: 1½ hrs. Max Marks: **50**

No. of pages: 5

Note: *Attempt **ALL** questions are **compulsory**. Marks are indicated against each question.*

(COMPRÉHENSION ÉCRITE)

Q.1 **Lisez le passage et répondez aux questions** [HM-506.4][L-6]

(Read the passage and answer to the questions)

Bonjour ! Je m'appelle Amélie Legrand et j'ai onze ans. J'habite à Lyon. J'ai une sœur. Elle s'appelle Catherine Legrand, elle a quinze ans. Mon père s'appelle Joseph Legrand. Ma mère s'appelle Laura Legrand. Ils sont intelligents. Mes grands-parents habitent à Marseille. Je visite mes grands-parents dans les vacances d'été. J'aime bien mes grands-parents et mes parents. Ils sont très sympathiques. J'ai deux chiens, trois chats et un perroquet (*parrot*). Ma famille est très grande. J'adore beaucoup ma famille et mes amis.

a) Dites vrai ou faux :
(True or False)

i.) Amélie a douze ans. _____

ii.) Amélie a un frère. _____

iii.) Les grands-parents d'Amélie sont intelligents. _____

iv.) Les parents d'Amélie sont sympathiques. _____

v.) Amélie visite ses amies dans les vacances d'été. _____

½x5

b) Donnez l'infinitf des verbs
(Write the infinite form of the verbs)

i.) Ai _____

ii.) Est _____

iii.) Visite _____

iv.) Adore _____

v.) Habite _____ **½x5**

End Semester Examination, Dec. 2021

B. Tech. — Fifth Semester

GERMAN-I (HM-507)

Time: 1½ hrs. Max Marks: **50**

No. of pages: 4

Note: *Attempt **ALL** questions are **compulsory**. Marks are indicated against each question.*

Q.1 **Lies den Text.**

(read the given passage and answer the questions) [HM-507.2][L-2,4]

Hallo,
Ich bin Tom und wohne in Hamburg. Ich bin 15 jahre alt. Ich habe einen Bruder, er ist noch klein. Er ist 7 jahre alt. Ich wohne mit meiner Familie. Meine Mutter ist Deutschlehrerin. Mein Vater wohnt in Frankfurt. Er ist Arzt von Beruf. Er arbeitet viel in seiner Praxis.

Richtig oder Falsch?

a) Tom hat eine Schwester. _____

b) Der Bruder von Tom ist 7. _____

c) Tom wohnt in Berlin. _____

d) Der Vater von Tom ist Lehrer von Beruf. _____

e) Die Mutter von Tom ist Deutschlehrerin. _____ **1x5**

Q.2 **Wie spät ist es? (Offizielle Zeit)** [HM-507.5][L-5]

What time is it? (Write in the official format)

a) 03.00 _____

b) 11.50 _____

c) 07.00 _____

d) 10.35 _____

e) 18.00 _____ **1x5**

Q.3 **Schreiben Sie 5 Sätze über Ihr Lieblingshobby.** [HM-507.5][L-3,5]

Write 5 sentences about your favourite hobby.

_____.

_____.

_____.

End Semester Examination, Dec. 2021

B. Tech. – Fifth Semester

SPANISH-I (HM-508)

Time: 2 hrs. Max Marks:

No. of pages

Note: *Attempt **ALL** questions are **compulsory.** Marks are indicated against each question.*

Q.1 a) **Lee y responde.**
Read and respond.

¡Hola! ¡Buenas tardes! Me llamo Ángela, soy mexicana pero vivo en Madrid, la ca de España con mis amigos. Yo tengo 30 años y soy profesora de geografía e escuela. Mi número de teléfono es 9399339. Tengo un amigo en Madrid que se ll Sergio Lopez. Él es de Perú, es peruano, Sergio tiene 32 años y es doctor. Te otros amigos que son cantantes, guitarristas y profesores. Nosotros vivimos en casa muy grande. Gracias, ¡chao!

i) ¿Ángela es de España? Verdadero o falso
ii) ¿Cuántos años tiene ella?
iii) ¿Cuál es la profesión de Sergio Lopez?
iv) ¿Dónde vive Ángela? **1x**

b) **Elige la opción correcta: (HM508.2)**
Choosethecorrectoption

i.)	a) Un coche	b) Una coche	c) Uno coche	d) Unas coches
ii.)	a) Unas casos	b) Unas casas	c) Unos cacos	d) Uno casa
iii.)	a) El perra	b) La perro	c) El perro	d) El perro
iv.)	a) Las silas	b) Las cilas	c) Las sillas	d) Los sillas
v.)	a) La ordenador	b) Las ordenadores	c) Lo ordenadore	d) El ordenador
vi.)	a) Una planta	b) Un planta	c) Las planta	d) Los plantes

Q.2 **Elige uno y escribe un párrafo.**
Write a paragraph on any 1 of the following.

o

End Semester Examination, Dec 2021

M.Sc. Applied Geology – Third Semester

ADVANCE ENGINEERING GEOLOGY (MAG-DS-301)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Marks are indicated against each question.*

Q.1 Answer the following questions:

a) Hardness is which kind of property?
   i) Isotropic ii) Anisotropic
   iii) Homogenous iv) Non-homogenous

b) The tendency of a crystallized mineral to break along certain directions yielding more or less smooth, plane surfaces is _____.
   i) Tenacity ii) Hardness
   iii) Cleavage iv) Fracture

c) Sampling is done:
   i) Parallel to the strike of the ore body. ii) Across the strike of the ore body.
   iii) Diagonal to the strike of the ore body. iv) In any possible direction.

d) What is the downgrade movement of mass along no definite surface called?
   i) Flowage ii) Sliding
   iii) Subsidence iv) Earthquake

e) What type of material may undergo landslide?
   i) Rock fragments ii) Loose soil
   iii) Whole blocks iv) Any type of mass

f) Which types of clay is used as a drilling mud:
   i) China clay. ii) Fullers earth.
   iii) Bentonite clay. iv) Fire clay.

g) A solid barrier constructed at a suitable location across the river side is called ……
   i) Reservoir ii) Dam
   iii) Tunnel iv) retaining walls

h) Which is the tallest Dam of india?
   i) Hirakud Dam ii) Bhakra Dam
   iii) Krishnarajasagar Dam iv) Nagarjun Sagar Dam

i) To prevent landslide, improving the cultivation in the sloppy region, the root of which prevent
   i) Erosion ii) Coherent
   iii) Cohesion iv) floo

j) Repetitive observation of the same area at equal interval of time are useful to monitor the dynamic phenomena:
   i) Cloud evolution ii) Vegetative cover
   iii) Snow cover iv) All of these **2x10**

PART-A

Q.2 a) Discuss the branches of engineering Geology. [C0-2][L3]**10**

b) Explain Rock Quality Design (RQD). [C0-2][L4]**10**

Q.3 a) Discuss the suitable geological condition for the Dam construction? [C0-5][L5]

b) Explain Coastal protection structures with few examples. [C0-][L4]**10**

End Semester Examination, Dec. 2021

M.TECH (Biotechnology) - Third Semester

ENTREPRENEURSHIP OPPORTUNITIES IN FOOD INDUSTRY

(MBT -321)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Taking at least **ONE** question from each **UNIT**. Each question carries equal marks.*

Q.1 Answer the following in brief:

a) Who is an entrepreneur? [CO1][L-1]

b) Enlist entrepreneur traits that are needed to become a successful entrepreneur. [CO1][L-1]

c) Illustrate different food business opportunities available in India. [CO2][L-3]

d) Contrast between 'patent' and 'copyright'. [CO3][L-2]

e) Outline different types of market we have. [CO4][L-4]

f) Determine the significance of a market research to an entrepreneur. [CO3][L-3]

g) Summarize different component of a project management. [CO4][L-2]

h) Define the term unit price and unit sale. [CO6][L-1]

i) Describe Finance and its categories. [CO5][L-2]

j) Analyze how budgeting influence the business? [CO6][L-4]**2x10**

UNIT-I

Q.2 a) State the characteristics and functions of an entrepreneur. [CO1][L-1]**10**

b) Illustrate the case of any successful entrepreneur consisting of the mindset and approach to get success. [CO2][L-3]**10**

Q.3 a) Explain patent. Describe patentable and non patentable objects. How one can file the patent application? [CO3][L-3]**10**

b) Outline the different licenses and conditions required for food business. Explain about the validity and renewal of food license. [CO4][L-4]**10**

UNIT-II

Q.4 Determine different sources to search for a business idea. Prepare a project report for a food business of your choice. [CO6][L-3]**20**

Q.5 a) Outline and explain the 5 Ps for marketing with examples. [CO4][L-4]**10**

b) Illustrate the marketing core concept? How organizational resources and opportunities affect the planning process. [CO3][L-3]**10**

UNIT-III

Q.6. a) Evaluate various finance categories and significance of financial management. [CO5][L-5]**10**

b) Compare between sole proprietorship and partnerships. Mention advantages and disadvantages. [CO4][L-5]**10**

Q.7 Design a business model to explain the concept of breakeven analysis and cash flow analysis. Explain the significance of budgeting to run a food business successfully. [CO6][L-6]**20**

End Semester Examination, Dec. 2021

M. Tech. - Third Semester

DESIGN OF PRESTRESSED CONCRETE STRUCTURES (MCE-SE-301A)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question. Assume appropriate data as required. Use of Scientific calculators, IS:1343-2012 and IS:456-2000 is allowed.*

Q.1 Answer the following questions:

a) State the disadvantages of prestressed concrete over reinforced concrete. [CO1][L-1]

b) Define bonded and unbonded prestressing concrete. [CO1][L-1]

c) Give applications of pretensioned concrete and post tensioned concrete? [CO1][L-1]

d) Classify various losses of prestressed concrete during its life time through a flow diagram. [CO3][L-1]

e) Why loss due to shrinkage is more for pretensioned member compared to post tensioned member? [CO3][L-2]

f) Write a note on "Loss due to Elastic Shortening for a Post – Tensioned Member" when multiple wires are provided with subsequent tensioning.[CO3][L

g) Write a short note on "Shrinkage of Concrete". [CO6][L-1]

h) Enlist the modes of failure due to Shear. [CO4][L-2]

i) Which all codes need to be referred to get information about the loads considered in the design. [CO5][L-1]

j) What does IS:1343 - 1980 specify about the limits of crack width such that the appearance and durability of the structural element are not affected. [CO6][L-2]**2x10**

PART-A

Q.2 a) Illustrate various stages of the Pre-tensioning operation with neat diagrams. [CO2][L-2]**10**

b) Describe the different Modulus of Elasticity of Concrete with a neat sketch. [CO3][L-5]**10**

Q.3 a) Describe briefly the losses due to Elastic Shortening and Friction. How do we account for them in Pre/Post Tensioning? [CO3][L-2]**10**

b) A pretensioned beam 225 mm by 300 mm is prestressed by 12 wires of 5mm dia. The initial prestressing is 1100 MPa. The grade of concrete is M40. The relaxation of steel is 5% and $E_s=2X10^5$ MPa. Creep coefficient=1.6. The shrinkage strain=$3X10^{-4}$. Find the losses due to various causes. The eccentricity is 50 mm from CGC.E_c = 31.5 kN/mm^2. [CO3][L-5]**10**

Q.4 A concrete beam of span 6m and dimensions 500 X 600 mm is prestressed with a parabolic tendon with zero eccentricity at the ends and an eccentricity of 100

End Semester Examination, Dec. 2021

M. Tech. – Third Semester

TRAFFIC SIMULATION MODELLING AND APPLICATION (MCE-TE-302

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions fro **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against eac question.*

Q.1 a) Differentiate between Discrete distribution and continuous distribution.

b) Define the term "random variates". Also mention their need in simulation. [CO1][L2

c) Give some important applications of queuing theory. [CO2][L1

d) For a (M / M /1):(∞/FCFS) queuing model, write the expressions for:

i) The steady state equation.

ii) Expected number of customers in the system.

iii) Expected number of customers in the queue. [CO3][L3

e) Draw the flow diagram of a microscopic traffic simulation model. [CO1][L3

f) Differentiate between mean arrival rate and mean service rate. [CO4][L2

g) Define Cumulative Distribution Function (cdf) and write down the expression for the same. [CO1][L1

h) Write down the rules for acceleration in cellular automaton model. [CO5][L1

i) Explain the term "cycle" and also the effect of period on cycle. [CO2][L2

j) Explain the system performance measures of queuing model. [CO3][L2]**2x1**

PART-A

Q.2 a) Compare between Stochastic vs deterministic simulations. Mention the advantages also. [CO1][L5] **10**

b) Simulation can be used in various fields for modelling. Justify this statement wit citing relevant field examples. [CO5][L5]**10**

Q.3 a) How linear congruential method is useful over other methods of generatin pseudo-random numbers? [CO2][L4]**10**

b) For the following data, use chi-square test with a=0.05 to check the uniformity. [CO2][L4]**1**

Degree of freedom for 9 and 10 would be 16.9 &18.3

0.34	0.90	0.25	0.89	0.87	0.44	0.12	0.21	0.46	0.67
0.83	0.76	0.79	0.64	0.70	0.81	0.94	0.74	0.22	0.74
0.96	0.99	0.77	0.67	0.56	0.41	0.52	0.73	0.99	0.02
0.47	0.30	0.17	0.82	0.56	0.05	0.45	0.31	0.78	0.05
0.79	0.71	0.23	0.19	0.82	0.93	0.65	0.37	0.39	0.42
0.99	0.17	0.99	0.46	0.05	0.66	0.10	0.42	0.18	0.49
0.37	0.51	0.54	0.01	0.81	0.28	0.69	0.34	0.75	0.49
0.72	0.43	0.56	0.97	0.30	0.94	0.96	0.58	0.73	0.05
0.06	0.39	0.84	0.24	0.40	0.64	0.40	0.19	0.79	0.62
0.18	0.26	0.97	0.88	0.64	0.47	0.60	0.11	0.29	0.78

End Semester Examination, Dec. 2021

M. Tech. – Third Semester

OPTIMIZATION TECHNIQUES (MCS-323)

Time: 3 hrs. Max Marks: **100**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) In modeling, what is an optimal solution understood to be?

b) What are the limitations in the graphical method in solving linear programming problems?

c) Differentiate between an inflection point, saddle point and a critical point.

d) If a critical point is a minimum or a maximum, or a saddle, we look at the Hessian matrix, Comment on it.

e) For a rectangle matrix, when number of rows is less than number of columns, i.e., m<n, the rank of this matrix can be:

i) Less than or equal m b) less than or equal n

ii) More than or equal m d) none of the above

f) Genetic algorithms (GA) are heuristic methods that do not guarantee an optimal solution to a problem (***True or False***?). Justify!

g) Write the Lagrange function associated with the problem Opt.f(x, y, z) subject to g(x, y, z) = c.

h) Describe a Hessian matrix and mention any two usages.

i) All of the following are suitable problems for Genetic Algorithms (GA) EXCEPT.

i) Dynamic process control. ii) Pattern recognition with complex patterns

iii) Simulation of biological models. iv) Simple optimization with few variables.

j) What are the three key aspects of swarm intelligence? **2x10**

PART-A

Q.2 a) What is optimization, what are the three elements of an optimization problem? And discuss four different types of optimization techniques. [CO1][L-1]**10**

b) Solve the following LPP by graphical method:

$$\text{Maximize: } P = 7X + 5Y$$
$$\text{Subject to: } 4X + 3Y \leq 240$$
$$2X + Y \leq 100$$
$$X \geq 0, Y \geq 0$$

[CO1][L-3]**10**

Q.3 a) A plastic cup company seeks to increase earnings by optimizing their production mix. They specialize in custom beer mugs and champagne glasses. A case of beer mugs yields a profit of $25, whereas a case of champagne glasses yields a profit of $20. Plastic resins are fed into a machine called a plastic extruder, which produces the cups. Each case of beer mugs requires 20 lbs. of plastic resins to produce while champagne glasses require 12 lbs. per case.

End Semester Examination, Dec. 2021

M.TECH – Third Semester

BUSINESS ANALYTICS (M-ID-001)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all. Marks are indicated against each question.*

Q.1 What is business analytics? Critically assess the role and contribution of busines analytics as a solution for business challenges. [CO1][L-3]**2**

Q.2 a) Explain the essential Steps needed in the process of business analytics. [CO1][L-2]
b) How is the business analytics process similar to the organization decision-makin process? [CO1][L-3]**1**

Q.3 Forecasting techniques rely on using actual information from previous periods as th basis for the predictions the model will make.
a) How many previous periods of information should a model use to produce prediction which you would rely on to assist in making a decision?
b) Why do you set the number of previous periods of information required to produc the model at the level you chose? [CO3,4][L-3]**2**

Q.4 a) Explain the need of data preprocessing how would you preprocess your data Illustrate with examples. [CO2][L-2]**1**
b) Classify each of the variables in the data set given below as categorical, ordina interval, or ratio with suitable explanations.

Index	Country	Age	Salary	Purchased
0	INDIA	30	68000	No
1	FRANCE	43	45000	Yes
2	GERMANY	30	54000	No
3	FRANCE	48	65000	No
4	GERMANY	40	nan	Yes
5	INDIA	35	58000	Yes
6	GERMANY	nan	53000	No
7	FRANCE	49	79000	Yes
8	INDIA	50	88000	No
9	FRANCE	37	77000	Yes

[CO2][L-3]**1**

Q.5 Write short notes on:
a) Data journalism.
b) Embedded business intelligence.
c) Visual data recovery.
d) Data story telling. [CO6][L23]**5x**

Q.6 a) Explain various team management issues that should be considered durin Business Analysis. [CO1][L-2]**1**
b) Give a brief introduction to data mining knowledge discovery. [CO1][L-2]**1**

End Semester Examination, Dec. 2021

M. Tech. -Third Semester

OPERATIONS RESEARCH (M-ID-003)

Time: 3 hrs. Max Marks: **10**

No. of pages: 2

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions fro **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against eac question.*

Q.1 Answer the following questions:

a) Define 'operations research'. [CO1][L1
b) Discuss the limitation of linear programming. [CO1][L1
c) What are the rules of constructing the dual from primal? [CO2][L2
d) Define 'degeneracy'. [CO1][L2
e) Write the advantages and disadvantages of simulation. [CO3][L1
f) What are the characteristics of game theory? [CO4][L2
g) Explain phases of operations research. [CO4][L2
h) The expected time (t_e) of a PERT activity in terms of optimistic time (t_o), pessimistic time (t_p) and most likely time (tl) is given by……. [CO3][L2
i) What is the need for Simulation? [CO3][L2
j) How can sensitivity analysis be used? [CO3][L2]**2x1**

PART-A

Q.2 A company produces two types of products say type A and B. Profits on the two type of product are Rs.30/- and Rs.40/- per kg respectively. The data on resource required and availability of resources are given below:

	Requirements		Capital available per month
	Product A	Product B	
Raw material (kgs)	6	12	120
Machining Hrs/prices	8	5	600
Assembling (man hrs)	3	4	500

Formulate this problem as a linear programming problem to maximize the profit.

[CO1][L3]**2**

Q.3 A company makes two kinds of leather belts, belt A and belt B. Belt A is a high qualit belt and belt B is of lower quality. The respective profits are Rs 4 and Rs 3 per bel The production of each of type A requires twice as much time as a belt of type B, an if all belts were of type B, the company could make 1,000 belts per day. The supply c leather is sufficient for only 800 belts per day (both A and B combined). Belt requires a fancy buckle and only 400 of these are available per day. There are onl 700 buckles a day available for belt B. What should be the daily production of eac type of belt? Formulate this problem as an LP model and solve it using the simple method.

Maximize (total profit) $Z = 4x_1 + 3x_2$

subject to the constraints

(i) $2x_1 + x_2 \le 1{,}000$ (Time availability), (ii) $x_1 + x_2 \le 800$ (Supply of leather)

(iii) $\left.\begin{array}{l} x_1 \le 400 \\ x_2 \le 700 \end{array}\right\}$ (Buckles availability)

and $x_1, x_2 \ge 0$

End Semester Examination, Dec. 2021

M. Tech. - Third Semester

WASTE TO ENERGY (M-ID-006)

Time: 3 hrs | Max Marks: **100**

No. of pages: 1

Note: *Attempt* any ***FIVE*** *questions in all. Marks are indicated against each question.*

Q.1 a) Explain the process of Classification of waste as fuel. Is energy from waste is good or bad? [CO1][L3]**12**

b) Is municipal solid waste considered a renewable resource? [CO1][L3]**8**

Q.2 a) Classify roll of incinerators, gasifiers and digestor to management of waste. [CO2][L4]**12**

b) Discuss energy recovery impact on greenhouse gas emissions. [CO2][L2]**8**

Q.3 a) Write note on biomass energy programme of India. [CO3][L3]**10**

b) Describe slow and fast pyrolysis process. [CO3][L2]**10**

Q.4 a) Evaluate the role of biomass pyrolysis in waste to energy management system. [CO2][L5]**12**

b) Justify various reaction model of biomass pyrolysis. [CO2][L5]**8**

Q.5 a) Illustrate that environmental permit to operate energy from waste facility. [CO4][L4]**10**

b) Differentiate between fixed bed and fluidized bed gasifiers. [CO4][L5]**10**

Q.6 a) Evaluate issues associated with 1st generation biofuels and to what extent can 2nd generation biofuels address these issue. [CO5][L4]**10**

b) Why woody bio-residue gasifier use is not encouraged. Discuss the reasons. [CO5][L5]**10**

Q.7 a) Describe various bioenergy conversion technologies. [CO3][L2]**10**

b) Evaluate environmental and other aspects of energy crop production. [CO4][L6]**10**

Q.8 Formulate a case study on biogas generation, purification and bottling development in India. [CO5][L6]**20**

End Semester Examination, Dec. 2021

B. Tech (M.E.) (Industry Integrated) – Fifth Semester

PRODUCT DESIGN AND PROCESS PLANNING (MII-501)

Time: 3Hours Max Marks: **10**

No. of pages: 1

Note: *Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) Mean time to failure is for: [CO1][L-1]
   i) Repairable products ii) unrepairable products iii) Both

b) Parallel assembly lead to: [CO1][L-1]
   i) Higher reliability ii) lower reliability iii) neither of two

c) In a bath tub curve, early life failure reasons are: [CO2][L-1]
   i) Wearout of parts ii) rare occurrences iii) non conformance norms

d) Reliability modelling includes: [CO3][L-1]
   i) Use of CAD and CAE in design
   ii) Historical data analysis
   iii) Setting reliability goals

e) Which of the following is not a fixed cost? [CO3][L-1]
   i) Tooling cost ii) Machinery cost iii) Material cost

f) Which of the following is a variable cost? [CO3][L-1]
   i) BOP cost ii) machinery cost iii) Tooling cost

g) Which of the following processes gives accuracy in the range of 100 microns? [CO3][L-1]
   i) turning ii) milling iii) grinding

h) To calculate the material weight you have to multiply material volume with: [CO3][L-1]
   i) density ii) specific weight iii) Raw material weight

i) Which of the following parts is made by casting? [CO4][L-1]
   i) Engine block ii) train wheels iii) crane hooks

j) Which of the following is a transparent thermoplastic material? [CO4][L-1]
   i) Phenol formaldehyde
   ii) Poly carbonate
   iii) Melamine formaldehyde

k) In plastics, cavities are given for: [CO4][L-1]
   i) Reduce weight ii) Better strength iii) Neither of the two

l) Sink mark in plastics is: [CO4][L-1]
   i) quality defect ii) white marks iii) Neither of the two

m) In sheet metal parts, minimum distance between edge of hole and flat sheet edg should be: [CO4][L-1]
   i) Dia of hole ii) sheet thickness iii) Neither of the two

n) Unit of modulus of hardness is: [CO4][L-1]
   i) N-m ii) Rockwell iii) kgf

o) Recommended minimum working height above floor from ergonomic point of vie is: [CO4][L-1]
   i) 900 mm ii) 700 mm iii) 800 mm

p) Safety items are mostly made by: [CO4][L-1]

End Semester Examination, Dec. 2021

B-Tech. (Industry Integrated) - Fifth semester

MEASURING TECHNIQUE AND COMPUTER AIDED INSPECTION (MII-502)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

*Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.*

Q.1 Answer the following:

a) What are line and end standards? [MII.502L-1]
b) Define 'straight edge and its use'. [MII.502L-1]
c) Discuss benefits of no-contact type instruments. [MII.502L-1]
d) What are GO and NO-Go gauges used for? [MII.502L-2]
e) Define 'hole base system'. [MII.502L-1]
f) What is the use of surface gauge? [MII.502L-1]
g) Define interchangebility. [MII.502L-1]
h) What is a photodiode? [MII.502L-1]
i) Define 'sensors'. [MII.502L-1]
j) What are limit switches? [MII.502L-2]

2x10

PART-A

Q.2 What do you understand by linear measurement? Explain Vernier caliper with neat sketch. [MII.502L-1,3,4]**20**

Q.3 Explain the working of autocollimator surface measurement with neat diagram. [MII.502L-1,2,4]**20**

Q.4 Design the acceptance test procedure for a lathe machine. [MII.502L-3,5,6]**20**

PART-B

Q.5 What are the principle and applications of optoelectronic devices? [MII.502L-1,3,5]**20**

Q.6 What are the different types of proximity sensors and their applications? [MII.502L-3,4,6]**20**

Q.7 Explain various types of non-contact sensors in detail. [MII.502L-2,4]**20**

End Semester Examination, Dec. 2021

B-Tech. (Industry Integrated) - Fifth semester

FACILITY PLANNING AND PLANT LAYOUT (MII-503)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.*

Q.1 Answer the following questions:

a) What is the nature of facility planning? [L2]
b) Define 'cost contours'. [L1]
c) Define 'fixed position layout'. [L1]
d) Define 'travel chart'. [L1]
e) Define chain type structure for part coding. [L1]
f) Define 'production line'. [L1]
g) Define 'screw feeders'. [L1]
h) What are the advantages of a unit load? [L2]
i) Define 'hoppers and feeders'. [L1]
j) What are the functions of warehouse? [L1]**2x10**

PART-A

Q.2 Define location analysis. What are the various techniques used for analysis of a location. [L1,2,4]**20**

Q.3 Describe facility layout and discuss its significance and objectives. [L1,4,5]**20**

Q.4 Explain in detail the Grouping techniques. How they are beneficial for the industry? [L1,4,5]**20**

PART-B

Q.5 Classify the various material handling equipments. [L2] **20**

Q.6 Write the principles and functions of material handling. [L2,6]**20**

Q.7 Describe the following with their applications:-

a) Pneumatic conveyors.
b) Bucket elevators.
c) Vibratory conveyors.
d) Bins. [L1],2**5x4**

End Semester Examination, Dec.2021

B-Tech. (Industry Integrated)-Fifth semester

VEHICLE ENGINEERING (MII-506)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

*Note: Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B.** Marks are indicated against each question.*

Q.1 Answer the following:

a) Define 'camber'. [MII.56.L1]
b) What is instantaneous centre of rotation? [MII.56.L1]
c) What is riding height? [MII.56.L1]
d) What is function of Panhard rod? [MII.56.L2]
e) What are universal joints? [MII.56.L1]
f) What are the desired properties of brake fluids? [MII.56.L1]
g) What is ABS? [MII.56.L2]
h) Distinguish between sprung & unsprung weight of an automobile. [MII.56.L2]
i) What is the use of torsion bar? [MII.56.L1]
j) Define 'leaf spring'. [MII.56.L1]**2x10**

PART-A

Q.2 Explain the steering linkages in Independent suspension system with neat sketch. [MII.56.L2]**20**

Q.3 Explain various types of steering gear box. [MII.56.L2]**20**

Q.4 Explain the working and construction of a differential. [MII.56.L3]**20**

PART-B

Q.5 Explain the working and construction of Disc brakes. [MII.56.L5]**20**

Q.6 Explain Exhaust gas re-circulation system with neat sketch. [MII.56.L5]**20**

Q.7 Explain McPherson strut suspension system with neat sketch. [MII.56.L6]**20**

End Semester Examination, Dec.2021

B-tech. (Industry Integrated)-Seventh semester

ROBOTICS (MII-701)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **Part-A** and **TWO** questions from **Part-B**. Each question carries equal marks.*

Q.1 ***Answer the following questions:***

a) Define Laws of Robotics.
b) Sketch a robot and name its parts
c) What is a mechanical gripper?
d) Give some examples of tool as robot end effector.
e) Briefly explain the function of a piezoelectric sensor.
f) Differentiate between the sensor & transducer.
g) What are safety sensors?
h) Define Optic sensors.
i) Define Cartesian space trajectory planning.
j) Define Path & trajectory.

2x1

PART-A

Q.2 Sketch and explain various configuration of robot. **2**

Q.3 Explain Industrial applications of robots. **2**

Q.4 Discuss the performance characteristics of actuators. Compare electrical, pneumatic hydraulic actuators for their characteristics. **2**

PART-B

Q.5 Describe the classification of sensors and the factors to be considered for its selection. **2**

Q.6 Explain various steps in Trajectory Planning. **2**

Q.7 Explain architecture of robotic vision system along with stationary & moving camera. **2**

End Semester Examination, Dec. 2021

B. Tech (M.E.) (Industry Integrated) – Seven Semester

PRESS TOOLS-II (MII-702)

Time: 3Hours | Max Marks: **10**

No. of pages: 2

Note: *Attempt **FIVE** questions in all. **Q.1 is compulsory.** Attempt any **TWO** questions from **PART-A** and any **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following:

a) What is the function of cushion pins in Draw tool? [CO1][L-1]
   i) Provide force ii) To eject the draw panel iii) Both

b) Identify single action draw tool: [CO1][L-1]
   i) Die Block up - punch down ii) Punch up-Die Block down iii) Neither of the two

c) The maximum draw percentage in 1st draw is: [CO1][L-1]
   i) 10% ii) 25% iii) 40%

d) Lower hardness in blank will lead to following problem in draw operation: [CO1][L-1]
   i) Wrinkle ii) Spring back iii) crack

e) If the blank holding force of sheet is too high, it can lead to following problem: [CO1][L-1]
   i) crack ii) Wrinkle iii) spring back

f) In Erichsen test, punch comes down until the following happens: [CO1][L-1]
   i) sheet gets clamped ii) Sheet gets drawn iii) sheet cracks

g) In Draw tool, choose the correct condition: [CO1][L-1]
   i) Excess material cut off ii) Part shape changes iii) Springback correction

h) In stamping simulation, the following is input in pre processing: [CO2][L-1]
   i) Material properties of blank
   ii) CAD Model of die face
   iii) Both

i) Stamping simulation software indicates the following: [CO3][L-1]
   i) crack ii) wrinkle iii) Both

j) The purpose of the restriking tools is: [CO3][L-1]
   i) Local shape change ii) Cut extra material
   iii) control spring back

k) In trimming tool, lower tool acts as: [CO3][L-1]
   i) Trimming punch-piercing punch
   ii) Trimming die-piercing punch
   iii) Trimming die-piercing die

l) In trimming tool, size of piercing hole will be equal to size of: [CO3][L-2]
   i) trimming punch size ii) trimming die size iii) piercing punch size

m) In trimming tool, material of pad is: [CO3][L-1]
   i) FC 300 ii) FCD 550 iv) HCHCr

n) In trimming tool, the hardness of steel inserts should be: [CO4][L-1]
   i) 55-60 HRc ii) 50-55 HRc iii) 56-62HRc

o) In restrikingtool, function of wear plates: [CO4][L-1]
   i) Hold the pad ii) pad guiding
   iii) prevent the pad from falling out

p) Gauges are used to: [CO3][L-2]

End Semester Examination, Dec. 2021

B. Tech. (Industry Integrated) - Seventh Semester

QUALITY ENGINEERING (MII-704)

Time: 3 hrs. Max Marks: **10**

No. of pages:

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Each question carries equal marks.*

Q.1 Answer the following questions:

a) Define 'quality and reliability'. [L
b) Write down the dimensions of quality. [L
c) Define 'probability'. [L
d) Write down various symbols used in flow chart and their significance. [L
e) Define 'histogram'. [L
f) Define 'MTBF'. [L
g) Define 'acceptance sampling'. [L
h) Define 'TQM'. [L
i) Draw Maslow's Hierarchy of needs. [L
j) What do you understand by quality standard systems? [L1] **2x1**

PART-A

Q.2 What do you understand by quality and what are dimensions of quality? [L2,3]**2**

Q.3 Explain applications of probability concepts in QC. [L3,4]**2**

Q.4 Explain 7QC tools with diagrams. [L3,4,6]**2**

PART-B

Q.5 Explain life testing and types of test used for this along with some examples. [L2,3]**2**

Q.6 How can we differentiate between Total quality management and total quality control? [L3,6]**2**

Q.7 Explain basic steps for successful implementation of total quality management syste in an organization. [L4,6]**2**

End Semester Examination, Dec. 2021

M. Sc. - Third Semester

PLANT BIOTECHNOLOGY (MS-BT-301)

Time: 3 hrs. Max Marks: **100**

No. of pages: 1

*Note: Attempt **FIVE** questions in all; Taking at least **one** question from each **PART**. **Q.1 is compulsory**. Marks are indicated against each question.*

Q.1 Answer the following questions:

a) Compare embryo culture and embryo rescue.
b) Define transgene and transgenic technology.
c) Recall the process of somatic hybridization.
d) Give two examples of macronutrients and micronutrients.
e) Differentiate between hybrid and cybrid.
f) Recite cytogenic and organogenic differentiation.
g) Define symmetrical and asymmetrical hybrid.
h) Name the bacteria known as natural genetic engineer of plants and why?
i) List down any two functions of auxin and cytokinin.
j) Write down note on Flavr Savr tomato**.** **2x10**

PART-A

Q.2 a) Demonstrate the technique of clonal-propagation by taking suitable example. [CO1,2][L-2]**10**

b) Summarize the technique of germplasm storage. [CO4,5][L-2]**10**

Q.3 Compare androgenetic and gynogenetic methods for haploid production with diagram. [CO2,5][L-4]**20**

PART-B

Q.4 Distinguish agro bacterium and gemin iviruses mediated gene transfer methods in plants. [CO3,5][L-2]**20**

Q.5 Analyze the process of gene transfer in plants by direct method. [CO3,5][L-4]**20**

PART-C

Q.6 Explain any two methods for virus resistance. [CO6][L-2]**20**

Q.7 Classify the use of transgenic technology in crop improvement. [CO6][L-4]**20**

End Semester Examination, Dec. 2021

M. Sc. Bio-Tech. – Third Semester

ANIMAL BIOTECHNOLOGY (MS-BT-322)

Time: 3 hrs. Max Marks: **100**

No. of pages: 3

Note: *Attempt **FIVE** questions in all; **Q.1 is compulsory**. Attempt any **TWO** questions from **PART-A** and **TWO** questions from **PART-B**. Marks are indicated against each question.*

Q.1 Answer the following questions.

a) What are induced pluripotent stem cells? Name the Yamanaka Factors. [CO1][L1]

b) How does the reduction of tetrazolium salts be used to indicate viability? [CO1][L2]

c) Can terminally differentiated cells be labeled as Nullipotent? What are totipotent cells? [CO1][L2]

d) Why is the indirect contact cytotoxity test better than the direct contact test? [CO1][L2]

e) Name any 3 zones of a 3 dimensional spheroid. Also mention the gradient of gases and growth nutritrient along with growth factors? [CO1][L1]

f) Name any two scaffold-free methods by which 3D spheroids can be generated? [CO1][L1]

g) Name any two commercially available biologically derived scaffold/ matrix materials used in 3D culture. [CO1][L1]

h) Mention two features of Adeno-associated virus vector systems. [CO1][L1]

i) Why are adenoviruses widely used for gene-transfer and expression vectors? Mention two reasons. [CO1][L2]

j) What do the early and late genes code for in the SV40 virus? [CO1][L2]**2x10**

PART-A

Q.2 a) Write a note on the types of incubators and there importance. How does one maintain CO2, temperature and humidity in the incubator? [CO1][L2]**10**

b) What is the difference between natural and artificial media? Describe the four classes of artificial media? [CO1][L2]**10**

Q.3 a) Why do we use cryoprotective agents? With the help of a flowchart describe the cooling process until the sample is frozen? [CO2][L2]**10**

b) With the help of a flowchart describe the origin of cell culture and cell lines from organ or tissue fragments? [CO2][L3]**10**

Q.4 Describe the various phases of cell growth? Calculate the number of generations passed when the number of cell seeded were 10^4 and the number of harvested cells is 10^9. [Given that $\log_2 10^4 = 13.3$ and $\log_2 10^9 = 29.9$].Using the above data calculate the Multuplication rate (r) after 72 hours. What will be the population doubling time (PDT)? [CO1][L4]**20**

PART-B

Q.5 a) The cells observed under the microscope were counted using a hemocytometer. If the number of cells counted in 4 primary square is as follows:

Primary Square 1 = 50