B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

FLUID MECHANICS - II
(Civil Engineering)

Time: 3 hours

Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
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SECTION - I

1. (a) Derive Darcy-Weishbach equation for loss of head due to friction in a pipe.

   (b) A pipe 5 cm diameter is 6 m long and the velocity of flow of water in the pipe is 2.4 m/sec. What loss of head and the corresponding H.P. would be saved if the central 2 m length of pipe was replaced by 7.5 cm dia. pipe when the change of section being sudden. Take f = 0.04 for the pipes of both diameter.

2. (a) Prove that the head lost due to friction is equal to one-third the total head at inlet for maximum power transmission through pipes.

   (b) What is compound pipe? How will you determine the equivalent size of a compound pipe? A piping system consists of three pipes of lengths 2000 m , 1500 m and 1000 m and of diameters 40 cm, 30 cm and 20 cm. Transform the system to an equivalent length of 30 cm diameter pipe.

SECTION - II

3. (a) For a steady laminar flow, derive an expression for velocity distribution and shear stress distribution across a section of a horizontal pipe.

   (b) An oil of viscosity 10 poise flows between two fixed parallel plates which are kept at a distance of 60 mm apart. Determine the rate of flow of oil between the plates, if the drop of pressure in a length of 1.5 m be $0.5 \times 10^4 \, N/m^2$. The width of the plates is 250 mm.

4. (a) Derive an expression for Prandtl's Universal velocity distribution for turbulent flow in pipes.

   (b) For a turbulent flow in a pipe of diameter 30 cm, determine the discharge when the centre-line velocity is 2.0 m/s and the velocity at a point 10 cm from the centre as measured by pitot tube is 1.5 m/s.

SECTION - III

5. (a) Define 'Energy thickness' and derive an expression for the same.

   (b) Determine the displacement thickness and momentum thickness for the velocity distribution in the boundary layer given by $u/U = 5(y/\delta)^2 - 2(y/\delta)^3$

6. (a) Differentiate between (i) Stream lined body and Bluff body (ii) Friction drag and pressure drag.

   (b) A flat plate 1.5 m x 1.5 m moves at 40 km/hr. in stationary air of density $1.20 \, kg/m^3$. If the coefficients of drag and lift are 0.18 and 0.72 respectively, determine i) Lift force ii) Drag force iii) Resultant force iv) The power required to keep the plate in motion.

SECTION - IV

7 (a) Derive an expression for the discharge through an external cylindrical mouthpiece.

   (b) A tank has two identical orifices in one of its vertical sides one above the other. The diameter of the orifices is 5 cm. The upper orifice is 4m below the water surface and lower one is 6 m below the water surface. If the value of C_v for both orifices is 0.96, determine the total discharge and the point of intersection of the two jets from its vertical side.

8 (a) Prove that the discharge through a triangular notch or weir is given

$$Q = \frac{8}{15} Cd \times tan\frac{\theta}{2} \times \sqrt{2g} \ H^{5/2}$$

   (b) A 90^0 triangular weir discharges water at a height of 0.15 m in to a tank which has a 7.5 cm. sharp edged orifice in the bottom. Determine the depth of water in the tank. If C_d is same for both weir and orifice.

SECTION - V

9 (a) State the Angular Momentum Principle. Derive an equation for the work done by the jet of water on a series of radial curved vanes.

   (b) A jet of water having a diameter of 65 mm and the head of water at the center of the nozzle is 100 meters strikes a flat plate, the normal of which is inclined at 55^0 to the axis of the jet. Find the normal force on the plate, when (i) the plate is stationary, (ii) the plate is moving with a velocity of 16 m/sec in the direction of the jet. Also determine the power and efficiency of the jet, when the plate is moving. Take C_v as 0.96.

10 (a) Describe briefly the function of various components of Pelton turbine with neat sketches.

   (b) Design a Francis Turbine runner with the following data:

Net Head, H	= 68 m ;	Speed, N	= 750 r.p.m.
Output, P	= 450 H.P.;	η_h = 94% ;	η_o = 85%
Flow ratio, φ	= 0.15 ;	Breadth ratio, n = 0.1	

Inner diameter of the runner is 0.5 times the outer diameter. It may be assumed that 6% of the circumferential area of the runner is occupied by the thickness of the vanes. The velocity of flow remains constant throughout, and the flow at the exit is radial.

SECTION - VI

11 (a) What are unit quantities? Define and derive expressions for unit quantities of a turbine.

   (b) A turbine is to operate under a head of 25 m at 200 r.p.m.. The discharge through the turbine is 10 m³/s. If the overall efficiency is 90%, determine, specific speed, Power generated and suitable type of turbine.

12 (a) Explain the principle and working of a Centrifugal Pump with the help of a neat sketch

   (b) The diameters of an impeller of a centrifugal pump at inlet and outlet are 30cm and 60cm respectively. The velocity of flow at outlet is 2 m/sec and the vanes are set back at an angle of 45^0 at the outlet. Determine the minimum starting speed of pump if the manometric efficiency is 70%.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester
R.C.C. STRUCTURAL DESIGN – I
(Civil Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Discuss the merits and demerits of working stress method and ultimate load method.

   (b) Explain the stress block parameters in the limit state design method

2   Design suitable reinforcement for a T-beam of span 8 m subjected to a live load of 7 kN/m^2. The spacing of the T-beam is 2.7 m form centre to centre. Assume Floor finish of 0.5 kN/m^2. The thickness of flange is 150 mm, width of web is 230 mm and overall depth is 650 mm. Use M$_{20}$ grade concrete and Fe$_{415}$ steel.

SECTION - II

3   Design the torsional reinforcement in a rectangular beam section of size 350 mm x 700 mm , subjected to an ultimate twisting moment of 120 kNm, combined with an ultimate (hogging) bending moment of 210 kNm and an ultimate shear force of 120 kN. Assume M$_{25}$ grade concrete and Fe$_{415}$ steel, mild exposure conditions.

4   A simply supported beam of rectangular section is 250 wide with an effective depth of 450mm is reinforced with 6 bars of 22 mm diameter, out of which 3 bars have been bent at 45^0 at a section. Determine the shear resistance of bent up bars and additional reinforcement required if it is subjected to ultimate shear force of 220 kN. Adopt M$_{25}$ grade of concrete and steel Fe$_{415}$ grade steel.

SECTION - III

5   Design the roof slab for hall size 4m x 10m. The sab is simply resting on 230 mm thick brick wall on all sides. Take live load on the slab is 2.25 kN/m^2 and finishing load 1.5 kN/m^2. Use M 20 grade concrete and Fe415 grade steel.

6   Design a RC continuous beam of rectangular section to support a dead load of 12 kN/m and live load of 15 kN/m over three spans of 8 m each. Use M$_{25}$ grade concrete and Fe$_{415}$ steel.

SECTION - IV

7   Design a spiral column subjected to a factored load of 1500 kN. The column has unsupported length of 3.2 m, and is braced against side sway. Use M_{25} grade concrete and Fe_{415} steel. Sketch the reinforcement details.

8   Design the reinforcements in short circular column of diameter 400 mm to support a factored axial load of 1000 kN together with factored moment of 100 kN.m . Adopt M_{25} grade concrete and Fe_{415} grade steel.

SECTION - V

9   A rectangular RC column of size 400 x 600 mm carrying an axial load of 1500kN. If the safe bearing capacity of soil is 160 kN/m^2, design a suitable footing. Adopt M_{20} grade concrete and Fe_{415} grade steel.

10   Design a square footing for a short axially loaded column of size 400mm x 400 mm carrying 700 kN load. Use M_{20} grade concrete and Fe_{415} steel. The safe bearing capacity of soil is 180 kN/m^2. Sketch the details of reinforcements.

SECTION - VI

11   Design a dog legged stair case for an office building, given the height between floor is 3.2 m, riser 160 mm, tread 270 mm, width of flight 1.25 m, live load 5 kN/m^2, finishes load 0.5 kN/m^2, assume the stairs to be supported on 230 mm thick brick masonry walls at the outer edges of the landing, use M_{20} grade concrete and Fe_{415} steel. Assume mild exposure conditions.

12   Determine the long term deflection of a simply supported beam of size 300mm x 590mm. Clear span of the beam is 5.5 m. The beam is reinforced with 6 nos. of 20mm diameter bars in the tension zone and 2 nos of 22 mm diameter in compressive zone at a clear cover of 25 mm. Consider support width of 400 mm. . The external load on the beam is 18kN/m and dead load 45kN/m at service state. Use M_{20} grade concrete and Fe_{415} grade steel. Assume any data from IS 456-2000.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

SURVEYING - II
(Civil Engineering)

Time: 3 hours

Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Define the following terms associated with the Vernier transit theodolite:
(i) Vertical axis,(ii) Trunnion axis,(iii) Axis of plate level, (iv) Centering.

(b) Explain the repetition method of measuring horizontal angles using Theodolite.

2 The table below gives the lengths and bearings of the lines of a traverse ABCDEA, the length and bearing of EA having been omitted. Determine the length and bearing of line EA.

Line	Length (m)	Bearing
AB	204.0	87° 30'
BC	226.0	20° 20'
CD	187.0	280° 00'
DE	192.0	210° 30'
EA	?	?

SECTION - II

3 (a) Classify tachometric methods? Describe its applications.

(b) Determine the difference in elevation between two points A and B from the following observations:

Point	Vertical angle	Stadia hair reading (m)
A	+ 08°00'	0.825, 1.300, 1.775
B	-22°00'	0.802, 1.850, 2.898

Staff held vertical, the instrument is fitted with anallatic lens and the multiplying constant was 100 and additive constant is zero. The tacheometer was set-up at an intermediate station C on the line AB and take R.L of axis of instrument is 500.000m.

4   (a)   What is tangential system of tacheometry? What are its advantages over the stadia method?

      (b)   Two observations are taken upon a vertical staff by means of a Theodolite. For the first, the line of sight is directed to give a staff reading of 0.880m and an angle of elevation of 4°08'. In the second case, the staff reading is 3.340m and the angle of elevation is 5°30'. If the elevation of trunnion axis of the instrument is 195.60m, compute the R.L. of the staff station and its horizontal distance from the instrument.

SECTION - III

5   (a)   Draw the neat sketch of a circular curve and show the following notations :
(i) Back tangent (ii) Forward tangent (iii) Point of intersection (iv) Angle of deflection (v) Long chord.

      (b)   How would you select a suitable peg interval for a circular curve? What do you understand by unit chord and sub-chord?

6   (a)   Explain various methods of determining the length of a transition curve.

      (b)   Two tangents intersect at chainage 1300 m, the deflection angle being 26°. Calculate the necessary data for setting out a curve of radius 300 m to connect the two tangents if it is intended to set out the curve by one theodolite method. If the theodolite has a least count of 20", tabulate the actual deflection angles to be set out.

SECTION – IV

7   (a)   Write short notes on the following:
         (i)   Principal point (ii) Vertical photograph

      (b)   What is photographic scale? Derive an equation for the calculation of photographic scale with the help of a neat diagram.

8   (a)   Discuss about the electromagnetic energy and electromagnetic spectrum.

      (b)   Name the systems of remote sensing. Give a brief descriptions of them.

SECTION - V

9   (a)   Explain the component parts of total station and state the functions of each part.

      (b)   Explain the procedure to find the distance between two points using total station.

10 (a) Explain the procedure for setting up total station for taking observations.

(b) Explain the procedure how the co-ordinate data (NEZ) can be collected by using total station.

SECTION - VI

11 (a) Explain in detail the overview of GPS.

(b) Explain about the differential GPS and its applications.

12 (a) Explain the components of a GIS.

(b) Define map and state the necessity of map projection.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

SOIL MECHANICS
(Civil Engineering)

Time: 3 hours

Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

GRAPH SHEETS TO BE PROVIDED TO THE CANDIDATES ON DEMAND

SECTION - I

1 (a) Discuss soil formation?

(b) A moist soil sample compacted into a mould of 1000cm³ capacity and weight 35N, weighs 53N with the mould. A representative sample of soil taken from it has an initial weight of 0.20N and oven dry weight of 0.17N. Determine (i) wet density (ii) void ratio

2 (a) Derive the relationship between γ and γ_{dry} from first principles?

(b) A completely saturated sample of clay has a volume of 31cm³ and a weight of 58g. The same sample after drying has a volume of 24cm³ and a weight of 43g. Compute the porosity of the initial soil sample and specific gravity of the soil grains.

SECTION - II

3 (a) Laboratory tests on a soil sample yielded the following results:
Liquid limit = 54%
Plastic limit = 25%
Natural moisture content = 29%
% finer than 0.002mm = 18%
   (i) Determine the liquidity index of the soil
   (ii) Find the activity number

(b) Draw neatly the IS plasticity chart and label it.

4 (a) Briefly explain sieve analysis, the way it is carried out in a Geotechnical Engineering Lab?

(b) In a hydrometer test, the initial reading is 1.080. After one hour, the corrected hydrometer reading is 1.030 and the corresponding effective depth is 12cm. Find the initial weight of soil placed in 1000cc suspension, the particle size corresponding to the 15min reading, and the percentage of particles finer than this size. Take G =2.65, and μ=0.1 poise.

SECTION - III

5 (a) Derive the expression to determine the average coefficient of permeability in the horizontal direction for a stratified soil deposit.

(b) A permeameter of diameter 75mm contains a column of fine sand 500mm long. When water flows through under constant head at the rate of 200 x 10³ mm³ in 60 seconds, the loss of head between two points 250mm apart is 375mm. Compute the coefficient of permeability in metres/day.

6 (a) Derive the expression for capillary rise given by $h_c = 4T_s/(d_c \gamma_w)$, where T_s is the surface tension of water, d_c is the diameter of the capillary, γ_w is the unit of water.

(b) Determine the average horizontal and vertical permeability coefficients of a soil deposit made up of three horizontal strata, each 1m thick, if the coefficients of permeability are 1×10^{-1} mm/s, 3×10^{-2} mm/s, and 8×10^{-3} mm/s respectively for the three layers.

SECTION - IV

7   (a) Write a short note on the effects of compaction on soil properties?

(b) An earth dam is built on an impervious foundation with a horizontal filter at the base near the toe. The permeability of the soil in the horizontal and vertical directions are 3×10^{-2} mm/s and 1×10^{-2} mm/s respectively. The full reservoir level is 35m above the filter. A flow net constructed for the transformed section of the dam consists of 4 flow channels and 16 head drops. Estimate the seepage loss per metre length of the dam.

8   (a) The optimum moisture content of a soil is 16.5% and its maximum dry density is 1.57g/cc. The specific gravity of solids is 2.65. Determine: (i) the degree of saturation and percentage of air voids of the soil at OMC. (ii) the theoretical dry density at OMC corresponding to zero air voids.

(b) Derive the expression to determine the critical hydraulic gradient?

SECTION - V

9   (a) In a consolidation test the pressure on a sample was increased from 140 to 280kN/m^2. The void ratio after 100% consolidation under 140kN/m^2 was 0.95, and that under 280kN/m^2 was 0.82. The coefficient of permeability of the soil was 20×10^{-6} mm/s, and the initial height of the sample was 20mm. Determine the time taken in days for 90% consolidation of the layer of this clay, 0.5mm thick in the field, sandwiched between an impervious layer beneath and the pervious layer on top.

(b) Define normally-consolidated clay, over consolidation ratio and isochrone?

10 (a) Explain the procedure to determine the coefficient of consolidation using Casagrande's logarithm of time fitting method?

(b) A clay layer 5m thick has double drainage. It was consolidated under a load of 127kN/m^2. The load is increased to 197kN/m^2. The coefficient of volume compressibility is 5.5×10^{-4} m^2/kN and value of k $= 2 \times 10^{-8}$ m/min. Find total settlement and settlement at 50% consolidation. If the test sample is 2cm thick and attains 100% consolidation in 24hours, what is the time taken for 100% consolidation in the actual layer?

SECTION - VI

11 (a) List the shear tests based on drainage conditions. Enumerate the field conditions which necessitate each of these tests.

(b) Samples of compacted, clean, dry sand were tested in a shear box, 6cm x 6cm, and the following observations were recorded:

Normal load (N)	100	200	300
Peak shear load (N)	90	180	270
Ultimate shear load (N)	75	150	225

Determine the angle of shearing resistance in the dense state.

12 (a) A normally consolidated clay was consolidated under a stress of 150kPa then sheared undrained in axial compression. The principal stress difference at failure was 100kPa, and the induced pore pressure at failure was 88kPa. Determine the Mohr-Coulomb strength parameters, in terms of effective stresses.

(b) Explain the shear characteristics of sands.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester
STRUCTURAL ANALYSIS - I
(Civil Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION – I

1. (a) Derive the basic differential equation of the elastic curve.

    (b) A simply supported steel beam, 6m long is circular in cross-section and is of 15 cm diameter. What point load should be placed at the mid span to restrict the deflection to 1.035 cm. take value of E= 2 x 10^5 N/mm², what will be the slope at the ends.

2.   A cantilever beam of 3 m length carries three point loads of 20 kN each at distances 1m, 2m and 3m from fixed end. Calculate the maximum slope and maximum deflection in terms of flexural rigidity.

SECTION – II

3. (a) Explain the failure of different types of columns?

    (b) Compare the strength of solid circular column of diameter 200mm and hollow circular column of same cross-sectional area and thickness 30mm. The other parameters are same for both the sections.

4.   A column of circular section has 150mm diameter and 3 m length. Both ends of the column are fixed. The column carries a load of 120kN at an eccentricity of 15mm from the geometrical axis of the column. Find the maximum compressive stress on the column section.

SECTION – III

5. (a) Explain the concept of combined direct stress and bending stress with the help of neat sketch.

    (b) A bar of rectangular section 10cm wide x 5cm thick is subjected to a load of 140kN which acts vertically downward in the centre of width, but at a distance of 0.6cm from the centre in the direction of thickness. Calculate the maximum and minimum stress and draw the stress distribution diagram.

6.   A hollow cylindrical shaft of 25cm external diameter is bored eccentrically, the diameter of the bore being 19cm so that thickness varies from 2cm at one end to 4cm at the other. If the shaft is subjected to a compressive load of 1050kN along the axis of the bored hole, calculate the maximum and minimum stress in the shaft.

SECTION – IV

7. A cantilever beam AB of span 7m is fixed at A and propped at B. the beam carries a UDL of 3kN/m over its whole length. Find the reaction at propped end and draw S.F. and B.M. diagrams.

8. A fixed beam of 5m span carries a gradually varying load from 12kN/m at one end to 32kN/m at the other end. Find the fixing moments and reactions at the fixed ends.

SECTION – V

9. Analyze the continuous beam shown in Fig. 1, using three-moment equation. Draw S.F and B.M diagrams.

Fig.1
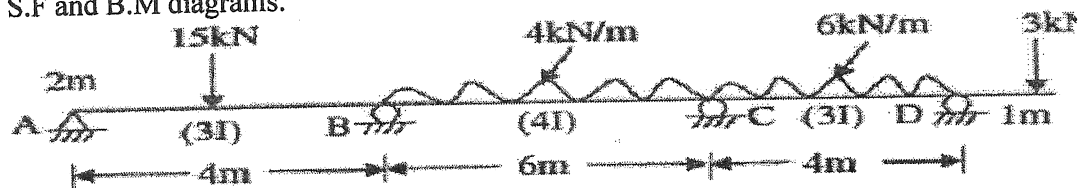
10. State and prove the Clapeyron's theorem of three moments.

SECTION – VI

11 A beam of length 'l' simply supported at the ends is loaded with a point load 2W at a distance 'a' from one end. Assuming that the beam has constant cross-section with moment of inertia as 'I' and Young's modulus of elasticity for the material of the beam as 'E', find the strain energy of the beam and hence find the deflection under the load.

12 Using castigliano's theorem, calculate the vertical deflection at the middle of a simply supported beam which carries a uniformly distributed load of intensity 'w' over the full span. The flexural rigidity EI of the beam is constant and only strain energy of bending is to be considered.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

TRANSPORTATION ENGINEERING - I
(Civil Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1   (a)   Discuss the different modes of transportation and their characteristics.

    (b)   List out the engineering surveys required establish the new connectivity between two habitations.

2   Explain briefly the modified classification of road system in India as per the Third twenty year road development plan, 1981-2001.

SECTION - II

3   (a)   The radius of a horizontal curve is 400m, the total pavement width at curve is 7.6m and the superelevation is 0.07.Design the transition curve length for a speed of 100kmph. Assume pavement to be rotated about the inner edge.

    (b)   A highway of width 7.5 m radius 150 m with a speed of 120 kmph and the length of the wheel base 7.0 m. Find the extra widening required.

4   (a)   Define road gradient and mention its various types. Explain briefly.

    (b)   What are the general controls to be kept in view in determining the horizontal alignment of road.

SECTION - III

5   (a)   List out the types of pavement along with their component and functions.

    (b)   Enumerate the various factors to be considered in the pavement design? Discuss the significance of each.

6   (a)   Explain the CBR method of pavement design. Discuss the IRC 37:2012 recommendations.
SECTION - IV

7   (a)   Discuss with neat sketch different types of joints adapted in regid pavements.

    (b)   Explain: Joint filler materials and Joint sealer materials.

8   Calculate the stresses at interior, edge and corner of a CC pavement by Westergaards's stress equations.

- Modulus of elasticity of concrete   = 300000 kg/sqcm
- Poisson's ratio of concrete   = 0.15
- Thickness of concrete pavement   = 20 cm
- Modulus of Subgrade reaction   = 7.5 kg / sqcm
- Wheel Load   = 5100 kg
- Radius of loaded area   = 15 cm

SECTION - V

9   (a) Discuss the need and importance of highway maintenance in India.

     (b) Discuss the construction process of WBM.

10   Discuss the importance of subsurface drainage in pavement construction.

SECTION - VI

11 (a) With neat sketches show various types of traffic signs, classifying them in proper groups.

     (b) Define Passenger car unit. Discuss its importance in traffic engineering.

12   At a right angled intersection of two roads, road 1 has four lanes with a total width of 14.0 m and road 2 has two lanes with a total width of 7.0 m. The volume of traffic approaching the intersection during design hour are 1240 and 880 pcu/hour on the two approaches of road 1 and 380 and 290 pcu/hour on the two approaches of road 2. Design two phase traffic signal by Webster's method.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester
ENVIRONMENTAL STUDIES
(Common to CE & ME)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1   (a)   "Environmental study is very useful for public awareness" Explain?

    (b)   Enumerate the various components of environment.

2   (a)   What is the importance of environment in human life? Explain it.

    (b)   Highlight the multidisciplinary approach of environmental studies.

SECTION - II

3   (a)   Write the main reasons for energy crises in cities?

    (b)   Interrelate between rain water harvesting and watershed management.

4   (a)   Discover the over exploitation of forest and their effects tribal people.

    (b)   Briefly explain the effects of over utilization of natural resources.

SECTION - III

5   (a)   Explain the structure and functions of an ecosystem.

    (b)   What are the different services that are contributed in various ways by biodiversity?

6   (a)   Discuss on characteristics of an ecosystem with neat illustration.

    (b)   Briefly explain how different types of pollutions affect biodiversity.

SECTION - IV

7   (a)   What is soil pollution? What are the causes?

    (b)   Explain the effects and control measures of air pollution.

8   (a)   Give brief account on Noise pollution.

    (b)   Differentiate various methods of composting.

SECTION - V

9 (a) Summarize the Industrial development impact on quality of environment in India.

   (b) Compile the economy and environment interaction.

10 (a) Classify various environmental problems in India.

   (b) What do you mean sustainability and how it relates to the environment.

SECTION - VI

11 (a) Write a debate on silent valley project.

   (b) Discuss the detailed document of Environmental protection Act.

12 (a) Evaluate Indian Wildlife protection Act.

   (b) Write on local ecosystem type and components.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

ELECTROMAGNETIC FIELDS
(Electrical & Electronics Engineering)

Time: 3 hours

Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1. (a) Illustrate about the Cylindrical Co-Ordinate system in detail.

   (b) Prove that divergence of curl of a vector is zero, using Stoke's theorem.

2. (a) State and explain Coulomb's law indicating clearly the units of quantities in the equation of force?

   (b) Derive the electric field due to an infinite uniformly charged sheet.

SECTION - II

3. (a) State and prove Gauss's law and write limitations of Gauss's law?

   (b) Given the potential field, $V=2x^2y-5z$, calculate V, E, D and volume charge density at a point P(-4,3,6).

4. (a) Develop the relationship between E and V at a point in the electrostatic field.

   (b) A parallel plate capacitor 30cm x 30cm and d=3cm is charged to a potential of 2kv with air as dielectric.
   (i) Find the energy stored in capacitor.
   (ii) The capacitor is now disconnected from source and a dielectric slab is inserted into capacitor with relative permittivity of 5, then calculate the energy stored in capacitor.

SECTION - III

5. (a) Define polarization and explain how dielectric material acquires polarization.

   (b) Develop the expression for Electric field intensity due to an electric dipole.

6. (a) What are the properties of conductor and derive the boundary conditions between conductor and free space?

   (b) Develop continuity equation and Point form of Ohms law.

SECTION - IV

7   (a)   State and explain Biot-Savart's law.

     (b)   An infinitely long conducting filament is placed along the x-axis and carries current of 10 mA in the a_x direction. Find H at (-2, 3, 4). Derive the necessary equations.

8   (a)   State Ampere's circuital law and hence derive $\nabla \times \vec{H} = \vec{J}$.

     (b)   Obtain the expressions for scalar and vector magnetic potential from first principles.

SECTION - V

9   (a)   Compute the energy density in free space on account of field having H= 1000 A /m?

     (b)   Derive the expression for inductance of a toroidal coil carrying current I, with N turns and the toroid radius as R units.

10   (a)   Explain about Magnetic Dipole Moment?

     (b)   Derive the expression for inductance of a co-axial cable?

SECTION - VI

11   (a)   State and Explain Faraday's 1st and 2nd laws of electromagnetic Induction.

     (b)   Find the displacement current density within a parallel plate capacitor having dielectric with $\varepsilon_r = 10$ and area of plates A= 0.01 m², distance of separation, d= 0.05 mm, applied voltage is V= 200 sin 200t.

12   (a)   Write Maxwell's equation for good conductors in time varying and static fields both in differential and integral forms?

     (b)   Describe the wave equation and deduce its general solution for free space conditions.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

ELECTROMECHANICAL ENERGY CONVERSION - II
(Electrical & Electronics Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1   a)   Explain the action of a transformer at no-load and also when loaded. Draw the vector diagram for the loaded condition.

    b)   The maximum flux density in the core of a 220/2000 volts, 50 Hz single phase transformer is 0.75 Wb/m^2 . If the emf induced per turn is 10 volts, determine i) primary turns and secondary turns ii) cross sectional area of the core.

2   a)   Compare an auto-transformer with a two winding transformer. What are the uses of an auto-transformer?

    b)   An auto-transformer is used to step-down voltage from V_1 to 0.8 V_1. If V_1 =250 V and 100A at upf is supplied by secondary , determine (i) current in common winding; (ii) power transformed, (iii)power that flows conductively to load, (iv) ratio of kVA rating of auto-transformer to that of conventional transformer with same load conditions.

SECTION - II

3   a)   Derive the expression for approximate regulation of a transformer.

    b)   A 10 kVA, 400/200 volts, 50 Hz, single phase transformer has the following test results.
         O.C. Test: 200 V,   1.5A,   140 Watts   (on L.V side)
         S.C. Test: 15 V,   20 A,   150 Watts   (on H.V side)
         Determine (i) the equivalent circuit parameters referred to L .V side. (ii) full load efficiency at 0.8 p.f leading.

4   a)   Describe with neat diagram Sumpner's test.

    b)   Two single phase transformers with equal turns have impedances of (0.5 + j 3.0) ohms and (0.6 + j 10) ohms with respect to the secondary. If they operate in parallel, determine how they will share total load of 100 kW at power factor of 0.8 lagging.

SECTION – III

5. a) Describe briefly the uses of tertiary winding in a star/star connected 3-phase transformer.

   b) A 3-phase, 50 Hz, transformer has a delta-connected primary and star connected secondary, the line voltages being 22000 volts and 400 volts respectively. The secondary has a star connected balanced load at 0.8 p.f lagging. The line current on the primary side is 5 amp. Determine the current in each coil of the primary and each secondary line. What is the output of the transformer in kW. ?

6. a) Explain how three-phase to two-phase transformation can be had using single-phase transformers in a laboratory.

   b) Two single-phase furnaces I and II are supplied at 80 volts by means of a scott-connected transformer combination from a 3-phase, 6.6 kV system. The voltage of furnace I is leading. Calculate the line currents on the 3-phase side when the furnaces I and II take 500 kW at unity power factor and 800 kW at 0.7 power factor lagging respectively. Draw the vector diagram.

SECTION- IV

7. a) Explain how a rotating magnetic field may be produced by stationery coils carrying three-phase currents.

   b) A 4-pole, 400 V, 3-phase, 50 Hz induction motor runs at 1440 RPM at 0.8 pf (lag) and delivers 14.5 H.P. The stator loss is 1060 watts and friction and windage losses equal to 375 watts. Calculate (i) the fractional slip, (ii) rotor copper loss, (iii) frequency of rotor e.m.f., (iv) the line current and (v) percentage efficiency

8. a) Draw and explain the speed-torque characteristics of a three-phase induction motor.

   b) The rotor resistance per phase and stand still reactance per phase of a 6-pole, 50 Hz, induction motor are 0.001 ohm and 0.005 ohm respectively. Determine the speed at which the maximum torque is obtained.
   Derive any formula used.

SECTION- V

9. a) Show that the locus of the current of the three-phase induction motor is a circle as slip is varied.

   b) Draw the circle diagram for a 20 h.p , 400-v, 50 Hz, 3-phase star connected induction motor from the following data:

   | No load test : | 400 V, | 9 A, | p.f = 0.2 |
   | Blocked rotor test: | 200 V, | 50 A, | p.f = 0.4 |

   From the circle diagram determine :
   (i) the line current and power factor at full load
   (ii) the maximum h.p

10. a) Explain why starters are necessary for starting 3-phase induction motors. Draw the internal connections of auto-transformer starter.

    b) The rotor of a 6-pole, 50 Hz, slip-ring induction motor has a resistance of 0.2 ohm per phase and runs at 960 RPM at full load. Calculate the approximate resistance per phase of a rotor rheostat such that the speed is reduced to 800 RPM for full load torque.

SECTION - VI

11   Explain with neat sketches the various methods of speed control of 3-phase induction motors

12 a) Explain the principle of operation of 3-phase induction generator.

    b) The resistance and reactance (equivalent) values of a double cage induction motor for stator, outer and inner cages are 0.25, 1.0, 0.15 ohms resistance and 3.5, zero, 3.0 ohms reactance respectively. Find the starting torque if the phase voltage is 250 V and synchronous speed is 1000 RPM.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

POWER SYSTEMS - I
(Electrical & Electronics Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1   Compare the conductor weight for various systems on the basis of equal maximum potential difference between any two conductors.

2   State and prove Kelvin's law for determining economic size of conductor for transmission system. Discuss its important limitations.

SECTION - II

3   A 3-phase over headline is designed with an equilateral spacing of 3.5m with a conductor diameter of 1.2cm. If the line is constructed with horizontal spacing with suitably transposed conductors. Find space between adjacent conductors which would give the same value of inductance in equilateral arrangement?

4   Derive the expression for capacitance per phase of a three phase line with
(i) equilateral and (ii) unsymmetrical spacing assume transposition.

SECTION - III

5   (a)   What is Ferranti effect? And what are the factors that effecting the skin effect?
(b)   Give the advantages and disadvantages of Corona.

6   A certain three phase equilateral transmission line has a total corona loss of 53kW at 106kV and a loss of 98kW at 110.9 kV. What is the disruptive critical voltage? What is the corona loss at 113kV?

SECTION - IV

7   Explain the methods used for improving the voltage distribution along the string of insulators in overhead lines.

8   Determine the voltage across each disc of suspension insulators as a percentage of the line voltage to earth. The self and capacitance to ground of each disc is C and 0.2C respectively. (a) When the capacitance between the link pin and the guard ring is 0.1C. (b) If the capacitance of the line of the lower link pin were increased to 0.3C by means of a guard ring. Determine the redistribution of voltage. Also determine the string efficiency in each case.

SECTION - V

9   Briefly explain the sag templates and derive expression for sag in a level supporting system?

10   A transmission line has a span of 150m between level supporters. Line conductor has a cross sectional area of $1.25cm^2$ and it weight 1.0 kg/m. If the breaking stress of conductor is 4200kg/cm^2, calculate the maximum sag for a factor of safety of 4. Assume a maximum wind pressure of 100kg/m^2 of projected surface.

SECTION - VI

11   What is meant by grading of cables? Discuss briefly the methods of grading.

12   The capacitor of a three phase belted cable is 0.3 μf between the two cores with the third core connected to lead sheath. Calculate the charging current taken by the cable when connected to three phase 50Hz 11kV supply.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

TECHNICAL ENGLISH & SOFT SKILLS
(Common to EEE,ECE & CSE)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION- I

1. What are the strategies used for communicating technical topics?

2. Explain in detail the dos and don'ts an effective technical presentation.

SECTION- II

3. What traits of the candidates are observed during group discussion?

4. Write notes on the characteristics of successful group discussion.

SECTION- III

5. What is the purpose of a resume? Explain in detail the format of a resume in general.

6. Prepare a resume along with cover letter to apply for the position of a graphics design engineer in a motorbike manufacturing company.

SECTION- IV

7. Analyze the importance of non- verbal communication in the process of communication.

8. Define soft skills and write notes on the importance of soft skills.

SECTION- V

9. 'Self- confidence is the key to success. But it can be achieved only through hard work". Discuss.

10. Write notes on assertiveness and leadership skills.

SECTION- VI

11. What are etiquettes? Explain various etiquettes that are followed in corporate culture.

12. Bring out the importance of 'Goal setting' and 'Career planning'?

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech II Semester
STATISTICS AND PARTIAL DIFFERENTIAL EQUATIONS
(Mechanical Engineering)

Time : 3 hours   Maxarks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1   (a)   Define Random Variable and explain types of Random Variable

     (b)   Let X denotes the number of heads in a single toss of 4 fair coins. Write the probability distribution of X . Determine Mean and variance of x

2   (a)   The $p.d.f$ of a random variable is given by $f(x) = \begin{cases} k(1 - x^2); 0 < X < 1 \\ \qquad 0; Otherwise \end{cases}$

            find the (I) k (II) P(0.1 ≤ X≤ 0.2) (b) P(X≥0.5)(III) mean, variance of X

     (b)   The $p.d.f$ $f(x) = k.e^{-|x|}$; $-\infty < x < \infty$. Find k, mean and variance of the distribution .

SECTION - II

3   (a)   Find Mean and variance of Poisson distribution

     (b)   The mean of binomial distribution is 3 and the variance is 9/4.
            Find   i) The values of parameters of the distribution
                    ii) $P(x \geq 7)$
                    iii) $P(1 \leq x \leq 6)$.

4   (a)   Find Mean and variance of Normal distribution

     (b)   The marks obtained in statistics in a certain examination found to be normally distributed. If 15% of the students $\geq 60\ marks$, $40\% < 30\ marks$, find the mean and standard deviation

SECTION - III

5   A population consists of five numbers 3,7,11 and 15. Consider all possible sample of size 2 that can be drawn with replacement form this population. Find
                (i) The mean of the population
                (ii) The standard deviation of the population.
                (iii) The mean of the sampling distribution of mean
                (iv) The standard deviation of the sampling distribution of means

6   (a)   What is finite Population correction? What is the formula for no of ways of drawing a of size 'n' which can be drawn from a population of size N with and without replacement?

    (b)   Measurements of the weights of a random sample of 200 ball bearings made by a certain machine during one week showed a mean of 0.824 and a standard deviation of 0.042.Find 95% confidence limits for the mean weight of all the ball bearings.

SECTION - IV

7   (a)   Define & uses of SQC and Explain causes of variation.

    (b)   Explain 3σ control limits

8   The following are the figures of defectives in 22 lots of each containing 2000 rubber belts.425,430,216,341,225,322,280,306,337,305,356,402,216,264,126,409,193,326,2 80,389,451,420. Construct a control chart for fractional defectives p-chart

SECTION - V

9   (a)   From the $P.D.E$ by eliminating the arbitrary constants a & b from $\quad 2z = \sqrt{x+a} + \sqrt{y-a} + b$

    (b)   From a $P.D.E$ by eliminating the arbitrary functions from $\quad \Phi\left(\frac{y}{x}, x^2 + y^2 + z^2\right) = 0$

10   (a)   From the $P.D.E$ by eliminating the arbitrary constants a, b and c from
$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$$

    (b)   From a $P.D.E$ by eliminating the arbitrary functions from $\quad z = y^2 + 2f\left(\frac{1}{x} + logy\right)$

SECTION - VI

11   Solve the equation $\quad 4\frac{\partial\mu}{\partial x} + \frac{\partial\mu}{\partial y} = 3\mu \quad (or)\ 4\mu_x + \mu_y = 3\mu$, $given \quad \mu = 3e^{-y} - e^{-5y}$, when x=0 by the method of separation of variables.

12   A Tightly stretched string with fixed end points x=0 and x = l is initially in a position given by $\quad y = y_0\ sin^3(\frac{\pi x}{l})$. If it is released from rest from this position. Find the displacement y(x, t).

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech II Semester

HYDRAULIC MACHINERY
(Mechanical Engineering)

Time : 3 hours   Max Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Derive an expression for the force exerted by the jet of water on a stationary inclined plate.

   (b) A jet 200 mm diameter moving at a velocity of 20 m per second impinges normally on a series of flat vanes mounted over a wheel. If the velocity of the vanes is 8 m/s, find (i) the force exerted by the jet on the wheel, (ii) the work done by the jet on the wheel per second, and (iii) the hydraulic efficiency

2 (a) Derive an expression for the force exerted by a jet striking the curved plate at one end tangentially when the plate is symmetrical.

   (b) A 20 cm diameter jet of oil (Relative Density = 0.9) strikes a flat plate at an angle of 25^0 to the normal. The plate is moving at a velocity of 3 m/s opposite to the direction of the jet. Calculate the absolute velocity of the jet if the resultant force exerted on the plate is 2500 N.

SECTION - II

3 A Pelton wheel working under a head of 52 m develops a shaft power of 92 kW at a speed of 250 rpm. If the overall efficiency is 82.5% and C_v =0.98, find the jet diameter, the diameter of the bucket circle, the size of the buckets and the number of buckets required. Assume maximum efficiency condition that the peripheral velocity is 0.47 times the velocity of the jet.

4 (a) What do you mean by gross head, net head and efficiency of a turbine? Explain different types of efficiencies of a turbine.

   (b) A Pelton wheel has a mean bucket speed of 30 m/s with a jet of water flowing with 1 m^3/s under a head of 260 m. the bucket deflect the jet through an angle of 165°. calculate the power delivered to the runner and hydraulic efficiency of the turbine. Tale C_v =0.98.

SECTION - III

5 (a) Describe the working principle Francis turbine with neat sketch.

   (b) A turbine develops 450 kW power under a head of 100 m at 180 rpm. What would be its normal speed and out put under a head of 85 m.

6 (a) Define specific speed of a turbine. Derive an expression for specific speed.

   (b) A Kaplan turbine working under a head of 18 m develops 18390 kW at an overall efficiency of 85%. The boss diameter is 0.3 times the runner diameter. If the velocity of flow is 9.05 m/s, calculate the discharge and the diameters of the runner and the boss.

SECTION - IV

7 (a) Explain the working of a single –stage centrifugal pump with the aid of neat sketch.

   (b) A centrifugal pump runs at 800 rpm and delivers 5000 L/min against a head of 7 m. The impeller has an outer diameter of 25 cm and a width of 5 cm at the outlet. If the backward curved vane at the outlet makes an angle of 45^0, determine the manometric efficiency. What is the specific speed of the pump?

8 (a) Obtain an expression for work done by impeller of a centrifugal pump.

   (b) A centrifugal pump has vanes which are radial at the outer periphery. The impeller has an outer diameter of 20 cm and a width of 3 cm at that diameter. If the discharge is 1800 L/min and the net head produced is 3.5 m, calculate the (i) rotational speed of the impeller and (ii) magnitude and direction of absolute velocity at exit. Manometric efficiency can be assumed as 0.85.

SECTION - V

9 (a) Explain the working of a double acting reciprocating pump with neat sketch.

   (b) A single acting reciprocating pump has a plunger of diameter 0.3 m and stroke of length 0.4 m. If the speed of the pump is 60 rpm and coefficient of discharge is 0.97, determine the percentage slip and actual discharge of the pump.

10 (a) Obtain an expression for work done by reciprocating pump.

    (b) A single acting reciprocating pump has a piston diameter of 150 mm and stroke length of 350 mm. The center of the pump is 3.5 m above the water surface in the sump and 22 m below the delivery water level. If the pump is working at 30 rpm, determine the power required to drive the pump.

SECTION - VI

11 (a) How does a torque converter differ from a fluid coupling?

    (b) Describe the working of hydraulic crane with a neat sketch.

12 (a) What is hydraulic intensifier? Explain its principle and working.

    (b) Explain the working of a hydraulic accumulator with a neat sketch.

B.TECH. DEGREE EXAMINATION, APRIL 2019   \\
II B.Tech II Semester
KINEMATICS OF MACHINERY
(Mechanical Engineering)

Time : 3 hours

Max Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Define Link. Explain about various type of links.

(b) Explain about the concept of Degrees of freedom and derive the formula for determining degrees of freedom for mechanisms.

2 (a) Describe various types of constrained relative motions with neat sketches.

(b) Explain about Grubler's criteria. Using Grubler's criterion prove that the minimum number of binary links in a constrained mechanism with simple hinges is four.

SECTION - II

3 Sketch and explain any two inversions of single slider crank chain.

4 (a) What is a machine? Giving an example, differentiate between machine and mechanism.

(b) Explain about steering gear mechanism. Derive the condition for correct steering.

SECTION - III

5 (a) Explain the following terms:
(i) Branch defect   (ii) Order defect   (iii) Greshof defect

(b) Describe the graphical procedure of three position synthesis of four-bar mechanism.

6 Determine the proportions of four bar mechanism, by using three precision points, to generate $y = x^{1.5}$, where 'x' varies between 1 and 4. Assume $\theta_S = 30°$; $\Delta\theta = 90°$; $\Phi_S = 90°$; and $\Delta\Phi = 90°$. Take length of the fixed link AD as 25 mm.
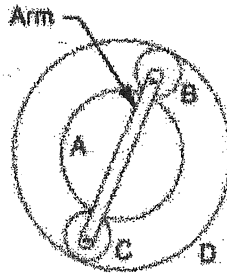
SECTION - IV

7 The crank and connecting rod of a theoretical steam engine are 0.5m and 2m long respectively. The crank makes 180 rpm in the clockwise direction. When it has turned 45^0 from the inner dead centre position, determine:
(i) velocity of piston   (ii) angular velocity of connecting rod, and
(iii) velocity of point 'E' on the connecting rod 1.5m from the gudgeon pin

8 (a) State and prove Kennedy theorem.

(b) Explain how the acceleration of a point on a link is obtained when the acceleration of some other point on the same link is given in magnitude in direction.

SECTION - V

9   A pair of gears, having 40 and 20 teeth respectively, are rotating in mesh, the speed of the smaller being 2000 r.p.m. Determine the velocity of sliding between the gear teeth faces at the point of engagement, at the pitch point, and at the point of disengagement if the smaller gear is the driver. Assume that the gear teeth are 20° involute form, addendum length is 5 mm and the module is 5 mm.

10   (a)   State and explain law of gearing.

       (b)   Determine the minimum number of teeth required on a pinion, in order to avoid interference which is to gear with,
            (i) a wheel to give a gear ratio of 3 to 1; and
            (ii) an equal wheel.

The pressure angle is 20° and a standard addendum of 1 module for the wheel may be assumed.

SECTION - VI

11   In an epicyclic gear train, an arm carries two gears A and B having 36 and 45 teeth respectively. If the arm rotates at 150 r.p.m. in the anticlockwise direction about the centre of the gear A which is fixed, determine the speed of gear B. If the gear A instead of being fixed, makes 300 r.p.m. in the clockwise direction, what will be the speed of gear B?

12   An epicyclic train of gears is arranged as shown in the following Fig. The number of teeth on the gears A and D are 40 and 90 respectively. How many revolutions does the arm, to which the pinions B and C are attached, make:
      (i) when A makes one revolution clockwise and D makes half a revolution anticlockwise, and
      (ii) when A makes one revolution clockwise and D is stationary.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

MACHINE TOOLS
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1. Explain the functions and uses of Lathe saddle, Cross-slide, Tool Post, Compound rest

2. What are the main parts of Capstan and turret lathes? Describe them with the help of neat sketches

SECTION - II

3. List the specifications and elaborate on working of planer with neat sketch.

4. (a) Explain the nomcaularate of twist drill with diagram.

   (b) What are the different operations performed on slotting machine? Explain.

SECTION - III

5. What are principal features of vertical milling machine? Explain the applications of gear hobbing machine.

6. How do you classify the various types of milling cutters? Explain.

SECTION - IV

7. What are the common wheel shapes used in grinding work? Sketch and describe them.

8. Write notes on: a) Sharpening of broaches b) Progressive broaching.

SECTION - V

9. What is abrasive jet machining process? Explain its principle of Operation and process parameters.

10. Discuss on principle of operation and process parameters of water jet machining

SECTION - VI

11. Describe the Basic elements and levels of automation.

12. Illustrate the important parts and working principle of Multi- spindle automatic lathe.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech II Semester

APPLIED THERMODYNAMICS - I
(Mechanical Engineering)

Time : 3 hours   Max Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Enlist the essential properties of steam considered in vapour power cycle analysis.

   (b) Describe any two thermodynamic processes of steam with p-v and t-s diagrams.

2 (a) Draw the line diagram for Carnot vapour power cycle and explain its working principle.

   (b) With a neat diagram explain the working of a modified Rankine cycle.

SECTION - II

3 (a) Provide a detailed classification of boilers on various grounds.

   (b) Illustrate the construction and function of a Cochran boiler.

4 (a) Explicate the working of any two of the boiler mountings with neat sketches.

   (b) Elucidate the working of an air preheater with a neat sketch.

SECTION - III

5 (a) Starting from fundamentals derive an expression for exit velocity of steam in a steam nozzle.

   (b) Dry saturated steam is passed at 7 bar through a convergent-divergent nozzle. The throat cross-sectional area is 4.5 cm^2. Find the mass of steam passing through the nozzle per minute.

6 (a) Draw the line diagram of steam condensing plant and demonstrate the components of condensing plant.

   (b) Distinguish between surface condensers and jet condensers.

SECTION - IV

7 (a) Sketch the De-Laval impulse steam turbine and locate all the parts.

   (b) In a De-Laval turbine, the steam issues from the nozzles with a velocity of 550 m/s. The nozzle angle is 20^0.Mean blade velocity is 300 m/s, the blades are equiangular. The mass flow rate is 1000 kg/min. Friction factor is 0.85. Determine (i) blade angles (ii) axial thrust on the end bearing.

8 (a) Distinguish between impulse and reaction turbine.

   (b) Sketch and explain the construction of a velocity triangle of an impulse turbine.

SECTION - V

9   (a)   Prove that a Parson's reaction turbine is a 50 % reaction turbine.

    (b)   The following data refer to a stage of a reaction turbine consisting one ring of fixed blades and one ring of moving blades. Mean diameter of rotor=85 cm, Speed of the rotor=2852 rpm, Inlet absolute velocity of steam=290 m/s, Blade outlet angle=21°, Find (i) the blade angle at inlet (ii) tangential force (iii) power developed in the stage assuming steam flow is 7.0 kg/s.

10   (a)   Sketch and explain the working of a reaction turbine.

    (b)   Derive an expression for the degree of reaction of a reaction turbine.

SECTION - VI

11   (a)   Derive an expression for blade or diagram efficiency of a single stage impulse turbine and arrive at the condition for maximum efficiency.

    (b)   What is meant by compounding of steam turbines? With a neat diagram describe the construction and working of velocity compounded impulse steam turbine.

12   (a)   Describe throttle governing of a steam turbine.

    (b)   Differentiate single stage and multi stage turbines.

B.TECH DEGREE EXAMINATIONS, APRIL 2019
II B.Tech II Semester

MATERIAL SCIENCE AND METALLURGY
(Mechanical Engineering)

Time: 3 hrs   Max. Marks: 60

Answer SIX Questions, choosing ONE from each section.
All Questions carry EQUAL marks.
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SECTION-I

1 a) Define Atomic Packing Factor (APF). Calculate Atomic Packing Factor for BCC and FCC type of crystal structures.

b) Define the following terms associated with crystallography.
(i) Crystal (ii) Structure   (iii) Space lattice (iv) Unit Cell (v) Miller indices.

2 a) Define the following mechanical properties of materials.
(i) Hardness   (ii) Toughness (iii) Brittleness (iv) Ductility (v) Malleability

b) Outline the mechanisms of plastic deformation in crystal structures.

SECTION-II

3 a) Describe the procedure of impact test.

b) Outline the procedure of fluorescent penetrant inspection of non-destructive testing method along with the applications.

4 a) Describe the procedure of fatigue test.

b) Outline the procedure of ultrasonic inspection of non-destructive testing method along with advantages, limitations and applications.

SECTION-III

5. Give the classification of equilibrium diagrams. Explain with neat sketch the equilibrium diagram of an alloy subject to peritectic transformation.

6. Draw the Iron-Iron Carbide equilibrium diagram and indicate the temperatures, compositions and phases on it. Define the micro-constituent structural components
(i) Austenite,   (ii) Ferrite,   (iii) Cementite,
(iv) Ledeburite,   (v) Pearlite,   (vi) Bainite
(vii) Martensite,   (viii) Troosite and (ix) Sorbite.

Section-IV

7   Describe the production of steel by L-D process.

8   a) Discuss the uses and limitations of plain carbon steels.

   b) Give the Classification of Cast irons, along with the composition, properties and applications of Grey Cast iron, White Cast iron, Malleable Cast iron and Spheroidal Graphite Cast iron.

SECTION-V

9   a) Explain the basic steps to construct a T.T.T diagram.

   b) Explain the principle, advantages, disadvantages and applications of flame hardening.

10   a) Explain the procedure of hardening in heat treatment of steels.

   b) Define and describe the process characteristics, advantages, disadvantages and applications of Cyaniding.

SECTION-VI

11   What is powder metallurgy? Describe the various steps involved in manufacture of a component by powder metallurgy.

12   Discuss the significance and applications of super alloys and smart materials in the present day world.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

ENGINEERING MATHEMATICS - III
(Common to EEE & ECE)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1   Solve the boundary value problem $\dfrac{\partial^2 y}{\partial x^2} = \dfrac{1}{c^2}\dfrac{\partial^2 y}{\partial t^2}, 0 < x < l, t > 0,$ with

$u(0,t) = 0, u(l,t) = 0, and\ u(x,0) = 0, u_t\ (x,0) = u_0 x(l-x)$ by method of separation of variables.

2   Solve the two dimensional Laplace equation by the method of separation of variables.

SECTION - II

3   (a)   Prove that $J_{\frac{1}{2}}(x) = \sqrt{\dfrac{2}{\pi x}}\sin x$

(b)   Prove that $x J_n^1(x) = n J_n(x) - x J_{n+1}(x)$

4   Prove that $P_n(x) = \dfrac{1}{n! 2^n}\dfrac{d^n}{dx^n}\left\{\left(x^2 - 1\right)^n\right\}$

SECTION - III

5   (a)   State and Prove polar form of C-R equations.

(b)   If $\omega = \phi + i\psi$ represents the complex potential for an electric field and

$\psi = x^2 - y^2 + \dfrac{x}{x^2 + y^2}$ determine the function ϕ.

6   (a)   If $f(z)$ is a regular function of z, prove that $\left(\dfrac{\partial^2}{\partial x^2} + \dfrac{\partial^2}{\partial y^2}\right)|f(z)|^2 = 4|f^1(z)|^2.$

(b)   Find the bilinear transformation which maps the points *(-1, 0, 1)* into the points *(0, 1, 3i)*.

7   (a)   Verify Cauchy's theorem by integrating e^{iz} along the boundary of the triangle with the vertices at the points $1+i$, $-1+i$, $-1-i$.

    (b)   Evaluate $\int_C \dfrac{z^2 - z + 1}{z - 1} dz$ where C is the circle $|z| = \dfrac{1}{2}$ and $|z| = 1$.

8   Evaluate $\oint_C \dfrac{e^z}{(z^2 + \pi^2)^2} dz$, where C is $|z| = 4$.

9   Find the Laurent's expansion of $f(z) = \dfrac{7z - 2}{(z + 1)(z - 2)}$ in the region $1 < |z + 1| < 3$.

10   Evaluate $\oint_C \dfrac{z - 3}{z^2 + 2z + 5} dz$ where C is the circle (a) $|z| = 1$ (b) $|z + 1 - i| = 2$ (c) $|z + 1 + i| = 2$

11   (a)   In 256 sets of 12 tosses of a coin, in how many cases one can expect 8 heads and 4 tails.

    (b)   In a certain factory turning out razor blades, there is a small chance of 0.002 for any blade to be defective. The blades are supplied in packets of 10. Use Poisson distribution to calculate the approximate number of packets containing no defective, one defective and two defective blades respectively in a consignment of 10,000 packets.

12   (a)   If X is a normal variate with mean 30 and standard deviation 5, find the probabilities that (i) $26 \le X \le 40$ (ii) $X \ge 45$ and (iii) $|X - 30| > 5$.

    (b)   In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester
ENGINEERING ECONOMICS & FINANCIAL ACCOUNTING
(Common to EEE & ECE)

Time: 3 hours

Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1   What are the methods of measurement of elasticity demand?

2   (a)   Explain the theory of marginal utility analysis.

     (b)   Distinguish GDP and National Income

SECTION - II

3   A company prepares a budget to produce 3 lakh units, with fixed costs as
     Rs.15 lakhs and average variable cost of Rs.10 lakh each. The selling price is
     to yield 20% profit on cost. You are required to calculate.
     i) P / V ratio
     ii) Break Even Point

4   (a)   Define production function

     (b)   Explain the law of variable proportion.

SECTION - III

5   Explain features of monopolistic competition. How price and out-put is determined ?

6   Elucidate price discrimination under monopoly competition.

SECTION - IV

7   Explain different types of public sector enterprises?

8   Explain the objectives and functions of RBI.

SECTION - V

9   Mr. 'X' is providing you the list of balances of his business as on 31-12-1998. Prepare final accounts for him.

Capital	50,000	Office expenses	6,210
Drawings	7,500	Buildings	15,000
Purchases	72,100	Insurance	1,500
Sales	95,000	Discount received	2,910
Purchase returns	2,700	Rent & taxes	10,700
Sales returns	1,300	Telephone charges	1,050
Debtors	18,200	Postage charges	950
Creditors	35,750	Furniture	5,000
Stock	19,800	Printing & Stationary	2,750
Bad debts	3,000	Commission	8,400
Bills receivables	12,000	Carriage inwards	3,200
Bills payables	23,000	Salaries & wages	20,000
Cash in hand	800		

Adjustments:

     A. Closing stock 61,700.
     B. Depreciation on Furniture 10%, Buildings 20%.
     C. Rent outstanding 900.
     D. Bad debts 200.
     E. Provide 5% for debts.
     F. 1/4th of salary and wages belong to factory.

10   Explain the accounting principles?

SECTION - VI

11   Coastal software Ltd.is proposing to mechanize their operations. Two proposals M and N in form of quotations have been received from two different vendors. The proposal in each case costs Rs.5, 00,000. A discount factor of 12% is used to compare the proposals. CFAT are likely to be as under:

YEAR	Proposal M	Proposal N
1	1,50,000	50,000
2	2,00,000	1,50,000
3	2,50,000	2,00,000
4	1,50,000	3,00,000
5	1,00,000	2,00,000

     Which one do you recommend under:
     a) Pay Back period method.
     b) Present value method.

12   Explain the concept of Capital Budgeting decisions.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

PULSE & SWITCHING CIRCUITS
(Common for EEE & ECE)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Why a high pass RC circuit is called a differentiator? Mention the applications of high pass RC circuits.

   (b) Draw RC integrator circuit and plot the output waveform assuming the input is a symmetrical square wave and the circuit's time constant is about one-fifth of the square wave's pulse width.

2 (a) Design a clipper circuit that clips any portion of the input AC waveform below +4V. Also draw the necessary waveforms.

   (b) Design a clamper circuit that clamps the complete input AC signal to negative directions. Draw the necessary input and output waveforms.

SECTION - II

3 (a) Briefly explain the switching characteristics of MOSFET.

   (b) Describe the following with neat diagrams
        (i) Two-input MOS NAND gate   (ii) Two-input MOS NOR gate.

4 (a) Explain the terms pertaining to transistor switching characteristics
        (i) Rise time (ii) Delay time (iii) Storage time (iv) Fall time (v) Turn-on time

   (b) Explain why in a high voltage MOSFET switching circuit the voltage rise and fall time is always greater than current fall and rise times.

SECTION - III

5 (a) Draw the circuit and waveforms of emitter coupled Astable Multivibrator.

   (b) State the applications of Astable Multivibrator and Schmitt trigger

6   The fixed bias Bistable Multivibrator uses $V_{CC}=+12V$, $V_{BB}=-8V$, $R_1=10K\Omega$, $R_2=50K\Omega$, $R_C=2.2K\Omega$. The transistors are silicon transistors with a minimum value of $h_{fe}=30$. Calculate the stable state currents and voltages when V_{CE} (sat)=0.2V and V_{BE} (sat)=0.7V

SECTION - IV

7   (a)   (i) Define Miller's theorem.
             (ii) What does bootstrapping mean?

     (b)   Why sampling gates are called selection circuits?

8   (a)   Explain how UJT is used for sweep circuit.

     (b)   Explain constant current Miller circuit using BJT.

SECTION - V

9   (a)   Derive the expression for the maximum efficiency of Class-B transformer coupled push pull amplifier.

     (b)   List out the different types of distortions.

10   (a)   What is power amplifier? Compare directly coupled Class A and transformer coupled Class A amplifier.

     (b)   What is the DC input power of a Class AB amplifier?

SECTION - VI

11   (a)   Discuss the effect of bandwidth on cascading single tuned amplifiers.

     (b)   A tank circuit has a capacitor of 100pF and an inductor of 150μH. The series resistance is 15Ω. Find the impedance and bandwidth of resonant circuit.

12   (a)   A single tuned transistor amplifier is used to amplify modulated RF carrier of 600KHz and bandwidth of 15KHz. The circuit has total output resistance R_t=20KΩ and output capacitance of 50pF. Calculate the values of inductance and capacitance of the circuit.

     (b)   Briefly explain the principle of stagger tuning.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

ELECTROMAGNETIC TRANSMISSION LINES
(Electronics & Communication Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Write down the Maxwell's equations for time varying fields in integral and differential forms and describe their physical significance?

   (b) In free space $E = 20 \cos (\omega t - 50x) \, a_y$ V/m. Calculate
   i)   Displacement current density J_d
   ii) Magnetic field intensity H
   iii) Angular frequency 'ω'

2 (a) Define Uniform plane wave? Derive all relations between E & H of a uniform plane wave?

   (b) The Magnetic field component of an EM wave propagating through a non magnetic medium ($\mu = \mu_0$) is $H = 25 \sin (2 \times 10^8 \, t + 6x)$ mA/m. Determine
   i) The Direction of wave propagation
   ii) The permittivity of the medium
   iii) The electric field internsity E

SECTION - II

3 (a) Discuss the wave propagation in lossless medium?

   (b) For a uniform plane wave in space λ =12cm. In a loss less material of unknown characteristics, λ=8cm. In this material E= 50V/m, H =0.1A/m. find f, μ_r , ε_r

4 (a) The electric field in free space is given by $E = 50 \cos (10^8 \, t + \beta x) \, a_y$ V/m.
   i)   Find the direction of wave propagation
   ii) Calculate β and the time it takes to travel a distance of λ/2
   iii) Sketch the wave at t = 0, T/4, and T/2

   (b) Derive the expressions for all the wave parameters in lossless medium

SECTION - III

5 (a) Derive wave equation in conducting medium?

   (b) How to distinguish conductors & dielectrics? Derive the expressions for α, β, υ, η for good conductors?

6   (a)   Define Poynting vector? State and Prove Poynting theorem?

     (b)   Explain skin depth? Derive expression for depth of penetration for good conductor?

SECTION - IV

7   (a)   What is Polarization? Explain Linear, Circular and Elliptical Polarizations?

     (b)   Define Brewster angle and derive expression for Brewster angle when a wave is parallel polarized?

8   (a)   What is Snell's law? Explain the total Internal reflection and where it is used?

     (b)   Derive an expression for reflection when a wave is incident on a dielectric obliquely with parallel polarization?

SECTION - V

9   (a)   Draw the equivalent circuit of Transmission line and derive expressions for Voltage and Current along the transmission line?

     (b)   A transmission line operating at 500 MHz has $Z_0 = 80\ \Omega$, $\alpha = 0.04$ Np/m, $\beta = 1.5$ rad/m, Find the line parameters R, L, G and C.

10 (a)   What are Primary constants of the Transmission line? Derive the expression for Characteristic impedance of the transmission line in-terms of Primary constants?

     (b)   What is Distortionless line? A distortionless line has $Z_0 = 60\ \Omega$, $\alpha = 20$ mNp/m, u= 0.6c, where c is speed of light in vacuum. Find R, L, G, C and λ at 100 MHz.

SECTION - VI

11 (a)   Derive the expression for input impedance of a transmission line. From which derive the input impedance of lossless line?

     (b)   Derive the expression for Z_{sc} and Z_{oc} of a transmission line.

12 (a)   Explain the construction of Smith Chart. List the applications of Smith Chart?

     (b)   What is Quarter wave transformer? Why it is called impedance transformer?

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester

ANALOG COMMUNICATION
(Electronics & Communication Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION – I

1 (a) Define modulation and explain the need of modulation.

   (b) When the modulation depth is 85, an AM transmitter produces 100KW. What is the carrier power? What would be the percentage of power saving if the carrier and one of the side band is suppressed.

2   Discuss various techniques for generation of AM signals.

SECTION – II

3 (a) Draw the block diagram for SSB generation using Frequency discrimination method and explain its operation.

   (b) Derive an expression of SSB modulated wave for which lower sideband is retained.

4 (a) Explain one technique for demodulation of SSBSC wave.

   (b) What is the amount of power saved in SSBSC over DSBSC or AM?

SECTION – III

5 (a) Draw the block diagram and explain generation of DSBSC signal using balanced modulator.

   (b) What is the effect of frequency and phase error in demodulation of DSBSC wave using synchronous detector.

6 (a) Discuss applications of different AM Systems.

   (b) How the baseband signal can be recovered from the VSB signal plus carrier using envelope detector.

SECTION – IV

7 (a) Explain the generation WBFM from NBFM with neat sketch.

   (b) Explain the principle of direct method of generation of FM signal using relevant diagrams.

8   Draw the spectral representation of FM wave and derive the expression for total transmission bandwidth.

SECTION – V

9   (a)   What is the Noise equivalent band width? Discuss the trade of between bandwidth S/N.

      (b)   Compare noise performance of PM and FM systems.

10   (a)   Explain the following.

          a) Resistive Noise source
          b) Short noise
          c) In phase and quadrature phase components and its properties
          d) Noise figure.

SECTION – VI

11   What is Automatic Gain Controlling radio receiver? What are the different types of AGC, explain in detail.

12   (a)   Discuss Simple FM transmitter using Reactance modulator.

      (b)   Give the comparison between phase discriminator and ratio detector.

Code No. 17EC2204

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech II Semester

RANDOM SIGNALS & STOCHASTIC PROCESSES
(Electronics & Communication Engineering)

Time : 3 hours   Max Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Explain about total probability theorem. State and prove Bayes' theorem of probability.

   (b) The probabilities that a husband and wife will be alive 25 years from now are 0.80 and 0.85 respectively. Find the probability that in 25 years (i) both will alive, (ii) neither will be alive. (iii) atleast one will be alive.

2 (a) A test consists of 10 multiple-choice questions, with 4 choices. Among the choices, only one is correct and only one can be chosen. A student selects the choices at random. What is the probability that he has 1,2,3, correct answers?

   (b) India plays two matches each with the West Indies and Australia. In any match, the probabilities of India getting 0, 1 and 2 points are 0.45, 0.05 and 0.5 respectively. Assuming that the outcomes are independent, find the probability of India getting at least 7 points.

SECTION - II

3 (a) What is Poisson random variable? Explain in brief. Prove that for large values of n binomial distribution can be approximated to Poisson distribution.

   (b) The thickness of a sheet in an automobile component is uniformly distributed between 0.9 and 1.10 millimeters. (i) Determine the CDF of sheet thickness. (ii) Determine the proportion of sheets that exceed 1.0 mm thickness. (iii) What thickness is exceeded by 20% sheets.

4 (a) Let x be a random variable defined by the density function

$$f_X(x) = \begin{cases} \dfrac{5}{4}\left(1 - x^4\right) & 0 < x < 1 \\ 0 & Otherwise \end{cases}$$

   Find $E[x]$. $E[x^2]$

   (b) Prove additive property of Binomial distribution

SECTION - III

5   (a)   The joint pdf of random variables (X,Y) is

$$f_{X,Y}(x,y) = abe^{-(ax+by)} \quad x > 0, \; y > 0$$
$$= 0 \qquad Otherwise$$

Find P(X>Y).

(b) Explain about the properties of Joint density function

6   (a)   Radha and Mohan decide to meet at a park between 5.00 p.m. and 6 p.m. They arrive independently and their arrival time is uniformly distributed. Find the probability that the first to arrive has to wait longer than 156 minutes.

(b)   Two statistically independent random variables X and Y have respective densities $f_X(x) = u(x) - u(x-1)$ and $f_Y(y) = u(y) - u(y-1)$. Find density of a variable Z=X+Y.

SECTION - IV

7   (a)   In the fair-coin experiment, a random process X(t) is defined as follows, $X(t) = \cos \pi t$ if heads occur, X(t)=t if tails occur. (a) Find E[x(t)]. Find $F_X(x,t)$ for $t = 0.25, 0.5, 1$.

(b)   Consider a random process $X(t) = A\cos(\omega_0 t + \theta)$, where A and ω_0 are real constants and θ is a random variable distributed over $(0, \dfrac{\pi}{2})$. Find the average power in X(t).

8   (a)   Explain in detail about the properties of Auto-correlation function.

(b)   Consider a random process $X(t) = A\sin \omega t + B\cos \omega t$; $-\infty < t < \infty$; where ω is a constant and A and B are random variables. (a) Find the condition for X(t) to be stationary. (b) Show that X(t) is WSS if and only if A and B are uncorrelated with equal variance.

SECTION - V

9   (a)   If X(t) is a WSS process and if $Y(t) = \int_{-\infty}^{\infty} X(\tau)h(t-\tau)d\tau$ then prove (a) $R_{XY}(\tau) = R_{XX}(\tau) * h(\tau)$. (b) $R_{YX}(\tau) = R_{XX}(\tau) * h(-\tau)$

b)   Find the noise bandwidth of the system having transfer function $H(\omega) = \dfrac{1}{1+j\omega RC}$.

10   A random noise process X(t) having power spectrum $S_{xx}(\omega) = \dfrac{3}{49 + \omega^2}$ is applied to a network for which $h(t) = t^2 e^{-2t} u(t)$. The network response is denoted by Y(t).

       (a) What is the average power of X(t)?
       (b) Find the power spectrum of Y(t).
       (c) Find the average power of Y(t)

SECTION – VI

11   (a)   Derive expression for effective noise temperature of a network with two resistors connected in series.

     (b)   Write a short note on shot noise.

12   Write a detailed note on Wiener filter.

B.TECH. DEGREE EXAMINATION, APRIL 2019

II B.Tech. II Semester

DATABASE MANAGEMENT SYSTEMS
(Computer Science & Engineering)

Time: 3 hours

Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Explain three-schema architecture of DBMS

   (b) Describe High level conceptual models for database design.

2 (a) Discuss the two main types of constraints on specialisation and generalization

   (b) Define foreign key and explain the need of the foreign key.

SECTION - II

3 Describe
   (a) Relational Model Concepts
   (b) Relational Constraints
   (c) Relational Algebra Operations

4 (a) Write a short notes on Tuple Relational Calculus

   (b) Write a short notes on Domain Relational Calculus

SECTION - III

5 (a) Explain aggregate functions in SQL

   (b) Explain how embedded SQL differs from SQL. Give Examples

6 (a) Explain the views in SQL

   (b) Explain schema change statements in SQL

SECTION - IV

7 Explain the following
   (a) Functional Dependencies
   (b) Multivalued Dependencies
   (c) Join Dependencies

8 Explain select, join, project and set operations with an example.

SECTION - V

9   What is deadlock? Explain about different deadlock prevention protocols..

10 (a) Describe the shadow paging recovery technique. Under what circumstance does it not require a log?

     (b) Explain about timestamp-based concurrency control

SECTION - VI

11 (a) Write short notes on Spatial Database Concepts

     (b) What is the difference between granting and revoking privilege?

12   Define Database Security and Explain the challenges and issues in database security design.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester
FORMAL LANGUAGES AND AUTOMATA THEORY
(Computer Science & Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
***

SECTION - I

1   (a)   Explain the significance of epsilon moves in NFA and construct DFA to accept strings end with ab over {a,b}*

    (b)   Prove that for every NFA there exists an equivalent DFA accepting same L.

2   (a)   Construct the minimal DFA accepting string over {0,1} that do not have three consecutive 1's

    (b)   Design Mealy Machine accepting the language of all strings in which every 0 is followed immediately by 11, and convert it into equivalent Moore Machine

SECTION - II

3   Use the Pumping Lemma to show that each of these languages is not Regular :
          i) L={ww | w $\in$ {0,1} }   ii) L={xy | x,y $\in$ {0,1} and y is either x or x^r}

4   (a)   Prove that Regular Sets are close under Union, Concatenation, kleene Closure

    (b)   State and explain Chomsky hierarchy of grammars

SECTION - III

5   Convert the following grammar into Normal Forms
          S $\rightarrow$ Aa / a / aaA / ASB
          A $\rightarrow$ Aa/a
          B $\rightarrow$ b/BS/bbS

6   (a)   Show that L= {a^p/p is prime} is not a Context –free language.

    (b)   Reduce the following grammar to Chomsky Normal Form(CNF)
          S$\rightarrow$ASA|bA , A$\rightarrow$B|S, B$\rightarrow$c

SECTION - IV

7   (a) Construct a **PDA** A accepting $L=\{wcw^T|\ w\in\{a,b\}^*\}$ by final state

     (b) Formally define acceptance of Push Down Automata by empty stack and final state

8   (a) Prove that if L is a CFL and R is a regular set, then L∩R is a CFL

     (b) Define Pushdown Automata with an example

SECTION - V

9   (a) Design a Turing Machine which can multiply two positive integers

     (b) Write a note on Universal Turing Machine

10   (a) Design Turing Machine to compute the function n! (Factorial of a number)

     (b) Discuss in detail about LBA model with one example

SECTION - VI

11   (a) Discuss on undecidable problems about Turing Machine

     (b) Describe some classic NP problems and why they are important?

12   (a) Define PCP. Prove that the PCP over Σ for $(\Sigma)\geq 2$ is insolvable

     (b) Explain the classes of P and NP

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester
DESIGN AND ANALYSIS OF ALGORITHMS
(Computer Science & Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
*All Questions carry equal marks*
* * *

SECTION - I

1   (a)   What is an algorithm? How do you evaluate an algorithm?

    (b)   Explain the different Mathematical Approaches for solving time complexity of algorithms?

2   (a)   Construct the algorithm for iterative binary search using Divide and Conquer technique

    (b)   Compare and contrast the divide and conquer technique with backtracking approach

SECTION - II

3   (a)   Construct the knapsack algorithm using Greedy method

    (b)   Show that if $p_1/w_1 \geq p_2/w_2 \geq \ldots \geq p_n/w_n$, then Greedy Knapsack generates an optimal solution to the instance of the knapsack problem.

4   (a)   Explain optimal storage on tapes using Greedy method

    (b)   Evaluate an optimal placement for 13 programs on 3 tapes T_0, T_1 & T_2 where the programs are lengths 12,5,8,32,7,5,18,26,4,3,11,10 & 6

SECTION - III

5   (a)   Compare the Dynamic Programming technique with Backtracking technique

    (b)   Illustrate all pairs shortest path algorithm of Dynamic Programming for the below directed graph.
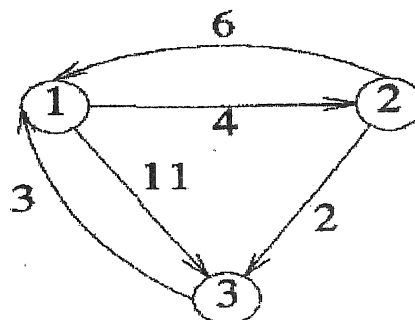
6   (a)   Explain 0/1 Knapsack problem using Dynamic Programming with an example

      (b)   Describe reliability design problem. Give Suitable example

SECTION – IV

7   (a)   Show that the articulation point can be at most one vertex in common of two bi-connected components

      (b)   Summarize the pseudo code to determine the bi-components

8   (a)   Write algorithms of Union and Find algorithms on sets. Explain with suitable examples.

      (b)   Write an algorithm of DFS and explain with an example

SECTION – V

9   (a)   Summarize recursive backtracking algorithm for sum of subsets problem

      (b)   Elaborate the graph coloring problem using backtracking technique

10 (a)   Draw the portions of state space tree generated by LCBB for the knapsack instance: n=5, (p1,p2,....p5) = (10,15,6,8,4) and (w1,w2,....w5) = (4,6,3,4,2) and m=12

      (b)   Describe the control abstraction for LC search

SECTION - VI

11 (a)   Compare and contrast NP hard and NP Complete problems

      (b)   Describe Clique decision problem

12 (a)   Describe computation model

      (b)   Write prefix computation problem.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester
SOFTWARE PROJECT MANAGEMENT
(Computer Science & Engineering)

Time: 3 hours

Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1 (a) Write a Short note on the following
    (i) Doing the project right is most efficient
    (ii) Review everything

  (b) What are the steps involved in creating a project plan? Explain in detail.

2 (a) Write a Short note on the following
    (i) Trust your team
    (ii) All software engineers are created equal

  (b) How do you diagnose project planning problems?

SECTION - II

3 (a) Explain briefly about PROBE and COCOMO estimation techniques

  (b) Discuss in detail about building the project schedule

4 (a) As a project manager how can you manage multiple projects? Discuss.

  (b) How do you diagnose estimation problems?

SECTION - III

5 (a) Explain briefly about Software requirement specification?

  (b) Discuss the following :
    (i) Desk checks
    (ii) Code reviews

6 (a) What do you know about Requirements elicitation? Explain.

  (b) How do you diagnosing review problems?

SECTION - IV

7 (a) How do you refactor a program? Explain refactoring with an example.

  (b) Discuss briefly about both defect tracking and triage

8 (a) Explain about version control with subversion?

  (b) Describe the standard for a software test plan? Relate a test plan with a test case.

SECTION - V

9   (a)   An important part of the project manager's job is managing upward in the organization? Discuss

     (b)   "Progress comes not just from making changes, but from making smart changes" Justify your answer.

10 (a)   "A person has responsibility to perform a task only if he is given sufficient authority to perform and is held accountable for results". Justify your answer.

     (b)   "Your attempt to change your own project may fail". Justify your answer.

SECTION - VI

11 (a)   List out the common causes of outsourced project failures? Explain.

     (b)   Discuss in detail about life without a software process

12 (a)   Explain briefly why the project manager needs to collaborate with Vendor?

     (b)   What is software process improvement? Briefly discuss supporting models and certificates.

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester
COMPUTER NETWORKS
(Computer Science & Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1   (a)   Briefly describe about the characteristics of LAN, WAN and MAN.

    (b)   Illustrate various design issues for the layers.

2   Explain with neat diagram about functions of protocols used in each layer of OSI reference model.

SECTION - II

3   (a)   Discuss about Error detection with suitable example.

    (b)   Explain selective repeat protocol with an example.

4   Describe about following list of protocols.

          i) A simplex stop-and-wait protocol.   ii) HDLC.

SECTION - III

5   (a)   Give a note on working procedure of CSMA/CD protocol.

    (b)   Explain about collision free protocols.

6   (a)   Summarize the problems occur in connecting two different IEEE 802 LANs.

    (b)   Briefly explain about following.
          i) Repeaters   ii) Hubs   iii) Switches.

SECTION - IV

7   List and explain various design issues of network layer.

8   (a)   Discuss about distance vector routing algorithm with example.

    (b)   Explain, how congestion can be controlled in open loop systems.

SECTION - V

9   (a)   Define Tunneling. Explain its role in internet working of devices.

    (b)   Describe routing in internet working.

10   (a)   Write a short note on Transport Service primitives.

    (b)   Explain about Flow control and Buffering.

SECTION - VI

11   (a)   Explain about each field in the TCP segment header with neat diagram.

    (b)   Describe the connection establishment procedure in TCP.

12   (a)   Explain about the role of DNS in application layer.

    (b)   Write a short note on architecture of the E-mail system with neat diagram.

Code : 17CS2206

B.TECH. DEGREE EXAMINATION, APRIL 2019
II B.Tech. II Semester
PRINCIPLES OF PROGRAMMING LANGUAGES
(Computer Science & Engineering)

Time: 3 hours   Max. Marks: 60

Answer SIX Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1   (a)   Discuss in detail about the attribute grammars

     (b)   Explain how is the order of evaluation of attributes determined for the tree of a given grammar

2   (a)   What are the factors influencing the writability of a language?

     (b)   Explain in detail about recursive descent parsing.

SECTION - II

3   (a)   Explain in detail arrays, indices, subscript bindings, and array categories.

     (b)   Explain various primitive data types with suitable examples

4   (a)   Explain the scope and lifetime of variables. Illustrate when they would coincide and when they don't.

     (b)   What is a variable? What are the attributes of a variable? Elaborate on address of a variable

SECTION - III

5   (a)   Define a function. What are the design issues for functions? Explain

     (b)   Explain how subprograms names are passed as parameters

6   (a)   What are generic methods? Explain in detail

     (b)   Explain the importance of dynamic scoping with an example

SECTION - IV

7   (a)   Discuss the design issues of Exception Handling.

     (b)   Compare and contrast the cooperation synchronization and competition synchronization in message passing.

8   (a)   What are the three possible levels of concurrency in programs? Explain.

     (b)   Differentiate between procedural languages and object oriented language.

SECTION - V

9   (a)   How to support for object oriented programming in Eiffel ? Explain.

      (b)   Give comparison of Functional and Imperative Languages

10   (a)   Why were imperative features added to most dialects of LISP?

      (b)   Explain about scheme functional programming language.

SECTION - VI

11   What do you know about Exception handling in Ada?

12   (a)   Can you differentiate between functional and imperative languages?

      (b)   Explain how RDBMS and expert systems are helped using logic programming.