B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

RCC STRUCTURAL DESIGN - II
(Civil Engineering)

Time : 3 hours   Max. Marks :60

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

1   Design a combined rectangular footing for two columns A and B carrying loads of 550 kN and 750 kN respectively. Column A is 300 x 300 mm in size and Column B is 400 x 400 mm in size. The c/c spacing of columns is 3.4 m. The SBC of the soil may be taken as 150 kN/m^2. Use M 20 mix and Fe 415 grade steel.

2   Design a combined footing for two columns, each 600 mm x 600 mm, 5 m. apart, and each carrying a load of 1800 kN. The available width is restricted to 2.4 m. The SBC of the soil may be taken as 200 kN/m^2. Use M 25 mix and Fe 415 grade steel.

SECTION - II

3   A counterfort retaining wall has to retain 6.5 m high embankment above ground level. The foundation is to be taken 1 m deep where the SBC of soil may be taken as 180 kN/m^2. The top of earth retained is horizontal and soil weighs 18 kN/m^3 with angle of internal friction as 30^0. The coefficient of friction between soil and concrete is 0.5. Use M 20 mix and Fe 415 grade steel.

    (a) Check the stability of retaining wall

    (b) Design the heel slab

4   A counterfort retaining wall is proposed for the following requirements.

Height of wall above the ground	= 8 m
Depth of foundation	= 1.5 m
Safe bearing capacity	= 200 kN/m^2
Unit weight of earth fill	= 18 kN/m^2
Surcharge angle	= 18^0
Angle of internal friction for backfill	= 30^0

Face to face spacing of front counterforts $= 2$ m

Coefficient of friction between concrete and soil $= 0.55$

Provide a parapet wall 1 m high on the top of stem.

Use M 20 mix and Fe 415 grade steel.

    (a) Check the stability of retaining wall

    (b) Design the heel slab

SECTION - III

5   Design a circular water tank with flexible base for a capacity of 5,00,000 litres. The depth of water is to be 4 m including a free board of 200 mm. Use M 20 mix and Fe 415 grade steel.

6   Design a rectangular water tank 5 m x 8 m x 3 m. deep. The tank is open at top and the walls are rigidly fixed to the base which rests on firm ground. Use M 25 mix and Fe 415 grade steel.

SECTION - IV

7   Sketch the yield line pattern for an equilateral triangular isotropic slab. Derive an expression for the yield moment using virtual work method.

8 (a) What are the assumptions made in the yield line theory ?

    (b) Briefly explain the Equilibrium method in yield line theory.

SECTION - V

9   An unsymmetrical prestressed concrete beam of I-section has the following dimensions.

Top Flange : 300 mm x 100 mm, Web : 250 mm x 80 mm,

Bottom Flange : 200 mm x 100 mm, Span of the beam $= 8$ m,

Live load $= 12$ kN/m, Area of wires $= 385$ mm^2,

Final stress in the wires $= 1500$ N/mm^2.

Determine the eccentricity at which the prestress should be applied so that a net residual compressive stress of 5 N/mm^2 is present at mid section under the full live load.

10   In a prestressed concrete beam of c/s 200 mm x 300 mm and span 6 m, an initial prestressing force of 400 kN is applied at an eccentricity of 70 mm by tendons of area 400 mm^2. Taking Es $= 2$ x 10^5 N/mm^2, Ec $= 0.333$ x 10^5 N/mm^2, Anchor slip $= 1.5$ mm, creep coefficient in concrete $= 1$, shrinkage of concrete $= 0.0002$, creep loss in steel $= 3$ %.

Determine the loss of prestress due to

(i) elastic shortening of concrete

(ii) anchorage slip

(iii) creep of concrete

(iv) shrinkage of concrete

(v) creep in steel

(vi) total loss and % loss of prestress

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

DYNAMICS OF MACHINERY
(Mechanical Engineering)

Time : 3 hours   Max. Marks : 60

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

SECTION - I

1 (a) .Derive an expression for the mean power transmitted for a body moving down an inclined plane
   (b) The mean diameter of a screw jack having pitch of 10mm is 50mm. A load of 20kN is lifted through a distance of 70 mm. Find the work done in lift the load and the efficiency of the screw jack when (i) the load rotates with the screw 9ii) the load rests on loose end which does not rotate with the screw

2 (a) Which of the two assumptions- uniform intensity of pressure or uniform rate of wear would you make use of in designing friction clutch and why?
   (b) A cone clutch with cone angle 20^0 is to transmit 7.5kW at 750 rpm. The normal intensity of pressure between the contact faces is not to exceed 0.12 N/mm^2. The coefficient of friction is 0.2. If the face width is 1/5th of mean diameter. Find
        (i) the mean dimensions of the clutch (ii) Axial force required while running

SECTION - II

3 (a) Derive an expression for total braking torque about fulcrum in a differential band brake when the brake drum rotates in counter clock wise direction
   (b) In a vertical belt transmission dynamometer the diameter of the driving pulley rotating at 1500rpm is 80mm. The centre distance of the intermediate pulleys from the fulcrum is also 80mm each. The weighing pan on the lever is at a distance of 250mm. Find the power Transmitted when a mass of 20kg is required in the pan, including its own mass.

4 (a) Name different types of dynamometers and explain any one of them
   (b) A band brake acts on ¾ th of a circumference of a brake drum of 450 mm diameter which is keyed to a shaft. The band brake provides a braking torque of 225 Nm. One end of the lever is attached to a fulcrum pin of the lever and the other end is attached to a pin 100 mm from the fulcrum. If the operating force is applied at 500 mm from the fulcrum and coefficient of friction is 0.25, find the operating force when the drum rotates in () clock-wise direction (ii) anti-clock wise direction

SECTION - III

5 (a) What is the function of governor and how it is differ from that of a flywheel.

 (b) The length of the upper and lower arms of a porter governor are 200mm and 250mm respectively. Both the arms are pivoted on the axis of rotation. The central load is 150N, the weight of the each ball is 20N and the friction of the sleeve together with the resistance of the operating gear is equivalent to a force of 30N at the sleeve. If the limiting inclinations of the upper arms to the vertical are 30° and 40° taking friction in to account. Find the range of speed of the governor.

6 (a) Derive an expression for the determination of equilibrium speed of Hartung Governors

 (b) In a spring controlled governor of the Hartung type, the length of the ball and sleeve arms are 80 mm and 120 mm respectively. The total travel of the sleeve is 25 mm. In the mid position, each spring is compressed by 50 mm and the radius of rotation of the mass center is 140mm. Each ball has a mass of 4 kg and the spring has a stiffness of 10 kN/m. The equivalent mass at the sleeve is 16 kg. Neglecting the moment due to revolving masses, when the arms are inclined, determine the ratio of range of speed to the mean speed of the governor. Also find the speed in mid position.

SECTION - IV

7 (a) Derive an equation for determining the mass of the flywheel rim involving the linear velocity, density and stress.

 (b) The torque delivered by a two stroke engine is represented by T= (1000+300sin2Θ - 500cos2Θ) N-m where Θ is the angle turned by the crank from the IDC. The engine speed is 250rpm. The mass of the flywheel is 400kg and radius of gyration 400mm. Determine, (i) the power developed (ii) the total percentage fluctuation of speed (iii) the angular acceleration of flywheel when the crank has rotated through an angle of 60° from the IDC. (iv) The maximum angular acceleration and retardation of the flywheel.

8 (a) Define the terms coefficient of fluctuation of energy and coefficient of fluctuation of speed

 (b) A vertical double acting steam engine has a cylinder 300mm diameter and 450mm stroke and runs at 200rpm. The reciprocating parts has a mass of 225kg and the piston rod is 50mm diameter. The connecting rod is 1.2m long. When the crank has turned 125°from IDC the steam pressure above the piston is 30KN/m2. Calculate (i)Crank-pin effort (ii) The effective turning moment on the crank shaft.

SECTION - V

9 (a) What is the effect of gyroscopic couple on the stability of a two wheeler taking a turn?

 (b) The mass of the motor cycle along with the rider is 180kg. the height of the center of gravity of total mass is 600 mm above the ground when it moves straight. Each wheel has a diameter of 700 mm and mass moment of Inertia of 2 kgm^2. The engine rotates at a speed of 5 times the road wheel and engine rotating parts have mass moment of inertia of 0.2 kgm^2. Determine the angle heel required if the motor cycle negotiates a curve of radius 100 meters at a speed of 108 km/hr.

10   (a)   What is the gyroscopic effect on a ship when it turns towards left and the propeller rotates counter clockwise when viewed from stern.

(b)   The rotor of a turbine yatch rotates at 1200rpm clockwise when viewed from stern. The rotor has a mass of 750 kg and radius of gyration of 250mm. Find the maximum gyroscopic couple transmitted to the hull when yacht pitches with a maximum angular velocity of 1 rad/s. What is the effect of this couple?

Code : 13EC3201

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

MICROPROCESSORS& INTERFACING
(Common for EEE, ECE, & CSE)

Time : 3 hours   Max. Marks :60

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

SECTION - I

1 (a) With a neat architecture and explain the elementary components of a microprocessor.
   (b) What is meant by a register? Explain the functionality of various registers associated with 8085.
2 (a) Explain the General Bus operation of a microprocessor with neat Timing diagrams.
   (b) What is the purpose of Stack and Subroutine in a microprocessor based programming.

SECTION - II

3 (a) Explain the following with respect to 8085.
       i)HLT   ii)RRC   iii)TRAP
   (b) Write an ALP in 8085 to perform average of given data. (Assume suitable input data.)

4 (a) Why interrupt is needed in 8085 programming? Explain.
   (b) What is the difference between Memory mapped & I/O mapped interfacing? Explain.

SECTION - III

5 (a) Explain the following regarding 8086
       i)AAA   ii)PUSH   iii)LOOP
   (b) Differentiate Procedure and Macro with an example.

6 (a) Write an ALP in 8086 to perform Multibyte BCD addition. (Assume suitable input data.)
   (b) Write an ALP in 8086 to check whether a string is palindrome or not. (Assume suitable input data.)

SECTION - IV

7 (a) Explain the principle of operation of DMA type data transfer scheme.
   (b) Differentiate Synchronous and Asynchronous data transfer scheme with an example.

8 (a) Explain the operation of USART 8251 with neat diagram.
   (b) Explain about RS-232 serial communication interface standard

SECTION - V

9 Discuss the interfacing of two 16x4 EPROM's and two 16x4 RAM's with 8086 and while mapping, the address of EPROM must start at FFFFFH and the address of RAM should start from OOOOOH.

10   Draw the interfacing circuitry of DAC with 8086 and write an ALP to generate an Triangular waveform with an amplitude of 5V and a frequency of 2 KHz.

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

HYDROLOGY
(Civil Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION – I

1. a) Describe the hydrologic cycle with a neat sketch.

   b) Rain gauge station X did not function for a part of a month during which a storm occurred. The storm produced rainfalls of 84, 70 and 96mm at three surrounding stations A, B and C respectively. The normal annual rainfalls at the stations X, A, B and C respectively are 770, 882, 736 and 944 mm. Estimate the missing storm rainfall at station X

2. Explain the three methods of determining the average depth of rainfall over an area. Discuss the merits and demerits of each method.

SECTION – II

3. a) Discuss various methods of reducing evaporation from water body.

   b) Bring out the difference between evaporation, transpiration, evapotranspiration and consumptive use.

4. a) Discuss the factors affecting infiltration.

   b) In Horton's infiltration capacity curve, initial infiltration capacity = 2 cm/h and final capacity = 0.3 cm/h. If rainfall intensity is more than infiltration capacity, what is the total depth of infiltration in a duration of 0h to 4h, if decay constant k = 0.8/h

SECTION – III

5. a) What are the various components of runoff? Describe how each component is derived in the runoff process

   b) How is runoff estimated using Strange's tables and Barlow's tables?

6. a) Explain the various climatic factors affecting runoff

   b) What is a flow mass curve? How is it constructed?

SECTION – IV

7. a) What are the methods of estimating design flood? What are their limitations?

   b) Explain the different methods of separation of base flow from total runoff.

8. a) Define unit hydrograph. What are the assumptions, limitations and applications of unit hydrograph theory?

   b) A 3 hr storm produced a flood hydrograph as given below
      Time (hr)   : 0   3   6   9   12   15   18   21   24   27   30
      Discharge (m³/s) : 4   9   12   18   20   16   20   10   8   6   4
      Assuming a constant base flow of 4 m³/s, determine the ordinates of unit hydrograph. The catchment area is 50km²

SECTION – V

9. a) Differentiate between
       i) Hydraulic routing and hydrologic routing
       ii) Channel routing and reservoir routing
       iii) Prism storage and wedge storage

   b) Explain the method of determining Muskingum parameters K and x of a reach from a pair of observed inflow and outflow hydrographs

10. a) Explain the following
        i) Specific yield and specific retention
        ii) Hydraulic conductivity and Transmissibility
        iii) Darcy's law and its validity

    b) A 30 cm diameter well completely penetrates a confined aquifer of permeability 45 m per day. The thickness of the aquifer is 20 m. Under steady state of pumping the drawdown at the well was found to be 3 m and the radius of influence was 300 m. Calculate the discharge from the well.

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

ELECTRONIC MEASUREMENTS
(Electrical & Electronics Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION - I

1 a   Derive the expression for deflection on the CRT screen, deflection sensitivity and deflection factor. Give conclusions from the expression of deflection on screen.

   b   A CRT has an anode voltage of 2000 V and parallel deflecting plates 2 cm long and 5 mm apart. The screen is 30 cm from the centre of the plates. Find the input voltage required to deflect the beam through 3 cm. The input voltage is applied through amplifiers having an overall gain of 200.

2 a   How the measurement of very fast signal can be done with the sampling oscilloscopes with neat block diagram?

   b   What are the advantages & limitations of sampling oscilloscopes?

SECTION - II

3 a   Explain the successive approximation type digital voltmeter.

   b   Explain the how can we measure 1 V of unknown voltage can be measured by considering 5 V as reference input with the help of successive approximation type digital voltmeter.

4 a   Explain the digital phase angle meter with neat block diagram.

   b   What is the importance of zero crossing detectors in digital phase angle meter?

SECTION - III

5 a   What are the different complex waveforms can be measured by the true RMS voltmeter?

   b   What is the relation between peak RMS voltage and power delivered to the heater?

   c   Explain the working of true RMS voltmeter with its neat block diagram and necessary expressions.

6 a   Explain with the help of block diagram, a heterodyne wave analyzer

   b   Describe the working of a frequency selective wave analyzer with a neat diagram.

SECTION - IV

7   a   Explain the construction & operation of LVDT.

      b   An AC LVDT has the following data:
Input = 6.3 V, Output = 5.2 V, range ± 0.5 inch
Calculate the output voltage Vs core position for a core movement going from +0.45 inch to -0.30 inch. The output voltage when the core is -0.25 inch from the centre

8   a   What is the principle of operation of strain gauge and define gauge factor?

      b   Derive the expression for gauge factor of strain gauge.

SECTION - V

9   a   Explain the concept of Electromagnet flow meter with necessary expressions.

      b   Mention the advantages and limitations of Electromagnet flow meter.

10   Explain the following types of vacuum level measurement with neat diagrams:

      a   Thermocouple vacuum gauge

      b   Ionization type vacuum gauge

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

HEAT TRANSFER
(Mechanical Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION - I

1 (a) What are different modes of heat transfer? Give at least two suitable examples for each type?

   (b) An insulated steel pipe is carrying steam at 400 °C. The inner layer of insulation is 25 mm thick and outer layer is 45 mm thick, the inner diameter of the steel pipe is 150 mm and the wall is 25 mm thick. Calculate the heat lost per unit length of the pipe if the ambient air temperature is 30°C. Thermal conductivity of steel is 59 W/mK, thermal conductivity of inner insulation is 0.19 W/mK, thermal conductivity of outer insulation is 0.025 W/mK, heat transfer coefficient steam side is 30W/m²K and heat transfer coefficient air side: 5 W/m²K.

2 (a) With a neat sketch explain thermal contact resistance? List Factors influencing contact conductance.

   (b) A spherical, thin-walled metallic container is used to store liquid nitrogen at 77 K. The container has a diameter of 0.5 m and is covered with an evacuated, reflective insulation composed of silica powder. The insulation is 25 mm thick, and its outer surface is exposed to ambient air at 300 K. The convection coefficient is known to be 20 W/m² K. The latent heat of vaporization and the density of liquid nitrogen are 2 x 10⁵ J/kg and 804 kg/m³, respectively.
   1. What is the rate of heat transfer to the liquid nitrogen?
   2. What is the rate of liquid boil-off?

SECTION - II

3 (a) What is the physical interpretation of the Biot number? Is the lumped capacitance method of analysis likely to be more applicable for a hot solid being cooled by forced convection in air or in water? By forced convection in air or natural convection in air?

   (b) A long rod 12mm square section made of low carbon steel protrudes into air at 35 °C from a furnace wall at 200 °C. The convective heat transfer coefficient is 22 W/m²-K and the conductivity of the material is 51.9 W/mK. Determine the location from the wall at which the temperature will be 60 °C.

4 (a) Explain the use of Grober and Heisler Charts? How is maximum heat transfer calculated in case of infinite bodies?

   (b) A copper wire 0.8 mm diameter at 150 °C is suddenly dipped into water at 35 °C. If h = 85 W/m²K, estimate time required to cool the wire to 95⁰.If the same wire were placed in air instead of water what would have been the time required to cool it to 95 °C. h_{air}= 11.65 W/m²K. Take for copper: ρ=9000 kg/m³, Cp=0.38kJ/kgK, k=373W/mK.

SECTION – III

5   (a)   What do you understand by the Hydrodynamic boundary and thermal boundary layers? Illustrate with reference to flow over a flat plate.

       (b)   Consider a 0.6-m x 0.6-m thin square plate in a room at 30°C. One side of the plate is maintained at a temperature of 90°C, while the other side is insulated. Determine the rate of heat transfer from the plate by natural convection if the plate is (a) vertical, (b) horizontal with hot surface facing up, and (c) horizontal with hot surface facing down.

6   (a)   Explain the various parameters used in free convection. Using dimensional analysis obtain a non-dimensional parameters which can be used to express free convective heat transfer.

       (b)   Air at 30^{0}C and 1 atmosphere flows over a flat plate at a speed of 2 m/s. Calculate the boundary layer thickness at distances of 0.2 and 0.4 m from leading edge of the plate. If the plate is at uniform temperature of 60^{0}C, calculate rate of heat transfer from first 0.3 m of the plate.

SECTION – IV

7   (a)   Define the total and spectral blackbody emissive powers. How are they related to each other? How do they differ?

       (b)   Two parallel plates 0.5 m by 1 m, spaced 0.5 m apart. One plate is maintained at 1000°C and the other plate is at 500°C. The emissivities of the plates are 0.2 and 0.5 respectively. The plates are located in a very large room whose walls are maintained at 27°C. The plates exchange heat with each other and the room, but only the plate surfaces facing each other need to be considered in the analysis. Find the net transfer to each plate and to the room.

8   (a)   For a surface, how is radiosity defined? For diffusely emitting and reflecting surfaces, how is radiosity related to the intensities of emitted and reflected radiation?

       (b)   A spherical vessel of inner diameter 28 cm is filled with ice at 0^{0}C. The vessel is placed in another spherical vessel of inner diameter 30 cm and the space between them is completely evacuated. If the emissivity of the inner vessel is 0.1 and that of the other is 0.05, and the outer vessel is at a temperature of 40^{0}C. Determine the amount of ice melts in 10 hrs. The latent heat of fusion of ice at 0^{0}C is 333 kJ/kg.

SECTION – V

9   (a)   Draw the variation of temperature for hot and cold fluids along the length heat exchangers for : (i) condenser (ii) evaporator (iii) counter flow HE (iv) parallel flow HE.

       (b)   Saturated steam at 1 atmospheric pressure condenses on the outer surface of a 100m diameter vertical pipe of length 1m and uniform surface temperature of 94 ^{o}C. Estimate the total condensation rate and heat transfer rate to the pipe.

10   (a)   Draw the Nukiyama's boiling curve for saturated pool boiling curve for water at atmospheric pressure and indicate the salient points on it.

       (b)   A double pipe, parallel flow heat exchanger uses oil (C_p= 1.88kJ/kg ^{o}C) at an initial temperature of 205 ^{o}C to heat water, flowing at 225kg/hr from 16 ^{o}C to 44 ^{o}C. The oil flow rate is 270 kg/hr. (i) Calculate heat exchanger area with an overall heat transfer coefficient of 340W/m^2 ^{o}C. (ii)Determine the number of transfer units (NTU) (iii)Calculate the effectiveness of the heat exchanger

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

MICROWAVE TECHNIQUES

(Electronics & Communication Engineering)

Max. Marks :60

Time : 3 hours

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

SECTION - I

1　(a)　Describe how velocity modulation is converted to current modulation in two cavity klystron amplifier.

　　(b)　Describe the construction of a reflex klystron and explain how it works as an oscillator.

2　(a)　Explain the operation of a TWT amplifier with the help of a neat sketch.

　　(b)　A normal circular Magnetron has the following parameters.
Cathode radius= 2 mm, anode radius= 4 mm and Magnetic flux density =0.3 Wb/m^2.
Determine
　　　　(i)　The Hull cutoff voltage
　　　　(ii)　The cutoff magnetic flux density if the beam voltage is kept at 15KV
　　　　(iii)　The cyclotron frequency in Giga Hertz.

SECTION - II

3　(a)　Discuss the Gunn diode in relation to its negative resistance property.

　　(b)　Draw the Equivalent circuit of Tunnel diode. Explain how it can be used as a microwave oscillator?

4　(a)　Explain the operation of negative resistance parametric amplifiers.

　　(b)　Explain the operation, construction and applications of IMPATT diode.

SECTION - III

5 (a) An air filled rectangular waveguide of inner dimensions 7x3.5 cm operates in the dominant TE_{10} mode.
   (i) Find the cutoff frequency
   (ii) Determine the phase velocity of the wave in the guide at a frequency of 3.5 G Hz.
   (iii) Determine the guided wavelength at the same frequency.
   (b) Discuss about E-plane and H-plane Tee junctions.

6 (a) Explain about Faraday rotation Circulator.
   (b) Derive the S matrix for a Magic Tee junction.

SECTION - IV

7 (a) Explain the method of medium power measurement.
   (b) Explain the method of Impedance measurement.

8 (a) Explain the method of Attenuation constant measurement.
   (b) Explain the measurement of quality factor of a cavity.

SECTION - V

9 (a) Describe the advantages of microwave integrated circuits over discrete circuits.
   (b) Discuss about the principle features of micro strip line.

10 (a) Discuss about Horn antennas.
   (b) Explain about parabolic reflector antenna.

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

COMPUTER GRAPHICS
(Computer Science & Engineering)

Time : 3 hours

Max. Marks :60

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

SECTION - I

1 (a) List and explain the advantages of interactive graphics.

  (b) Explain about the classification of applications in computer graphics.

2   What are the steps involved in Bresenham's line drawing algorithm? Explain with an example.

SECTION - II

3 (a) List the operating characteristics of simple raster display system.

  (b) Discuss about the construction and functioning of different graphical input devices.

4 (a) What is meant by geometric transformations?

  (b) What is meant by homogeneous representation of transformation matrices, why is it necessary.

SECTION - III

5   Explain about the types of projections and examples of projections.

6   Discuss the following representations in detail
(i) Parametric cubic curves   (ii) Quadratic surfaces.

SECTION - IV

7   Explain the spatial –partitioning representations in solid modeling.

8   Explain the List priority algorithm.

SECTION - V

9   Explain the following illumination models
(i) Diffuse reflection   (ii) Specular reflection.

10   Define animation and explain methods for controlling animation.

Code : 13EE3211

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

MODERN CONTROL THEORY
(Electrical & Electronics Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION - I

1   Design Lag Compensator for a unity feedback system with open loop transfer function G(s)=k/s(1+4s) so that phase margin is 20 and steady state error for ramp input is ≤ 2.0.

2   Consider a typical second order system, type one system with unity feedback, being controlled by a PD controller and show that
i) damping increases with PD control
ii) steady state error to a ramp input remains unchanged if proportional gain kp = 1

SECTION - II

3   (a)   Obtain the state model of the system represented by the differential equation

$$\dddot{y} + 6\ddot{y} + 5\dot{y} + y = u$$

(b)   Construct the state model characterized by the differential equation.

$$\frac{y(s)}{u(s)} = \frac{8s + 4}{(s + 2)(s + 4)(s + 6)}$$

4   (a)   Write the block diagram of a system with observer based state feedback controller.

(b)   Determine the controllability and observability of the following state model

$$\dot{X} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -4 & -6 \end{bmatrix} X + \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} U$$

$$Y = \begin{bmatrix} 1 & 1 & 0 \end{bmatrix} X$$

SECTION - III

5   (a)   Consider the closed loop poles of the following system at s = -3 and s = -6 by a state feedback controller with the control law u=-Kx. Determine the state feedback gain matrix K and the control signal.

$$\dot{X} = \begin{bmatrix} 0 & 1 & 1 \\ 0 & 1 & 1 \\ 0 & 2 & 4 \end{bmatrix} X + \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix} U$$

$$Y = [1 \quad 0 \quad 1] X$$

(b)   State and explain a Sylvesters Expansion Theorem.

6   Consider the system defined by
$\dot{x} = Ax, \quad Y = CX$

where $A = \begin{bmatrix} -1 & 1 \\ 1 & -2 \end{bmatrix}$ $C = [1 \quad 0]$

Design a full order state observer. The desired Eigen values for the observer matrix are $\mu_1 = -5, \mu_2 = -5$.

SECTION - IV

7   (a)   Define singular point. Draw the phase trajectories for different eigen values and singular points.

(b)   Write in brief about construction of phase trajectories by phase plane method.

8   Construct a phase trajectory by Delta method for a nonlinear system represented by the differential equation choose the initial conditions as x(0)=1.0 and
$$\ddot{X} + 2|\dot{X}|\dot{X} + 2X = 0 \qquad X(0) = 1.0 \ \& \ \dot{X}(0) = 0$$

SECTION - V

9   (a)   State and explain the Liapunov stability problem.

(b)   By Lyapunov theorem, Investigate the stability of equilibrium state.
$$\dot{x}_1 = -5x_1 + 2x_2 \qquad \dot{x}_2 = x_1 - x_2 - x_2^2$$

10   (a)   State the Lyapunov theorems?

(b)   Consider a non-linear system described by the equations :
By using the Krasoviskii method, investigate the stability of the system.
$$\dot{x}_1 = -x_1, \dot{x}_2 = x_1 - x_2 - x_2^3$$

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

OPTICAL COMMUNICATION
(Electronics & Communication Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION – I

1 (a) Briefly explain the suitable materials to make a fiber
   (b) Differentiate between single model and multimode fibers

2 (a) Explain the concept of Ray Theory
   (b) Explain the scattering and bending losses that occur in an optical fiber with relevant diagrams

SECTION – II

3 (a) What is meant by 'fiber splicing'? Explain fusion splicing of optical fibers
   (b) Write a brief note on fiber alignment and joint loss
4 (a) Compare LED with a LASER diode
   (b) Draw and explain surface and edge emitting LEDs

SECTION – III

5. (a) Explain receiver performance and calculation
   (b) Explain different types of photo detectors
6 (a) Write a short notes on different noises in photo detectors
   (b) Explain the working of PIN photo diode with relevant diagrams

SECTION – IV

7 (a) Explain the terms i)external pumping and ii)amplifier gain in semi conductor optical amplifiers.
   (b) Explain the classification of WDM networks
8 (a) Explain the concept of WDM couplers
   (b) Explain basic noise networks

SECTION – V

9 (a) Distinguish between passive and active sensing

     (b) Write the applications of optical communications in Military

10 (a) Explain general optical system with neat diagram

     (b) Explain applications of fiber communications and list its advantages

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

INDUSTRIAL ENGINEERING & MANAGEMENT
(Mechanical Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION - I

1. What are the principles of Organization? Describe their significance in establishing a sound organization for a modern firm.

2. (a) List various methods of sales forecasting.

   (b) Discuss on using exponential smoothing forecasting technique over moving averages giving an account to 'Forecasting Error'.

SECTION - II

3. A reputed organization wants to expand the business operations by adding an additional new production plant. Predict the effect of various factors influencing the new plant location over city, sub-urban and country locations.

4. (a) Briefly describe various types of plant layouts.

   (b) Enumerate the advantages and limitations of product layout over process layout for a mass production type manufacturing.

SECTION - III

5. Describe the procedure of Method study in detail with suitable practical example?

6. (a) What is PMTS? Discuss in brief.

   (b) The following data pertains to a specific task on the production floor
   Average time for machine element = 22 min, Average time for manual elements = 16 min., with allowances as 8%, find out the standard time by assuming suitable Performance rating.

SECTION - IV

7. Explain the significant role of a Personnel manager in an organization by clearly describing the functions of personnel management

8. What are different Incentive plans? Suggest & discuss any one plan to incentivize workers in an automobile maintenance workshop.

SECTION - V

9. (a) Define what is Quality? Also describe what is quality control.
   (b) Clearly explain what is the producer's risk and consumer's risk in acceptance sampling

10. Explain the concepts of 'TQM' & 'Six-Sigma' in detail

SECTION - I

1 Explain about different types of classical Techniques.

2 Explain the following
    (a) Caesar cipher
    (b) Monoalphabetic cipher
    (c) Playfair cipher

SECTION – II

3 Explain about Diffie – Hellman Key algorithm with example.

4 Explain Random Number Generation in detail.

SECTION - III

5 Write about Fermat's and Euler's theorems.

6 Explain about Message Authentication.

SECTION - IV

7 Explain Message Digest Algorithm in detail

8 Discuss X.509 authentication service in detail.

SECTION – V

9 Explain the Encapsulating Security Payload with neat diagram.

10 Write short notes on the following

    (a) Intrusion Detection Techniques (b) Fire wall Design Principles

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B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

CONCRETE TECHNOLOGY
(Civil Engineering)

Time:3 hours

Max. Marks: 60

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

SECTION – I

1. (a) Explain how the Portland cement got its name?

   (b) What are the different raw materials required for the manufacture of cement. Explain how the quality of raw materials influences the properties of cement

2. (a) Classify the various concrete chemical based on their use.

   (b) Why are chloride-based accelerators not used in pre-stressed concrete structures?

SECTION – II

3. (a) Explain the purpose of aggregates in concrete.

   (b) In what way the source affects the quality of aggregate.

4. (a) What are the various factors which affect the workability of concrete?

   (b) Explain the relationship between the strength and density of concrete?

SECTION – III

5. (a) Discuss maturity of concrete? What are its practical uses in the concrete industry?

   (b) What is meant by autogenous healing of concrete? Comment on its relevance.

6. (a) Discuss the various factors that influence the development of strength of hardened concrete.

   (b) Explain in detail the Rebound hammer test procedure with a help of neat sketch.

SECTION – IV

7. (a) Explain `Durability' of concrete and emphasize various specifications suggested by relevant code

   (b) Explain the `permeability' of concrete and its influence on the strength of concrete.

8. (a) How does the microstructure of concrete affect the durability of the structure?

   (b) What are the reasons for the cracking of concrete and how does it affect durability?

SECTION – V

9. List out various steps involved in the proportioning of concrete mix by ISI method.

10. (a) Explain the significance of quality control.

    (b) What are the common defects in making concrete and what are the remedies for these defects?

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B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech II Semester

POWER SYSTEMS – II
(Electrical & Electronics Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION - I

1   a.   Derive the expressions for the ABCD constants for the nominal-π circuit of a medium transmission line.

      b.   Starting from the first principles, deduce expressions for ABCD constants of a long line in terms of its parameters.

2   Find the ABCD parameters of a 3-phase, 80Km, 50Hz transmission line with series impedance of $(0.15 + j\ 0.28)$ ohms per Km and a shunt admittance of $j5 \times 10^{-4}$ ohm per Km for the both Π and T networks.

SECTION - II

3   a.   Deduce expression for the magnitude of incident and reflected voltages at any point on a transmission line interms of voltage and current at receiving end, characteristic impedance and propagation constant of the line.

      b.   Develop an equivalent circuit at the transition points of transmission lines for analyzing the behavior of travelling waves.

4   a.   Starting from the first principles, show that surges behave as travelling waves. Derive expressions for surge impedance and wave velocity.

      b.   A surge of 220kV travelling in a line of natural impedance 400Ω arrives at a junction with two lines of impedances 700Ω and 400Ω respectively. Find the surge voltages and currents transmitted into each branch line. Also find the reflected surge voltage and current.

SECTION - III

5   a.   What are the different types of earthings. explain any two types of earthings.

      b.   Briefly describe Arcing grounds and ground practices.

6   a.   Draw and explain the Design of earthing grid.

      b.   Explain how to find tower footing resistance and Explain about grounding transformers.

SECTION - IV

7   a.   Draw different Bus bar arrangements.

      b.   Draw the key diagram for 66/11kv substation.

8   a.   Explain the Need for EHV and UHV in india.

      b.   Explain different types of HVDC links.

SECTION - V

9   a.   Write the advantages of PU systems

      b.

$$Z_{pu(new)} = Z_{pu(old)} \times \frac{(MVA)_{Base(new)}}{(MVA)_{Base(old)}} \times \frac{(KV_{LL})^2_{Baseold}}{(KV_{LL})^2_{Basenew}}$$

10   a.   Explain the difference between the two- winding three-winding transformer.

       b.   Draw Single line diagram representation of impedance diagram by taking example.

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

DIGITAL DESIGN

(Electronics & Communication Engineering)

Time : 3 hours

Max. Marks :60

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

SECTION - I

1   (a)   Discuss common drain amplifier with neat sketches.

(b)   Explain about active current mirrors without signal analysis.

2   (a)   Explain briefly about basic current mirrors.

(b)   Explain working of CMOS differential amplifier circuit and derive the expression for CMRR.

SECTION - II

3   (a)   Discuss about the advantages and classification of ICs.

(b)   Explain TTL NAND gate with totem-pole output with neat sketches and draw its transfer characteristics.

4   (a)   What is the disadvantage of RTL gate? Explain DTL NAND gate circuit.

(b)   What is the advantage of ECL gate over other logic families? Explain ECL OR/NOR logic with neat sketches.

SECTION - III

5   (a)   Explain various hardware modeling used in VHDL.

(b)   What is package? Explain package declaration and package body with suitable examples.

6   (a)   (i) Discuss the needs of HDL.

ii) Explain the shift operators available in VHDL with general syntax and suitable examples.

(b) What do you mean by data flow style of description? Explain its features with suitable examples.

SECTION - IV

7 (a) Construct 2 to 4 decoder using logic gates. Construct a 3 to 8 decoder using two 2 to 4 decoders.

(b) Write VHDL program for a 4 to 1 multiplexer.

8 (a) What is priority encoder? Derive the logic circuit for 4-bit priority encoder.

(b) What is 74X138 IC? Write VHDL program for 74X138.

SECTION - V

9 (a) Construct a Modulo-6 synchronous counter using JK-flipflops.

(b) What is IC 74X74? Write a VHDL program for 74X74.

10 (a) Describe the circuit diagram of 4-bit Johnson counter using D flip-flops and explain its operation with the help of bit pattern.

(b) Explain and write a VHDL program for ring counter.

B.TECH. DEGREE EXAMINATION, MAY 2018
III B.Tech. II Semester
MECHANICAL MEASUREMENTS & CONTROL
(Mechanical Engineering)

Time : 3 hours

Max. Marks :60

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

SECTION - I

1. (a) Explain the terms (i) Threshold (ii) Resolution (iii) Hysteresis (iv) Reliability
   (b) What are calibration standards? Explain
2. Describe the following
   (i) Amplitude response (ii) Frequency response (iii) delay time and time constant
   (iv) Component errors in overall system accuracy

SECTION - II

3. Describe ay two transducers for measurement and discuss their limitations and applications?
4. Explain the working of Bellows and Diaphragm gauge and thermocouple vacuum gauge with neat sketches?

SECTION - III

5. (a) Explain ultrasonic flow meter with a neat sketch and give limitations?
   (b) What are electrical thermometers? Explain working of pyrometers?

6. Describe how force and torque are measured with different methods?

SECTION - IV

7. Consider a single strain gauge of resistance 120Ω mounted along the axial direction of an axially loaded specimen of steel (E=200 GPa). If the percentage change in length of the rod due to loading is 3% and the corresponding change in resistivity of the strain gauge material is 0.3%, estimate the percentage change in the resistance of the strain gauge and its gauge factor; Poisson ratio=0.3. If the strain gauge is connected to a measurement device capable of determine change in resistance with an accurate of ± 0.02 Ω, what is the uncertainty in stress that would result in using this resistance measurement device?

8. Describe the principle and working of measurement of vibration and acceleration?

SECTION - V

9   A second order system a unit feedback and open loop transfer function G(s)=500/s(s=15), draw the block diagram for closed loop system and write the characteristic equation. Calculate the damping ratio, and natural frequency, peak time, peak overshoot and setting time for the system output when excited by step input.

10   (a) Explain the concept of servo mechanism and process control?
     (b) Describe the block diagrams and pneumatic control systems?

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

FREE & OPEN SOURCE SOFTWARE

(Computer Science & Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION - I

1 (a) Name some of the major open source software websites.

(b) Explain the phases of open source maturity model.

2 (a) Give a brief history of open source initiative.

(b) Explain the importance of open source software.

(c) Write about some standard open source licenses.

SECTION - II

3 (a) Describe the basic architecture of Linux operating system.

(b) Discuss in detail about file permissions in Linux.

4 Explain the following UNIX command with examples :
(a) pwd   (b) mam   (c) find
(d) cp   (e) ls   (f) rm

SECTION - III

5 Explain the following file filter command with examples :
(a) uniq   (b) grep   (c) join   (d) sed

6 (a) What is pipe? Explain the "tee" command with an example.

(b) Explain all backup command with suitable examples.

SECTION - IV

7 Explain the following FOSS applications.
(a) LAMP   (b) Moodle   (c) Virtual box   (d) Open stack

8 Discuss the following FOSS applications :
(a) Network simulator   (b) Android
(c) Maxima   (d) LaTeX

SECTION - V

9 Explain the open source software development in detail.

10 Explain some of the technical in fractures required for open source software development.

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

ENVIRONMENTAL ENGINEERING - I
(Civil Engineering)

Max. Marks :60

Time : 3 hours

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

SECTION - I

1 a) What are the factors governing the source of a water supply.
   b) The populations of 5 decades from 1920 to 1960 are given below in table. Find out the population of the year 2000, by using geometric increase method.

Year	1920	1930	1940	1950	1960
Population	16000	27000	38000	53000	65000

2 a) Draw a neat sketch of Canal Intake and explain the working principle.
   b) Explain Arithmetic Increase method of forecasting population.

SECTION - II

3 a) Draw the sequence of surface water treatment plant and explain each plant in brief.
   b) Discuss the various Physical and Chemical characteristics of water.

4 a) Explain the theory of sedimentation treatment process.
   b) How does the quality of groundwater differ from surface water?

SECTION - III

5 a) What are the differences of slow sand filter and rapid sand filter?
   b) What do you understand by chlorination, where it is necessary in the water treatment plant and why?

6   Give details about Rapid Sand filtration process with neat Sketch.

SECTION - IV

7 a) Explain any one of the Ion-Exchange method.
   b) What is the use of Activated carbon in wastewater treatment plant?

8 a) Explain the Nalgonda Technique of fluoride removal method.
   b) Give in detail about the Reverse Osmosis process.

SECTION - V

9 a) Draw the typical line sketch of a Dead-end water supply system.
   b) Compare the merit and demerits of continuous and intermittent supply system.

10 a) What are the different types of valves?
    b) Enumerate the Gravity system of water distribution method.

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

POWER ELECTRONICS
(Electrical & Electronics Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION - I

1   a   Explain the static and dynamic characteristics of SCR.
     b   What is snubber circuit and How is it useful in SCR.
2   a   Explain the operation of series connected and parallel connected SCRs with neat circuit diagrams and their characteristics.
     b   Describe different Commutation methods used for SCRs.

SECTION - II

3   a   Draw the circuit diagram of a single phase half controlled converter and derive the equation for average current in case of RL load discontinuous conduction.
     b   A single phase full converter feeding an RLE load is fed by 230V, 50Hz mains. If R = 0.5Ω, L = 8mH and E = 50 volts assuming that conduction is continuous and firing angle is 40°, find the average value of load current.

4   A single phase fully controlled bridge converter is operated from a single phase 220V, 50Hz supply. The load current is continuous and has negligible ripple. The average load current is Idc= 50A and commutating inductance per phase is LC = 0.5mH. Determine the overlap angle if
          (a) $\alpha = 30^0$
          (b) $\alpha = 60^0$

SECTION - III

5   a.   Briefly Explain about Step-down and step-up choppers.
     b.   A step-up chopper with a pulse width of 150 µs operating on 220V, dc supply. Compute the load voltage if the blocking period of the device is 40 µs.

6   Explain the operation of DC Morgan's Chopper d with neat circuit diagram and draw its output voltage and current waveforms.

SECTION - IV

7   a.   A single phase full bridge inverter may be connected to load consisting of a) R b) RL. For these loads draw the load voltage and load current waveforms under steady

operating conditions.

b. A single phase full bridge inverter has rms value of fundamental component of output voltage with single pulse width modulation equal to 110V . Compute the pulse width required and the rms value of output voltage in case dc source voltage is 220V.

8 a. Explain the operation of Mc Murray Bedford bridge inverter with relevant voltage and current waveforms.

b. Briefly Explain about current source invertor.

SECTION - V

9 a. Explain performance of AC Series voltage controllers.

b. An ac voltage controller uses a triac for phase angle control of a resistive load of 100Ω. Calculate the value of delay angle for having an rms load voltage of 220 volts. Also calculate the rms value of triac current . Assume the rms supply voltage to be 230V.

10 Explain the operation of single phase midpoint cyclo-converter with R-L load s for continuous conduction with relevant circuit diagram and necessary output waveforms for f0 = 1/3 fs.

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

COMPUTER ORGANIZATION
(Electronics & Communication Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION - I

1   (a)   Explain the working of arithmetic logic shift unit with diagram.

     (b)   What are the various shift micro operations?

2   How does the register transfer for the fetch phase of an instruction cycle take place?

SECTION - II

3   Define machine and assembly language and compare them with the help of examples.

4   Explain how address is selected for control memory.

SECTION - III

5   Discuss about the efficiency of evaluation of arithmetic operations using reverse polish notation combined with arrangement of registers.

6   (a)   Provide the conditional branch instructions in a table.

     (b)   Explain the 'compare' instruction for unsigned and signed numbers with examples.

SECTION - IV

7   Explain about I/O interface unit with the help of an example.

8   (a)   Describe Daisy-chaining priority interrupt.

     (b)   Explain about Parallel priority interrupt.

SECTION - V

9   (a)   What are the components of main memory?

     (b)   How are main memory connected to the CPU?

10   Describe the various interprocessor arbitration procedures in detail.

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

PRINCIPLES OF MACHINE DESIGN
(Mechanical Engineering)

Time : 3 hours

Max. Marks :60

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

SECTION - I

1 a. What are R5 and R10 designations of standardization of sizes?
  b. Explain various steps in machine design process.

2 a. A mild steel rod supports a tensile load of 50 kN. If the stress in the rod is limited to 100 MPa, find the size of the rod when the cross-section is i. circular, ii. square, and iii. Rectangular with width = 3 × thickness.

  b. The load on a circular rod consists of an axial pull of 10kN together with a transverse shear force of 5kN. Find principal stresses and the diameter of rod required according to Maximum principal stress theory and Maximum shear stress theory if S_{ut}=360MPa and S_{yt}: 280MPa. Take factor safety:1.2.

SECTION - II

3. In a member under fatigue loading, the minimum and maximum stresses developed at the critical point are -50MPa and 150MPa respectively. The endurance ,yield and ultimate strengths of material are 200,300 and 400 MPa respectively. Find the factor of safety with Gerber and Good man criteria.

4. A carbon bar is subjected to fluctuating tensile load from -20kN to +20kN . The material yield strength of 240MPa and endurance limit is 160MPa. Take factor of safety :2. Determine the area of cross section of the bar according to Goodman principle and 10^5 cycles of finite life. Take stress concentration factor, size factor and surface finish factor as 1.Reliabilty factor:0.9.

SECTION - III

5. A copper reinforced asbestos gasket is used between the cover plate and the flanged end of pressure vessel as shown in figure. The pressure inside varies from 0 to 1MPa. During the operation. The gasket requires a seating pressure of 5MPa to make the joint leak proof. The total number of bolts used :8.The ratio of stiffness of all parts and gasket is 4. Take S_{yt} :580MPa ,factor safety:3. Determine nominal diameter of bolt.
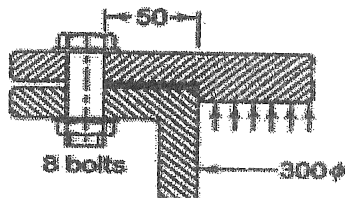
6 a.   What do you mean by uniform strength bolt?

b.   Explain the type of stresses developed in a threaded joint used to clamp two plates .

SECTION - IV

7.   Determine the size of the weld for welded structure shown below. Dimensions are in mm. ending stress is 60MPa.
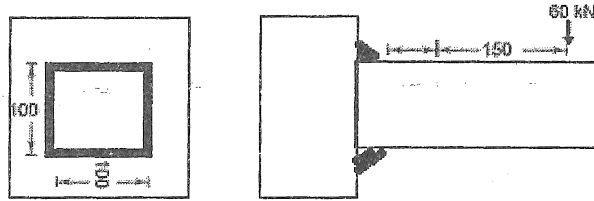
8.   Derive expression for stresses developed in fillet weld when a circular shaft attached to a frame through its base. Let the shaft is subjected to a bending moment M_t. Diameter of shaft is **D**.

SECTION - V

9.   A cotter joint connected to two steel rods of diameter of 50mm. Each rod is subjected to an axial tensile force of 50kN. Sketch the proportioned cotter joint with spigot end and determine stresses developed in each element.

10.   The bending moment (M) and twisting moment(T) at four sections P,Q,R and S along the length of shaft is shown in the following table. Find the diameter of shaft taking maximum permissible shear stress: 60MPa.

Section	P	Q	R	S
M (N m)	10	40	20	15
T (N m)	45	30	50	40

------ END OF QUESTION PAPER ---

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

COMPILER DESIGN
(Computer Science & Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION - I

1. a) What is Compiler? Draw the block diagram of phases of compiler and indicate the main functions of each phase.

   b) List and explain briefly about various compiler construction tools.

2. a) Explain the process of recognition of tokens from the source program.
   b) Write short notes on lexical analyzer generator, LEX.

SECTION - II

3. Explain the following with examples:
   (i) Eliminating ambiguity in grammar
   (ii) Eliminating left recursion
   (iii) Left factoring

4. a) Find the sets of LR(0) items for the following augmented grammar:

   $E^1 \rightarrow E$
   $E \rightarrow E + T$
   $E \rightarrow T$
   $T \rightarrow T * F$
   $T \rightarrow F$
   $F \rightarrow (E)$
   $F \rightarrow id$

   b) Construct SLR parsing table for the above grammar.

SECTION - III

5. a) What is syntax tree? Write syntax directed definitions for construction of syntax tree for the following grammar:

   $E \rightarrow E + T \mid E - T \mid T$
   $T \rightarrow (E) \mid id \mid num$

   b) Explain the bottom up evaluation of S-attributed definition.

6. a) What is structural equivalence of type expression? Write an algorithm to test structural equivalence of two type expressions.

   b) What is type expression? Explain basic type expressions and type expression formed by applying type constructors to basic type expressions.

SECTION - IV

7   a)   What is symbol table? List and explain, various data structures for implementing the symbol table.

      b)   What is an activation record? List and explain the various fields in it.

8   a)   Discuss the various intermediate representations.

      b)   Translate the assignment statement $x := - a * (b + c)$ in to the following:
         (i) Quadruple   (ii) triple   (iii) indirect triple

SECTION - V

9   Write code generation algorithm. Generate the target code for the following statement.

$x = (a - b) + (a - c) + (a - c)$

10   Explain the following code optimization techniques with examples.

      (i) Function preserving transformations
      (ii) Loop optimization

Code :13CE32E3

B.TECH. DEGREE EXAMINATION, MAY 2018
III B.Tech II Semester

TRANSPORTATION PLANNING
(Civil Engineering)

Time : 3 hours

Max. Marks: 60

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

* * *

SECTION - I

1. a) Describe some of the important transport- related polices that have been stated and implemented in post-independence period of India. Write a report on one of these polices and how (or whether) its implementation has achieved the stated goals.

   b) Write a report on the effects of construction of ring roads in New Delhi on land use and demographic patterns of the city. Write a similar report on the effects of constructing the eastern metropolitan bypass in Kolkata.

2. a) Explain the computer application in transportation planning.

   b) Elaborate on the difficulties in the Transport Planning Process

SECTION - II

3. a) Explain how registration number, public transport and tag surveys are conducted. Write the importance and relevance of each survey.

   b) Explain how expansion factors are sued for deriving the travel characteristics

4. a) What are the inventory measures in transport facilities that should be considered for improving the deficiencies in the present and future system?

   b) Explain the importance of inventory of land use and economic activities.

SECTION - III

5. a) The trip rate of a zone is explained by the household size done from the field survey. It was found that the household sizes are 1, 2, 3 and 4. The trip rates of the corresponding household are as shown in the table below. Fit a linear equation relating trip rate and household size

Household size(x)				
	1	2	3	4
Trips per day(y)	3	5	4	6
	2	4	6	7
	2	2	4	5
Σy	7	11	14	18

   b) Explain the advantageous for critical appraisal of the category analysis techniques.

6. a) Consider the following six – zone model of a town. Zones 1, 2 and 3 are fully residential areas and Zones 4, 5 and 6 are purely shopping areas. The shopping areas, the shopping trips attracted (per day), the shopping trips produced (per day) and the travel distances are as shown in table below. Determine the trip distribution between the zones for the following different scenarios:

i) Use the origin – constrained gravity model, assuming $f(a_j)$ to be linear function of the shopping area (sq.m.) with a slope of 0.01 and constant term of 10. Also assume $h(d_{ij})$ to be d_{ij}^2 where d_{ij} is the distance in km.

ii) Use the origin – destination constrained gravity model with the same relevant assumptions as those in (i)

Zone	Shop Area (m^2)	Trips prod uced	Trips attra cted	Distance (km) to					
				1	2	3	4	5	6
1	--	1000	--	--	--	--	4	2	7
2	--	1000	--	--	--	--	3	1	6
3	--	2000	--	--	--	--	5	2	6
4	1000	--	800	4	3	5	--	--	--
5	2000	--	2000	2	1	2	--	--	--
6	3000	--	1200	7	6	6	--	--	--

"-" Data is irrelevant to the problem

b) Briefly elaborate on the criticism of growth factor methods.

SECTION - IV

7 (a) a The number of trips from zone i to zone j is 5000, and two modes are available which has the characteristics given in Table below. Compute the trips made by mode bus, and the fare that is collected from the mode bus. If the fare of the bus is reduced to 6, then find the fare collected.

	t_{ij}^u	t_{ij}^w	t_{ij}^t	f_{ij}	Φ_j
Car	20	--	18	4	6
Bus	30	5	3	9	--
a_i	0.03	0.04	0.06	0.1	0.1

(b) Explain the diversion curves construction using variety of variables

8 (a) Explain the factors affecting modal split for transportation studies

(b) Write briefly on recent development in modal split analysis.

SECTION - V

9 (a) Explain the consideration in evaluation for alternatives in transportation planning

(b) Write a short note on evaluation of alternatives

10 (a) Explain the quick response techniques for estimation of travel demand

b) Explain the difficulties in Transport Planning for Medium Cities

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

UTILIZATION OF ELECTRIC POWER
(Electrical & Electronics Engineering)

Time : 3 hours   Max. Marks :60

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

1   Explain the construction and working of Mercury vapour lamp with a neat diagram

2   State and describe various types of lighting schemes and discuss the flood lighting with suitable diagrams.

SECTION - II

3   Explain the principal of operation of induction heating and state and explain different type's induction heating methods?

4   Explain in brief how heating is done in the following cases?
            i)Resistance heating, ii)Induction heating   iii) Dielectric heating

SECTION - III

5   Discuss the running characteristics of any two electric motors.

6   (a)   Discuss advantages and disadvantages of electric drive and also explain different types of drives.

     (b)   Explain the various methods of speed control of AC motors

SECTION - IV

7   Explain how rheostat braking is done in DC shunt motors and series motors.

8   Explain the different methods of the electric braking of the three-phase induction motor.

SECTION - V

9   Derive the expression for the tractive effort for a train on a level track?

10   Derive an expression for the distance traveled by an electric train using trapezoidal speed-time curve.

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

NEURAL NETWORKS & FUZZY LOGIC
(Electronics & Communication Engineering)

Time : 3 hours   Max. Marks :60

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

1 (a) Compare biological neuron with artificial neuron model.

   (b) Summarize various applications of neural networks.

2 (a) Define neuron and memorize the three basic elements of neuron model.

   (b) Describe the Mc Culloch – Pitts neuron model

SECTION - II

3 (a) Define XOR problem and analyze the architectural graph of network for solving the XOR problem.

   (b) Describe about the multi category single layer perceptron network

4 (a) Summarize the single discrete perceptron training algorithm (SDPTA).

   (b) Memorize the advantages and disadvantages of perceptron model.

SECTION - III

5   Design the Hamming network for the three following class prototype vectors:

$$S^{(1)} = \begin{bmatrix} 1 & -1 & 1 & -1 & 1 & -1 \end{bmatrix}^t,$$

$$S^{(2)} = \begin{bmatrix} -1 & -1 & -1 & -1 & -1 & 1 \end{bmatrix}^t,$$

$$S^{(3)} = \begin{bmatrix} 1 & 1 & 1 & -1 & -1 & 1 \end{bmatrix}^t$$

(a) Compute the weight matrix.

(b) Find net_m, for $m = 1, 2, 3$, for the input vector $x = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix}$ and verify that the HD parameter computed by the network agrees with the actual HD.

6   (a)   Describe the various functional blocks of minimum HD (Hamming distance) classifier.

(b)   Draw and explain the architecture of a single-layer feedback network that solves a two-variable four constraint linear programming problem

SECTION - IV

7   (a)   Describe Basic Set-Theoretic Operations for Fuzzy Sets.

(b)   Define a classical (crisp) set.

8   Determine all α-level sets and all strong α-level sets for the following fuzzy sets:
a. $\tilde{A} = \{(3, 1), (4, .2), (5, .3), (6, .4), (7, .6), (8, .8), (10, 1), (12, .8), (14, .6)\}$
b. $\tilde{B} = \{(x, \mu_B(x)) = (1 + (x - 10)^2)^{-1})\}$
for $\alpha = .3, .5, .8$
c. $\tilde{C} = \{(x, \mu_C(x)) \mid x \in R\}$
where $\mu_C(x) = 0$ for $x \leq 10$
$\mu_C(x) = (1 + (x - 10)^{-2})^{-1}$ for $x > 10$

SECTION - V

9   (a)   Describe the Centre of Gravity method of de-fuzzification

(b)   Describe the Suitability of De-fuzzification Methods

10   (a)   Summarize various parameters involved in the design of a fuzzy controller

(b)   List out the differences between the Mamdani and the Sugeno controller?

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

GRID COMPUTING
(Computer Science & Engineering)

Time : 3 hours

Max. Marks :60

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

SECTION - I

1 (a) Discuss in detail the architecture of Grid Computing systems.
   (b) List the Grid-related standards bodies. Explain RPC with neat diagram.
2 (a) Describe the OGSA (Open Grid Services) architecture and OGSA Goals
   (b) What is the relationship between OGSA, OGSI and web services.

SECTION – II

3 List out and explain the components of GMA.
   Write a short note on   i) MDS3   ii) R-GMA

4 (a) What is network weather service? Describe its architecture with the functionality of each component.
   (b) Evaluate the same for scalability, fault tolerance, monitoring, presentation, searching and security highlighting its pros and cons in comparison with other grids.

SECTION – III

5 (a) Discuss the design issues of grid resource management system.
   (b) Describe job lifecycle in Condor.

6 (a) Briefly discuss types of scheduling paradigms with example.
   (b) Describe the role of QoS in Grid scheduling.

SECTION – IV

7 (a) List out and explain types of data intensive applications.
   (b) Sketch and explain the architecture of first generation grid portals.

8 (a) Describe how grid resources can be accessed via grid portals, with a figure.
   (b) What extra services is needed in grid environment to manage data. Discuss data management and information services in GT3.

SECTION – V

9   (a)   What is gLite? Describe its architecture with functionality of various components.

    (b)   Explain any two middleware technologies with example.

10   Describe types of Globus toolkit versions and supporting components.

B.TECH. DEGREE EXAMINATION,, MAY 2018

III B.Tech. II Semester

MOBILE COMPUTING

(Computer Science & Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION - I

1   Write about Signals, Antennas, and Signal Propagation in detail

2   Discuss in detail Code Division Multiplexing with an example

SECTION - II

3   List Performance characteristics of GSM and explain each one of them briefly

4   Discuss Handoffs and Handovers in Global System for Mobile communication (GSM) in details

SECTION - III

5   Discuss in detail routing protocols DSDV and DSR

6   What are the network address, broadcast address, and the subnet mask for a host with the IP Address below? IP Address: 85.90.146.35 / 28
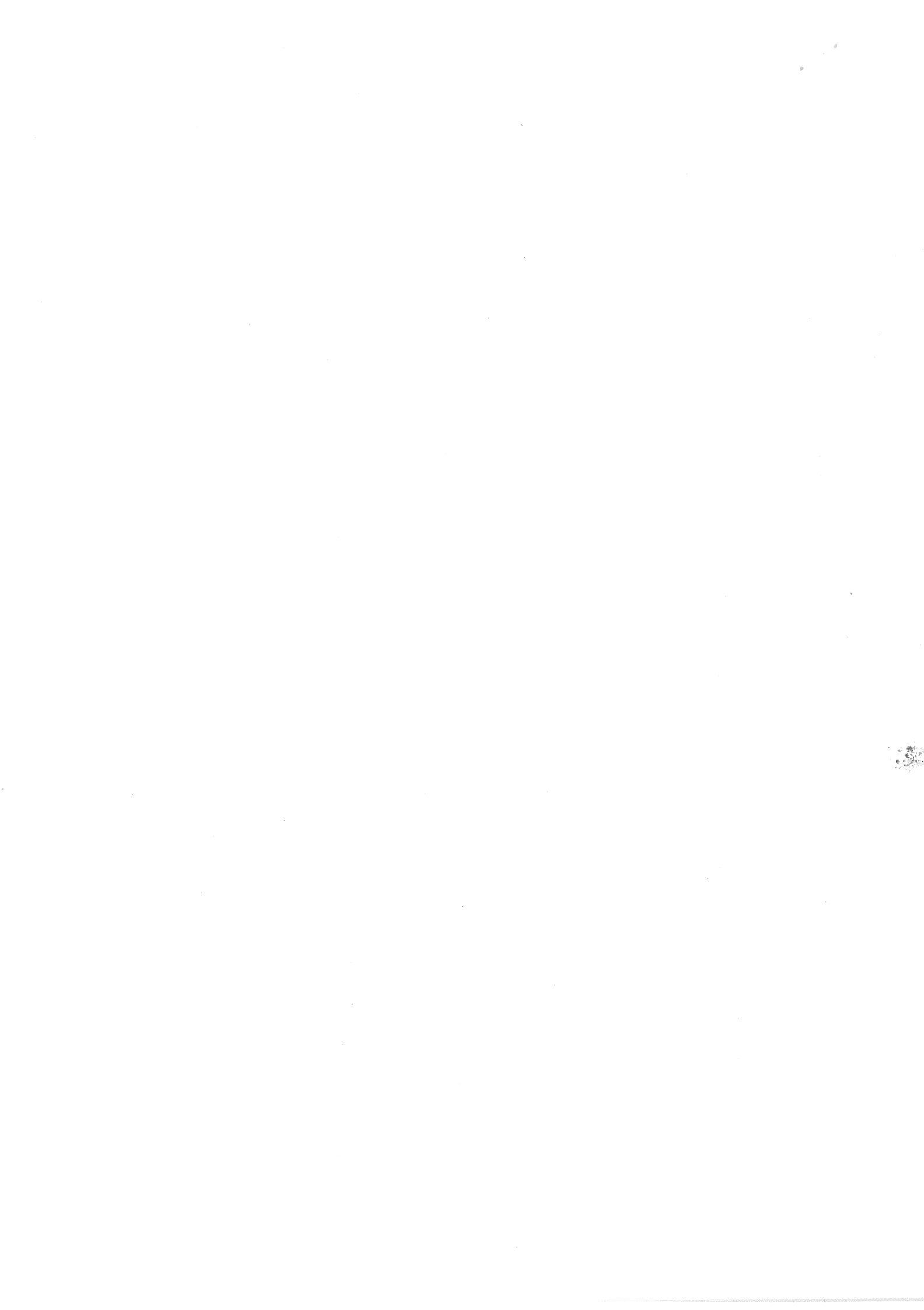
SECTION - IV

7   Compare different approaches for "mobile" TCP

8   List various Proposals to modify TCP to work in mobile environments and explain any one in detail

SECTION - V

9   What are various Wireless telephony application and explain any one of them in-detail

10   Discuss Wireless application protocol (WAP) reference model and protocols with neat diagram

B.TECH. DEGREE EXAMINATION, MAY 2018
III B.Tech. II Semester
COMPOSITE MATERIALS
(Mechanical Engineering)

Time : 3 hours   Max. Marks :60

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

SECTION - I

1   (a)   Define composite material? What is the different nature made composites? Explain them with suitable applications?

    (b)   Explain in detail about metal matrix composites? Mention the advantageous and drawbacks of the metal matrix composites?

2   (a)   Explain in detail about ceramic matrix composites? Mention the advantageous and drawbacks of the ceramic matrix composites?

    (b)   Explain in detail about ceramic matrix composites? Mention the advantageous and drawbacks of the ceramic matrix composites?

SECTION – II

3   (a)   What is the purpose of reinforcement in composite? Explain in detail about particulate composites?

    (b)   What do understand by polymer composites? Explain?

4   (a)   What is the importance of reinforcement in metal matrix composite? Explain?

    (b)   Explain the importance of glass and silica as fiber material in composite? Explain?

SECTION - III

5   (a)   What are the basic requirements while selecting the constituents for metal matrix composites? Explain?

    (b)   Explain Low pressure closed molding process used for making of polymer matrix composites with neat diagram?

6   (a)   Explain liquid metal impregnation technique used for making of metal matrix composites with neat diagram?

    (b)   What are the basic requirements while selecting the constituents for polymer matrix composites? Explain?

SECTION - IV

7   (a)   What are the different techniques used to control fiber content in composite? Explain?

    (b)   What are the different coatings used in preparation of composites? Explain?

8   (a)   How will be uniform distribution of particle in composite? Explain?

    (b)   In what way strength analysis of composite is different from metals? Explain?

SECTION - V

9   Write a note on applications of composite in the following areas
    a. Surface transport industries   b. Sports components

10 Write a note on applications of composite in the following areas
    a. Aerospace industries   b. House hold components

B.TECH. DEGREE EXAMINATION, MAY 2018

III B.Tech. II Semester

STRUCTURAL ANALYSIS - II
(Civil Engineering)

Time : 3 hours

Max. Marks :60

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

SECTION -I

1. a) What is an Equivalent UDL? What is its significance?

    b) Determine the maximum B.M developed anywhere on the girder of span 15 m due to two rolling loads 150 kN and 100 kN spaced 4 metres apart with the 100 kN load leading passing over the girder. Find the equivalent U.D.L to give the same maximum B.M.

2. a) What is an influence line? Write the uses of influence lines.

    b) A girder simply supported has a span of 24 m. An u.d.l of intensity 20 kN/m and 6 m long crosses a girder Using an ILD, find the maximum S.F and B.M at a section 9 m from the left support.

SECTION -II

3. a) Define static and kinematic indeterminacy with reference to truss and frames

    b) Using the method of virtual work, find the vertical deflection component of point E of the truss shown in the figure below. Cross sectional areas of the members are AE and FD = 250 mm^2 EF and EC are 1875 mm^2 AB,BC,CD,EB, and FC = 1250 mm^2 E = 200 kN / mm^2
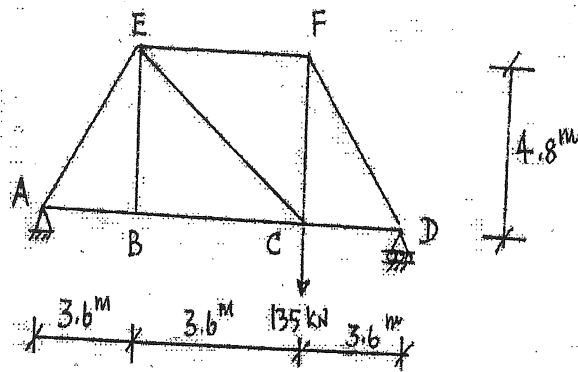
4. Calculate the change in the length of the diagonal BE due to the applied loading T area of the upper and lower chords = 400 mm², web members = 300 mm² and E= ‍ x 10³ N/mm² . Use the method of virtual work.
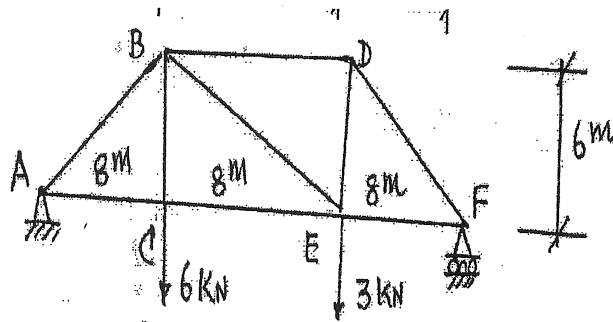
SECTION - III

5. a) Write the step - by- step procedure in slope deflection method.

    b) Analyze the beam loaded as shown in the figure below by slope deflection method. Draw B.M.D and S.F.D. EI is constant.
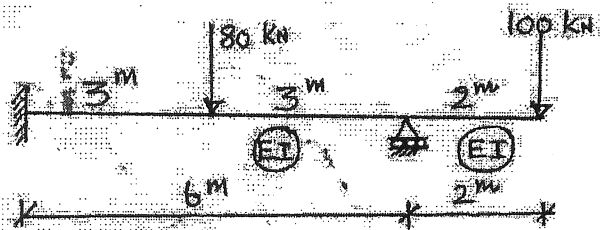

Fig. 8

6. A continuous beam ABCD 20 meters long is simply supported at its ends and is propped at the same level at B and C as shown in the figure below. If the support B sinks by 10 mm, analyze the beam by Moment Distribution method. Sketch the B.M.D. Take $E = 2.1 \times 10^5$ N/mm^2 and $I = 85 \times 10^5$ mm^4
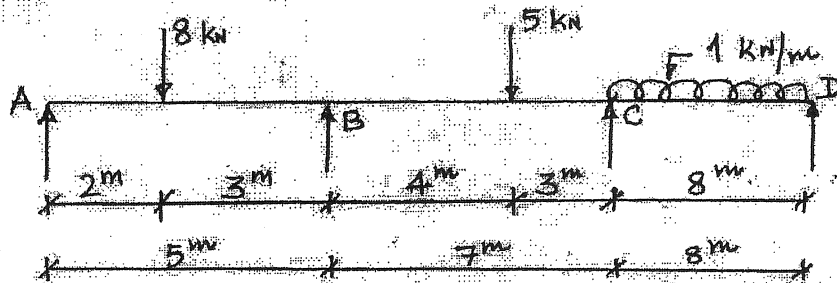

Fig. 9

SECTION - IV

7. A beam ABC is simply supported at A and C and continuous over support B. Beam AB of span 6 m carries a point load of 30 k N at 2 m from A. Beam BC carries a u.d.l of 10 kN /m over whole span of 4 m .Take EI as constant throughout spans AB and BC. Determine the final moments at the supports by Rotation contribution method. Support B sinks by 10 mm with respect to A and C.

8. Write the step -by-step procedure in the approximate analysis of building frames by cantilever method.

SECTION -V

9. a) Write about mechanisms in plastic theory with neat sketches.

   b) Determine the plastic section modulii Z_{pz} and Z_{py} for a beam with unequal flanges. Top flange (175 x 20) mm Bottom flange (250 x 20) mm Web (325 x 16) mm.

10. A beam of uniform cross section, fully plastic moment Mp of length 2L rests on simple supports at its ends and on a central prop. Equal concentrated loads 'W' are applied at a distance 'aL' from each end of the beam. What would be the value of the collapse load for the beam?