Code :13CE3201

B.TECH. DEGREE EXAMINATION, APRIL 2016

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 reinforced concrete combined rectangular slab for two columns located 4.2 m apart. The overall size of the columns is 400 ×400 mm and 500×500 mm and the loads on them are 900 kN and 1200 kN respectively. The safe bearing capacity of the soil is 200 kN/m^2. Adopt M_{25} grade concrete and Fe_{415} grade steel. Sketch the reinforcement detail.

2 Design a trapezoidal footing for two columns C_1 and C_2 transmitting loads of 600kN and 1000kN respectively. The column C_1 size is 400mm × 400mm and column C_2 size is 600mm × 600mm and the centre to centre distance of the columns is 4m. The property line is at a distance 0.3 m from the column carrying 600 kN. Length of the footing is to restricted to 5m. The safe bearing capacity of the soil is 150kN/m^2. Adopt M_{25} grade concrete and Fe_{415} grade steel.

SECTION - II

3 Design a cantilever retaining wall which is required to support 3.5 m high bank of earth embankment with horizontal top The unit weight of soil is 16kN/m^3. The safe bearing capacity of the soil is 200kN/m^2.Angle of shearing resistance is 30^0 and coefficient of friction between soil and concrete to be 0.5. Adopt M_{20} grade concrete and Fe_{415} grade steel.

4 Design a counter fort retaining wall to support an earth fill of 5.5 m height above the ground. The safe bearing capacity of the soil at site is 180kN/m^2. The unit weight of back fill is 18kN/m^3 and an angle of shearing resistance of 30^o. Assume the value of coefficient of friction as 0.5. Spacing of counter forts is 3.0m centre to centre. Adopt M_{20} grade concrete and Fe_{415} grade steel.

SECTION - III

5 Design rectangular water tank of size 5m × 4m ×3m deep resting on firm ground. Adopt M_{25} grade concrete and mild steel.

6 A flat bottom circular elevated water tank 10 m and total height 4m which is to be supported by ring beams of 7.5 m diameter. The ring beam is to be supported by six columns equally spaced. M_{25} grade concrete and Fe_{415} grade steel. Design the top dome, top ring beam and cylindrical wall of the water tank.

SECTION - IV

7 a)Explain the yield line theory for the analysis of slab
b)Derive the expression for relating yield line moment and ultimate load capacity w_u for isotropically simply supported equilateral triangular load.

8 Design the rectangular slab of size 4 m x 6m continuous on all the four sides using yield line analysis. Assume a live load of 3 kN/m^2 and floor finish of 1 kN/m^2. Use M20 grade concrete and Fe 415 grade steel. Sketch the details

SECTION - V

9 a)Discuss the necessity of using high strength concrete and the technology required to produce high strength concrete

b) Explain the Freyssinet system with neat sketches.

10. A prestressed concrete beam of rectangular section 350 mm wide and 700 mm deep has a span of 12.0 m. The effective prestressing force is 1500kn a an eccentricity of 150 mm. The dead load of the beam is 7 kN/m and the beam has o carry live load of 12.5 kN/m. Determine the extreme stresses in concrete
I)At the end of section
ii) At the mid section without the action of the live load
iii) At the mid section with the action of live load

Code : 13ME3201

B.TECH. DEGREE EXAMINATION, APRIL 2016

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 Outside diameter of a square threaded spindle of a screw jack is 40 mm. The screw pitch is 10 mm. If the coefficient of friction between the screw and the nut is 0.15, neglecting friction between the nut and the collar, determine : (a) Force required to be applied at the end of tommy bar 1 m in length to raise a load of 20 kN. (b) Efficiency of the screw.

2 Explain working principle of Centrifugal clutch with neat diagram.

SECTION - II

3 A differential band brake has brake drum of diameter 500mm and the maximum torque on the drum is 1000 N-m. The brake embraces 2/3rd of the circumference. If the band brake is lined with asbestos fabric having a coefficient of friction 0.3, then design the steel band. The permissible stress is 70 MPa in tesnion. The bearing pressure for the brake lining should not exceed 0.2 MPa.

4 Classify dynamometers and explain the working principle of Dynamometers - transmission type.

SECTION - III

5 The arms of a Porter governor are 25 cm long and pivoted on the governor axis. The mass of each ball is 5 kg and mass on central load of the sleeve is 30 kg. The radius of rotation of balls is 15 cm when the sleeve begins to rise and reaches a value of 20 cm for the maximum speed. Determine speed range.

6 The controlling force diagram of a spring controlled governor is a straight line. The weight of each governor ball is 40 N. The extreme radii of rotation of balls are 10 cm and 17.5 cm. The corresponding controlling forces at these radii are 205 N and 400 N. Determine : (a) the extreme equilibrium speeds of the governor, and (b) the equilibrium speed and the coefficient of insensitivenss at a radius of 15 cm. The friction of the mechanism is equivalent of 2.5 N at each ball.

SECTION - IV

7. What do you mean by turning moment diagram? Why variation in the turning moment of single cylinder 4-stroke IC engine is more as compared to the multi cylinder IC engines?

8 The resisting torque on the crank of a riveting machine is 200 Nm for first 90o, from 90o to 135o is 1600 Nm then it drops linearly to 200 Nm upto 180o and remains the same upto 360o. The duration of cycle is 2 sec. The motor driving the machine, however, has a speed of 1450 rpm and it delivers constant torque. The crank shaft of the machine is geared to the motor shaft. The speed fluctuation is limited to □ 2% of mean speed. Determine : (a) power of the motor, and (b) moment of inertia of the flywheel mounted on the motor shaft.

SECTION - V

9 A turbine rotor of a ship has a mass of 3500 kg and rotates at a speed of 2000 rpm. The rotor has a radius of gyration of 0.5 m and rotates in clockwise direction when viewed from the stern (rear) end. Determine the magnitude of gyroscopic couple and its direction for the following conditions :(i) When the ship runs at a speed of 12 knots and steers to the left in a curve of 70 m radius (ii) When the ship pitches 6° above and 6° below the horizontal position and the bow (Front) end is lowered. The pitching motion is simple harmonic with periodic time 30 sec. (iii)When the ship rolls and at a certain instant, it has an angular velocity of 0.05 rad/s clockwise when viewed from the stern

10 For the stability, overturning couple must be equal to balancing couple. Derive expressions for overturning couple and balancing couple by considering both centrifugal and gyroscopic effects.

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Code : 13EC3201

B.TECH. DEGREE EXAMINATION, APRIL 2016
III B.Tech. II Semester

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

Time : 3 hours Max. Marks :60

*Answer **FIVE** Questions, Choosing **ONE** Question from each section*

SECTION – I

1 (a) Explain Instruction Cycle.
(b) Draw the functional block diagram of 8085 and explain.

2 (a) Draw the timing diagram of memory read cycle.
(b) Draw the pin diagram of 8085 and explain function of each pin.

SECTION – II

3 (a) How many hardware interrupts are there in 8085? And explain them.
(b) Briefly explain 8085 instructions.

4 (a) Write an 8085 ALP for 32 bit addition.
(b) What is the use of addressing modes? And explain them.

SECTION – III

5 (a) Draw the 8086 architecture and explain the function of each block.
(b) Explain the interrupt structure of 8086.

6 (a) Write an 8086 ALP for BCD addition of N 8-bit numbers.
(b) What is the use of Assembler directives? And explain the following assembler Directives i) ENDP ii) EQU iii) LABEL iv) MACRO.

SECTION –IV

7 Explain with the help of block diagram, functioning of 8253 in various Programmable modes.

8 (a) What is the need of DMA and explain DMA data transfer methods?
(b) Draw the internal block diagram of 8259 and explain each block briefly.

SECTION – V

9 (a) Draw the interface diagram of an 8-bit DAC to 8086 with 8255 and write an ALP to generate a symmetrical square wave form.

(b) Draw the internal block diagram of 8255and explain function of each block.

10 (a) Draw the interfacing diagram of stepper motor and write an ALP for rotating stepper motor in clock wise direction.

(b) Explain how static RAM is interfaced to 8086, with necessary interface diagram assuming appropriate signals and memory size?

Code : 13ME3202

B.TECH. DEGREE EXAMINATION, APRIL 2016

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) Discuss the mechanism of thermal conduction in gasses, liquids and solids?

(b) A hollow cylinder with ID and OD 100 mm and 320 mm respectively, generates heat at the rate of 1500 W/m^3. The thermal conductivity of the cylinder is 0.75 W/mK. The maximum temperature occurs at a radius of 110 mm, the temperature of the outer surface is 60 °C. Calculate (a) the temperature at the inner surface (b) the maximum temperature in the cylinder.

2 (a) Why, in reducing the heat loss from a plane wall is it that the concept of critical thickness of insulation does not arise?

(b) An electrically heated sphere with diameter D = 6 cm is exposed to ambient air at $T_\infty = 25°C$ providing a heat transfer coefficient of 20 W/m^2-K. The surface of the sphere is to be maintained at temperature $T_i = 125°C$. Calculate the heat loss for the following cases: (a) The bare sphere (un-insulated) (b) Sphere covered with an insulation (k = 1 W/m-K) having a radius corresponding to the critical radius of insulation for the sphere.

SECTION - II

3 (a) What are the physical assumptions necessary for a lumped – capacity unsteady state analysis to apply? What is the criterion used to neglect the internal resistance of a hot solid compared to external surface resistance?

(b) A brick wall ($\alpha = 0.5 \times 10^{-6}$ m^2/s, k = 0.69 W/mK and ρ = 2300 kg/m^3) of 10 cm thick is initially at a uniform temperature of 230 °C. The wall is suddenly exposed to a convective environment at 30 °C with a surface heat transfer coefficient of 60 W/(m^{2}K). Using the transient temperature charts, determine (a) The centre temperature at ½ hour and 2 hours after the exposure to the cooler ambient, (b) Energy removed from the wall per m^2 during ½ hour and during 2 hours.

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

(b) A short fin of 8 mm diameter, 3 cm long is made of steel of thermal conductivity 35 W/mK dissipates heat to an ambient medium at 25 °C with a heat transfer coefficient of 10 W/m^2 °C. If the base is at a temperature of 150°C (a)Calculate the temperature at the tip of the fin (b)Calculate the fin effectiveness, and (c) Calculate the fin efficiency.

SECTION - III

5 (a) How does the hydrodynamic boundary layer and thermal boundary layer change with increasing velocity of the fluid?

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

6 (a) What are the physical variables affecting the natural convection phenomenon and write the dimensional formula for each variable.

(b) Calculate the local and average heat transfer coefficient for natural convection for a vertical plate 25 cm high at 55 °C. The surrounding air is at 25 °C. Also calculate the boundary layer thickness at the trailing edge of the plate.

SECTION - IV

7 (a) Define Black, grey and real surface.

(b) Two parallel infinite plates are maintained at 400 °C and 460 °C respectively. Calculate the net radiation heat flux between these planes if one has an emmisivity of 0.6 and other an emmisivity of 0.4.

8 (a) Define emissivity and absorptivity. When are these two properties equal to each other?

(b) Consider a 20 cm diameter spherical ball at 800 K suspended in air. Assuming the ball closely approximates a black body, determine (a) total blck body emmisive power (b) the total amount of radiation emitted by the ball in 5 min., (c) the spectral black body emmisive power at a wave length of 3 μm.

SECTION - V

9 (a) Write classification of Heat Exchangers.

(b) A fridge is designed to cool 250 kg/hr of hot liquid of Cp = 3350 J/kg K at 120 °C using parallel flow arrangement. 1000 kg/hr of cooling water is available for cooling purpose at 10 °C. The overall heat coefficient is 1160 W/m^2K and the surface area of the heat exchanger is 0.25 m^2. Calculate the outlet temperatures of the both the fluids.

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

(b) A metal clad heating element of 6 mm diameter and emissivity equal to unity is horizontally immersed in a water bath. The surface temperature of the metal is 255 °C under steady state boiling conditions. If the water is at atmospheric pressure estimate the power dissipation per unit length of the heater. Properties of water at 100 °C are: $\rho_l = 957.9$ kg/m^3; $h_{fg} = 2257 \times 10^3$ J/kg; $\rho_v = 4.808$ kg/m^3; $Cp_v = 2.56 \times 10^3$ J/(kg-K); $k_v = 0.0331$ W / (m -°C); $\mu_v = 14.85 \times 10^{-6}$ kg /(m s).

Code: 13EE3210

B.TECH. DEGREE EXAMINATION, APRIL 2016

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

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SECTION - I

1 (a) Explain the electrostatic focusing arrangement and derive the expression for deflection.
(b) Describe the dual trace type and dual beam type oscilloscopes.

2 (a) Draw the basic block diagram of an oscilloscopes and explain the functions of each Block.
(b) Why is a delay line used in the vertical section of an oscilloscope?

SECTION - II

3 (a) Discuss the advantages of digital instruments over analog instruments. Explain the Principle of working of integrating DVM. What are its limitations?
(b) A digital voltmeter has a read out range from 0 to 9,999 counts. Determine the resolution of the instrument in volt when full scale reading is 9.999 V.

4 (a) Explain the operating principle of a ramp type DVM.
(b) What are the advantages of SAR type DVM over other types of DVM?

SECTION - III

5 (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.

6 (a) Explain the basic Q-Meter circuit. Also describe the impedance measurement using Q-Meter.
(b) Describe the half wave and full wave rectifier type instruments.

SECTION - IV

7 (a) Explain the construction and principle of working of a LVDT.
(b) What is strain guage? Derive the expression for guage factor?

8 (a) List varies types of temperature transducers and describes the applications of each.
(b) Differentiate between thermistor and thermocouple.

SECTION - V

9 (a) Explain the principle and working of flow measurement.
(b) Discuss in detail about displacement meters.

10 (a) Explain the working of high pressure measurement
(b) Discuss the Data acquisition systems.

Code : 13CS3201

B.TECH. DEGREE EXAMINATION, APRIL 2016

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) Explain Basic line drawing algorithm with example?
b) Explain Raster Display with help of frame buffer?

2 a) Explain Basic Ellipses notation with implicit and parametric factors?
b) Explain Brenham's Line Generation?

SECTION - II

3 a) Write Short notes on 2D Transformations?
b) Perform a 45 degree rotation of object A(2,1) B(5,1) C(5,6) in clockwise direction and give the co-ordinates of the transformed objects?

4 a) Explain briefly line clipping with help of polygon clipping?
b) A clipping window ABCD is specified as A(0,0) B(40,0) C(40,40) D(0,40). Using midpoint subdivision algorithm, find the visible portion. If any of the line segment joining the points P(-10,20) and Q(50,10)?

SECTION - III

5 a) Find Transformation for
i)Cavalier Projection with $\theta=45^\circ$
ii)Cavalier Projection with $\theta=30^\circ$
b) Find each Transformation to draw the projection for the unit cube?

6 a) Explain the Isometric Projection in Brief?
b) Prove that 2 successive 2-D rotation are additive
i.e., $R(\theta 1).R(\theta 2) = R(\theta 1 + \theta 2)$

SECTION - IV

7 a) What is Visible Surface Detection? Explain its any two methods?
b) Differentiate Flat shading and smooth shading?
c) Mention the classification of visible surface detection algorithms?

8 List various visible surface detection methods and explain any two in detail with an example

SECTION - V

9 a) Compare and contrast different shading methods.

b) Discuss general Computer Animation Functions.

10 a) Define Random scan/Raster scan displays.

b) Write a detail notes on Computer Animation Languages.

Code : 13EC3202

B.TECH. DEGREE EXAMINATION, APRIL 2016

III B.Tech. II Semester

MICROWAVE TECHNIQUES
(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) A helical TWT has diameter of 2mm with 50 turns per cm. Calculate the axial phase velocity and the anode voltage at which the TWT can be operated for useful gain?
   b) Derive an expression for bunching process in 2- cavity klystron?
2. a) What are cross field devices? How does a magnetron in Pi-mode sustain its oscillation using this cross field?
   b) How velocity modulation differ from normal modulation?

SECTION-II

3. a) What is a parametric amplifier? How it is different from normal amplifier?
   b) Explain the tunnel diode characteristics with the aid of energy band diagram?
4. a) What are avalanche transit time devices? Explain the operation and applications of IMPATT device?
   b) Explain the working of Schottky barrier diode?

SECTION-iii

5. a) Derive the wave equation for a TM wave and obtain all the field components in a rectangular waveguide?
   b) What is resonant frequency? Derive an expression for resonant frequency of a rectangular cavity resonator?
6. a) Derive s matrix for magic tee?
   b) Explain the functioning of flap and vane attenuators?

SECTION-IV

7. a) How insertion loss can be measured?

b) Compare the power ratio and RF substitution methods of measuring attenuation provided by microwave component?

8. a) Explain the method for measuring VSWR<10?

b) Explain about microwave bench setup?

SECTION-V

9. a) Explain how a parabolic reflector antenna serves the purpose of transmitting and receiving antenna for use in microwave spectrum?

b) What are the special requirements of microwave antennas?

10. a) Explain about monolithic MICS?

b) Explain , why a micro strip line is also called an open strip line?

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Code: 13CE3203

B.Tech. DEGREE EXAMINATION, APRIL 2016

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

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SECTION – I

1. Calculate the maximum negative and positive SF and maximum BM at a section 3 m from left support in a simple beam of 8 m when a UDL of 13 kN/m for a length of 2m rolls across the beam.

2. Draw the influence line diagrams for shear force and bending moment for a section at 6m from the left hand support of a simply supported beam with 24 m long. Hence, calculate the maximum Bending moment and shear force at the section, due to an UDL of length 9m and intensity 16KN/m and also find the absolute maximum bending moment?

SECTION – II

3. Find the forces in all the members of the frame as shown in figure 1. All the members have the same c/s area and young's modulus.

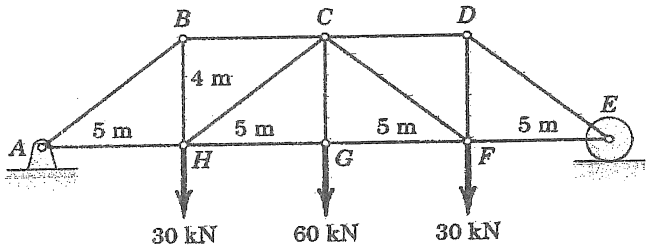

Fig.1

4. Determine the reaction at support A, C, E (as shown in fig.2) and all the member forces. Take E= 200 GPa and A = 500 mm^2

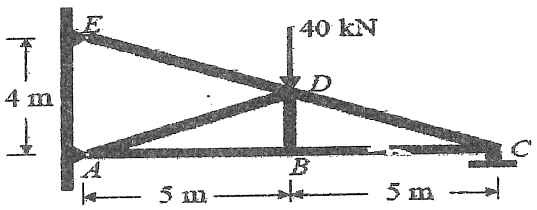

Fig-2

SECTION – V

9. Determine the collapse load in a fixed beam of span L carrying uniformly distributed load over one half of span. The plastic moment capacity is M_p throughout.

10. Determine the plastic moment capacity of the section required for the frame shown in fig.6. The loads shown ate the working loads. Take load factor λ=1.85. Assume same plastic moment capacity for all the members.

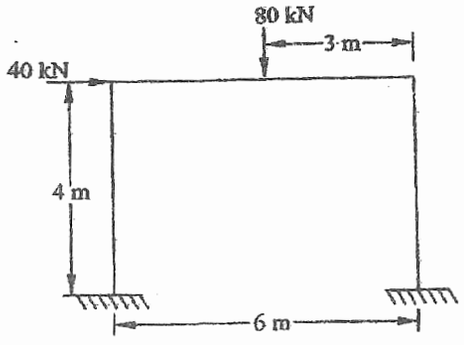

Fig.6

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Code : 13EE3211

B.TECH. DEGREE EXAMINATION, APRIL 2016

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 a Explain the frequency response of lead compensator and determine ω_m, φ_m and α

b Explain the frequency response of lag compensator and determine ω_m, φ_m and β

2 The open loop transfer function of a certain unity feedback control system is given by $G(s) = K/s(s+4)(s+80)$. It is desired to have the phase margin to be at least 33° and the velocity error constant $K_v = 30Sec^{-1}$. Design a phase lag series compensator.

SECTION - II

3 Define controllability and observability. Check for controllability and observability of a system having following coefficient matrices

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix} \qquad B = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} \qquad C = [10 \quad 5 \quad 1]$$

4 a Define the following terms (i) State (ii) State variables (iii) State vector and (iv) State space

b Obtain the state model of the following system represented by the following differential equation $\dddot{y} + 6\ddot{y} + 5\dot{y} + y = u(t)$. Draw the block diagram

SECTION - III

5 a Derive the solution of homogeneous state equations.

(P.T.O)

b Consider the system matrix A, Compute state transition matrix e^{At}, where $A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$

6 Consider a system represented by

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} [u]; \quad y = [1 \quad 0 \quad 0][x];$$

Design a full order state observer such that observer eigen values are at $-2 \pm j2\sqrt{3}$ and -5.

SECTION - IV

7 a What are singular points? Explain the classification of singular points based on the location of Eigen values of the system

b Explain the characteristics of non-linear systems

8 Explain stability analysis of non-linear systems using describing function method.

SECTION - V

9 a Define (i) Stability (ii) Asymptotic stability (iii) Asymptotic stability in the large.

b Examine the stability of the origin of the following system

$\dot{x}_1 = x_2$

$\dot{x}_2 = -6x_1 - 5x_2$

10 a Explain Krasovskii method for finding stability of non-linear systems

b Use Krasovskii theorem to prove that equilibrium state x=0 of the system described by

$\dot{x}_1 = 3x_1 + x_2$

$\dot{x}_2 = x_1 - x_2 - x_2^3$

Code: 13EC3203

B.TECH. DEGREE EXAMINATION, APRIL 2016

III BTech 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) What is a scattering loss? What are the differences between linear and non linear scattering losses? What are their types? Describe them in detail.

(b) The threshold optical powers for stimulated Brillouin and Raman scattering in a 8 μm core diameter single mode fiber are found to be 190 μm and 1.70 W, respectively, when using an injection laser source with a bandwidth of 1 GHz. Calculate the operating wavelength of the laser and the attenuation in dB/km of the fiber at this wavelength.

2 (a) What is the difference between inter-modal and intra-modal dispersion? Derive an equation for estimation of a material dispersion parameter.

(b) The material dispersion parameter for a glass fiber is 20 $ps/nm.km$ at a wavelength of 1.5 μm. Estimate the pulse broadening due to material dispersion within the fiber when light is launched from an injection laser source with a peak wavelength of 1.5 μm and rms spectral width of 2 mm into a 30 km length of the fiber.

SECTION – II

3 (a) Why double heterostructure is required to produce light from a Light Emitting Device (LED)? Describe its working principle with necessary diagrams. What are the light source materials used for construction of an LED.

(b) An engineer has two $Ga_{1-x}Al_x$ As LEDs: one has band gap energy of 1.540 eV and other has $x = 0.015$. (i) Find the aluminum mole fraction x and the emission wavelength for the first LED? (ii) Find the band gap energy and emission wavelength of the other LED?

4 (a) What is the difference between surface emitting source pattern and edge emitting source pattern? Derive an equation for the power coupled from a surface emitting LED into step index and graded index fibers.

(b) An LED with a circular emitting area of radius 20 μm has a lambertian emission pattern with a 100 $W/(cm^2.sr)$ axial radiance at a 100 mA drive current. How much optical power can be coupled into step index fiber having a 100 μm core diameter and numerical aperture is 0.22? How much optical power can be coupled from this source into a 50 μm core diameter graded index fiber having $\alpha = 2.0$, $n_1 = 1.48$, and $\Delta = 0.01$?

SECTION - III

5 (a) Describe the principle of operation of Avalanche Photodiode (APD). Derive an equation for its responsivity.

(b) A given silicon Avalanche photdiode has a quantum efficiency of 65 % at a wavelength of 900 *nm*. Suppose 0.5 μW of optical power produces a multiplied photo current of 100 μA. Find the pho current and multiplication factor M.

6 (a) Describe the principle of operation of a Photo transistor?

(b) What is Photo Darlington transistor receiver? Describe its principle of operation.

SECTION - IV

7 (a) What is an optical amplifier? Give their applications. What are the types of amplifiers used in optical systems? Describe them.

(b) Derive an equation for single pas gain of a semiconductor amplifier.

8 (a) What is Erbium Doped Fiber Amplifier (EDFA)? Describe its amplification mechanism.

(b) Describe EDFA power conversion efficiency and Gain.

SECTION - V

9 Give the military applications of optical communications. Describe in detail.

10 Describe how optical communications are used for telephony, telemetry and video distributions.

Code : 13ME3203

B.TECH. DEGREE EXAMINATION, APRIL 2016

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

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SECTION - I

1. a) The degree of involvement of managers in various management processes and their need to acquire different skills at various levels may vary from manager to manager, but eventually all managers have to be concerned with these processes as the back-bone of organizational functioning. Elaborate this statement and briefly discuss the underlying concepts.
   (b) Compare and contrast formal and informal organisation structures.

2. a) Explain linear regression technique with suitable example.
   b) The data for computer services employment (in thousands) is given below:

Year	1	2	3	4	5	6	7	8	9	10	11	12	13
Employ	268	322	330	354	421	457	535	578	629	682	738	778	790

   i) Find the time series linear regression equation and the forecast for next year's computer services employment.
   ii) Find a 95% confidence interval estimate for next year's forecast.
   [$t_{0.05, 13} = 1.77$; $t_{0.05, 11} = 1.81$; $t_{0.025, 13} = 2.16$; $t_{0.025, 11} = 2.20$]

SECTION - II

3. Define plant layout. Explain various types of layouts with suitable examples. Also list the advantages and disadvantages of each layout.
4. a) Explain the concept of Weber theory.
   b) What are the factors influencing while selecting plant location?

SECTION - III

5. (a) Explain about the following:
   ii) Work sampling ii) Predetermined Motion Time System

   (b) A work sampling study showed that 20% of a work for week of 48 hours was consumed by avoidable delays. Every time a work sampling observation was made, the operator was rated and the average of such ratings was 110%. If 110 units were produced per week, determine the standard per unit.

6. (a) Define time study. Explain the procedure of time study.
   (b) The time study showed the average time for a quality control test for an item is 14.55 min. The performance rating is 90, and allowances are 50 minutes per 8 hour shift.
   (i) Calculate the labour standard for the operation.
   (ii) If this quality control test is alone repeatedly, how many tests per 8 hour shift could be completed on the average?
   (iii) If the quality control test technician's labour rate is Rs. 10 per hour, what is the standard labour cost per test?

SECTION - IV

7. Define Incentive. Explain any three types of incentive plans with its adaptability to industry.

8. (a) Explain the functions of personnel management.
   (b) Distinguish between job evaluation and merit rating.

SECTION - V

9. a) Explain the following:
   (i) QFD process ii) Zero defect
   b) Explain the concept of six sigma with an application of furnace manufacturing.
10. (a) Distinguish between inspection and quality control.
   (b) A real estate firm evaluates incoming selling agreement forms using the single sampling plan $N = 1500$, $n = 110$ and $c = 3$. Construct the OC curve using about 7 points.

Code: 13CS3202

B.TECH. DEGREE EXAMINATION, APRIL 2016

III B.Tech. II Semester

CRYPTOGRAPHY & NETWORK SECURITY
(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. Describe Linear Feedback Shift Registers Sequences and Finite Fields with their application in cryptography.

2. Describe key discarding process of the DES.

Section II

3. Demonstrate encryption and decryption for the RSA algorithm parameters: p =3, q = 11, e =7, d =3, M=5.

4. Users A and B use the Diffie-Hellman Key Exchange with a common prime q=71 and a primitive root α =1. If user A has a private key X_A=5. What is the A's public key Y_A?

Section III

5. Explain about Chinese Remainder theorem.
6. Explain in detail about the Euclid's algorithm.

Section IV

7. Elaborately explain the Kerberos authentication mechanism with suitable diagram.
8. Describe in detail about the X.509 directory authentication service.

Section V

9. Explain pretty good privacy in detail.
10. Explain statistical anomaly detection and rule based intrusion detection.

Code : 13EC3204

B.TECH. DEGREE EXAMINATION, APRIL 2016

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) Compare common source and common drain amplifier with resistive loads.

(b) Explain Differential amplifier and its transfer characteristics,

2 (a) Write short notes about basic current mirrors.

(b) Explain cascode current mirrors.

SECTION - II

3 (a) Define the following with reference to CMOS.
i) Logic levels and noise margin
ii) Transition time
iii) Propagation delay
iv) Power dissipation

(b) Explain the basic ECL OR/NOR gate with a neat diagram. Why does the ECL family have the Lowest Propagation delay of all logic families?

4 (a) Write about CMOS-TTL interfacing.

(b) Explain 2-input low power Schottky TTL NAND gate with a neat circuit diagram.

SECTION - III

5 (a) Explain the organization of a VHDL design file.

(b) Write a data flow VHDL architecture for a prime number detector.

6 (a) Explain structural design elements with syntax and structure.

(b) Explain various hardware modeling issues in VHDL.

SECTION - IV

7 (a) Explain 2-input 4-bit multiplexer 74x157 with logic diagram, symbol and truth table.

(b) Write a VHDL behavioral architecture for a 4-input 8-bit multiplexer.

8 (a) Design a 5-32 decoder using 74x138s and 74x139.

(b) Write a VHDL program in data flow style for a 74x138 binary encoder.

SECTION - V

9 (a) Write a VHDL structural program for the D-latch.

(b) Explain the conversion of SR flip-flop to JK flip-flop.

10 (a) Design Modulo-11 counter using 74x163 with counting sequence 5, 6, ..., 15, 5, 6,...

(b) Write a VHDL program for a 74x163 4-bit binary counter.

Code : 13CE3201

B.TECH. DEGREE EXAMINATION, APRIL 2016

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 about Bogue compounds in cement.

(b) Explain how you improve the quality of concrete, by the use of Puzzolanas.

2 (a) Explain the properties and applications of Rapid hardening Portland cement.

(b) What are chemical admixtures? Explain any two types of chemical admixtures.

SECTION - II

3 (a) What is alkali-aggregate reaction? How will it affect the properties of concrete?

(b) Explain briefly the classification of aggregates.

4 (a) Explain about the properties of pumped concrete and vacuum processed concrete.

(b) Explain in detail the effect of time and temperature on workability of concrete.

SECTION - III

5 (a) What is meant by curing of concrete? Explain different methods of curing.

(b) Explain High pressure steam curing and its applications

6 Describe the methods used to test the hardened concrete.

SECTION - IV

7 (a) Define creep, explain the factors affecting creep.

(b) Discuss briefly on elastic properties of concrete.

8 (a) Define durability of concrete and its significance.

(b) Write short notes on resistance of concrete to fire.

SECTION - V

9 Explain with the example, step by step procedure for concrete mix design as p Indian standards.

10 (a) Briefly explain the procedure for quality control of concrete.

(b) Differentiate ACI method and IS method of design mix.

Code : 13EE3212

B.TECH. DEGREE EXAMINATION, APRIL 2016

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. A three-phase, 50 Hz transmission line, 100 km long delivers 25 MW at 110kV and 0.85 p.f. lagging. The resistance and reactance of the lines per phase per km are 0.3 ohm and 0.5 ohm respectively while capacitance admittance is 2.5×10^{-6} mho/km/ph. Calculate the efficiency of transmission. Use nominal π method.

b. Explain Ferranti effect and synchronous compensation.

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

b. Explain the effects of shunt capacitor and series capacitor in transmission line.

SECTION - II

3 a. Explain the surge impedance loading and attenuation and distortion.

b. A rectangular wave travels along a 500 km line terminated with a resistance of 1000 ohms. The line has a resistance of 0.3 ohms/km and a surge impedance of 400 ohms. If the voltage at the termination point after two successive reflections is 200 kV, determine the amplitude of the incoming surge.

4 a. Derive the expression for co-efficient of Reflection and Refraction.

b. Explain Bewley's Lattice diagram and give its uses.

SECTION - III

5 a. Explain the effects of ungrounded neutral on power system performance.

b. Explain Resistance and Reactance grounding.

6 a. Briefly describe reactive neutral grounding.

b. Briefly explain Arc suppression coil earthing.

SECTION - IV

7 a. Write the factors to be considered for the location of selection of substation.

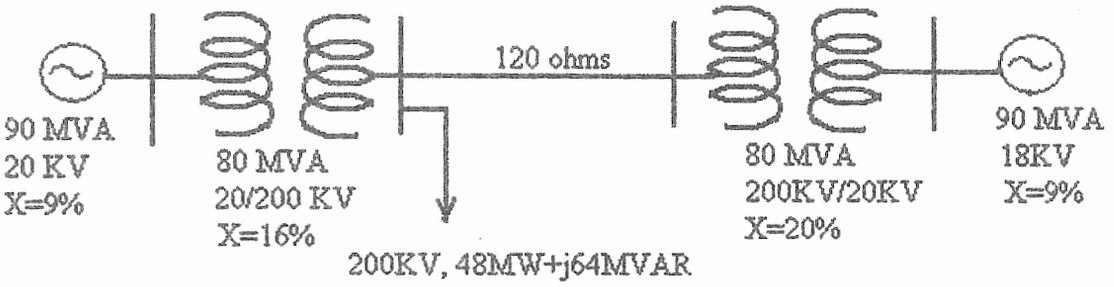
b. Explain the main equipment used in 33kv substations.

8 a. Explain need for EHV and UHV lines in India.

b. Write the advantages of HVDC over HVAC.

SECTION - V

9 a. Draw the pu impedance diagram for the system shown in fig choose Base MVA as 100 MVA and base KV as 20 KV.



b. Explain the difference between the two- winding three-winding transformer.

10 a. Write the advantages of p. u system.

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

Code: 13ME3201

B.TECH. DEGREE EXAMINATION, APRIL 2016

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) Define readability and sensitivity of an instrument. What is the relation between calibration curve and sensitivity?
(b) What do you understand by threshold? What are the causes for threshold?

2 (a)Define the terms Accuracy and Precision. Clearly differentiate between these two terms with an example.
(b) Define speed of response and measuring lag. Briefly explain about various types of measuring lags.

SECTION – II

3 Explain the working principle of a capacitive transducer with a neat sketch? What are the advantages and disadvantages of capacitive transducers?

4 Describe briefly the construction and working of Pirani gauge. Give its advantages and disadvantages.

SECTION – III

5 Explain the working of an electromagnetic flow meter with a neat sketch. Mention its advantages and disadvantages.

6 List the various methods used for measurement of torque. Write the working of a strain gauge torsion meter and electrical torsion meter.

SECTION – IV

7 (a) Describe the basic concept of the seismic instrument.
(b) Under what conditions seismic instrument is suitable for measuremen of acceleration and amplitude.

8 (a) Define vibration. How is it characterized and list some of its harmful effects?
(b) Briefly explain about any one method used to measure the vibrations.

SECTION – V

9 Describe a typical close loop control system that can be used in order to control the temperature of water being heated by steam.

10 Describe the operation of a hydraulic controller and a pneumatic controller. Point out the uses and limitations of each controller.

Code : 13CS3203

B.TECH. DEGREE EXAMINATION, APRIL 2016

III B.Tech. II Semester

FREE & OPEN SOURCES 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) Who creates open source? Explain development practices.
(b) List and explain challenges in open source software.

2 (a) How to use open source software? Explain.
(b) What are the open source risks? Explain

SECTION – II

3 (a) Explain in detail about LINUX File System.
(b) Write about man pages and cat command.

4 Explain the following commands with examples
(a) mkdir (b) rmdir (c) ls (d) find (e) cp (f) mv.

SECTION – III

5 Explain the following commands with examples
(i) tr (ii) unmask (iii) chmod

6 Explain various Back up commands with examples

SECTION – IV

7 (a) What is the use of LaTex? Explain.
(b) What is the advantage of moodle? Explain its applications.

8 Explain the following
(a)Android (b) NewGenLib (c) Media-wiki

SECTION - V

9 (a) How to apply and getting licenses in open source software? Explain.
(b) Discuss about version control and bug tracker in detail.

10 Write a short notes on
(a)Mailing Lists (b) RSS Feeds (c) wikis.

Code : 13CE3205

B.TECH. DEGREE EXAMINATION, APRIL 2016

III B.Tech. II Semester

ENVIRONMENTAL ENGINEERING
(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 hourly Fluctuations in demand of water? What is its importance in the design of water works. How do you manage these Fluctuations in demand of water while designing the water supply scheme.
   b. What factors are considered for the selection of location of Intake structure. Draw a neat sketch of River Intake structure.

2. a. what are the common sources of water for water supply scheme? State the factors that govern the selection of particular source.
   b. what are the various methods of forecasting population? Explain any two methods

SECTION – II

3. a. Compare surface water and ground water with reference to their quality
   b. What are the desirable limits for the following parameters for drinking purpose as per IS 10500. What objections could be there if present excess in water
   (i)P^H value, (ii) Turbidity, (iii) Chlorides, (iv) Fluorides . (v)TDS and (vi) Nitrates

4.a. Design a circular sedimentation tank to treat 10 million liters of water per day for a over flow rate of 30,000 lt /m^2 /day.
   b. Write the principle of coagulation process. List various types of coagulants used for water treatment. Describe about any one coagulant.

SECTION - III

5.a. Describe working of rapid sand gravity filter with a neat sketch
   b. Write sort note on (i) Loss of head, (ii) –ve head and (iii) Air binding

6. a. What is the difference between disinfection and sterilization? Explain the most popular method of disinfection of water treatment?
   b. What is Break point Chlorination? What are the advantages of it?

SECTION – IV

7.a .Write a note on Chemical Oxidation and Precipitation and removal of Iron
   b. Explain How do you remove Salinity from water

8. a. Write a note on Adsorption technique and removal of Arsenic
   b. Explain How do you remove Fluorides from water

SECTION – V

9.a.What are the methods of analysis of distribution system. Explain about Hardy Cross method.

b. Determine the storage capacity of a reservoir for a daily requirement of 2.5 lakh litres. The pumping is done from 8 am - 8 pm. The draw off is as follows

6AM-8AM	40% of daily supply
8AM-5PM	25% of daily supply
5PM-8PM	35% of daily supply.

10. a. Enumerate the principles governing the design of drainage in buildings.
    b. Write short note on the following with the help of neat sketches
       (i) Sluice valve
       (ii) Air relief valve

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Code: 13CS3207

B.TECH. DEGREE EXAMINATION, APRIL 2016

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) Draw the Bus system using Tri-state buffers and decoders.
b) What is micro operation? Explain Arithmetic micro operations.
2 a) Explain Timing and Control unit.
b) Explain Memory reference instructions.

SECTION - II

3 a) Explain the terms compiler, linker, assembler, loader and describe how a C program or any other high level language program is executed in system.
b) Why do we need subroutine register in a control unit? Explain
4 a) Explain the variety of techniques available for address sequencing of Microinstructions.
b) Draw and explain the Microinstruction Format.

SECTION - III

5 a) Discuss about Flynn's classification of computers.
b) Explain Instruction pipeline.
6 a) What is pipeline? Explain space-time diagram for Pipeline.
b) Explain different types of addressing modes.

SECTION - IV

7 a) What is Direct Memory Access? Explain the working of DMA.
b) What is daisy chaining? Explain.
8 Explain the following:
(i) CPU - I O P Communication (ii) I O P (iii) IBM 370 I/O Channel.

SECTION - V

9 a) Explain Paging in Virtual memory
b) What are the different types of Mapping Techniques used in the usage of cache Memory? Explain.
10 a) Explain about inter processor communication used in multiprocessors.
b) Explain Cache coherence in detail.

Code :13CS3204

B.TECH. DEGREE EXAMINATION, APRIL 2016

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? Explain various phases of a Compiler.
b) Describe different Compiler construction tools.

2 a) How does Lexical Analyzer identifies the Tokens.
b) What is Lex Tool? How Lex programs are used to perform Lexical Analysis.

SECTION - II

3 a) Explain in detail about the Role of parser.
b) Write about operator-precedence parsing algorithm.

4 a) What are advantages of LR parsing. Write LR parsing algorithm.
b) What is meant by Parser generator? Describe YACC Parser generator.

SECTION - III

5 a) Explain Syntax-directed definitions in detail.
b) Write a detailed note on the construction of syntax trees.

6 What is type Expression? Describe specification of a Simple Type Checker.

SECTION - IV

7 Describe in detail about Storage-allocation strategies.

8 Explain Intermediate Languages.

SECTION - V

9 What are the issues in design of a code generator?

10 Explain the concept of Register allocation and assignment.

Code : 13ME3205

B.TECH. DEGREE EXAMINATION, APRIL 2016

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 traditional design methods and design standards? Explain

(b) Describe the properties of following materials
(i) Alloy steel (ii) Aluminum (iii) Cast Iron (iv) Ceramics

2 (a) Explain the stresses due to axial, bending and torsional loads?

(b) The stresses induced at a critical point in a machine component of steel 45C8 (S_{yt}=380 MPa) are as follows:
σ_x = 100 MPa, σ_y = 40 MPa, $\square_{xy}$ = 80 MPa
Calculate the factor of safety by
(i) the maximum normal stress theory (ii) maximum shear stress theory
(iii) the distortion energy theory

SECTION - II

3 (a) Explain the parameters influence the stress concentration factor?

(b) A 25 mm diameter shaft is made of forged steel 30C8 (S_{ut}= 600 MPa). There is a step in the shaft and the theoretical stress concentration factor at the step is 2.1. The notch sensitivity factor is 0.84. Determine the endurance limit of the shaft if it is subjected to a reversed bending moment.

4 (a) Explain the notch sensitivity and endurance limit?

(b) A machine component is subjected to fluctuating stress that varies from 40 to 100 MPa. The corrected endurance limit stress for the machine component is 270 MPa. The ultimate tensile strength and yield strength of the material are 600 and 450 MPa respectively. Find the factor of safety using (i) Soderberg line, (ii) Goodman line and (iii) Gerber theory

SECTION - III

5 (a) What are salient features and advantages of threaded joints?

(b) A steam engine cylinder has an effective diameter of 250 mm. t is subjected to a maximum steam pressure of 1.5 MPa. The cylinder cover is fixed to the cylinder flange by means of 12 studs. The pitch circle diameter of the studs is 400mm. The permissible tensile stress in the studs is limited to 30 MPa.
(i) Determine the nominal diameter of the studs if d_c= 0.84d
(ii) Calculate the circumferential pitch of the studs. Is it satisfactory?

6 A bolted joint is used to connect two components. The combined stiffness of two components is twice the stiffness of the bolt. The initial tightening of the nut results in a preload of 10 kN in the bolt. The external force of 7.5 kN creates further tension in the bolt. The bolt is made of plain carbon steel 30C8 (S_{yt} = 400 MPa) and the factor of safety is 3. There are coarse threads on the bolt. Calculate the tensile stress area of the bolt and specify a suitable size for the bolt.

SECTION – IV

7 (a) Explain stress relieving in welded joints?

(b) Two steel plates, 120 mm wide and 12.5 mm thick are joined together by means of double transverse fillet welds as shown in Fig.1. The maximum tensile stress for the plates and the welding material should not exceed 110 MPa. Find the required length of the weld, if the strength of the weld is equal to the strength of the plates.

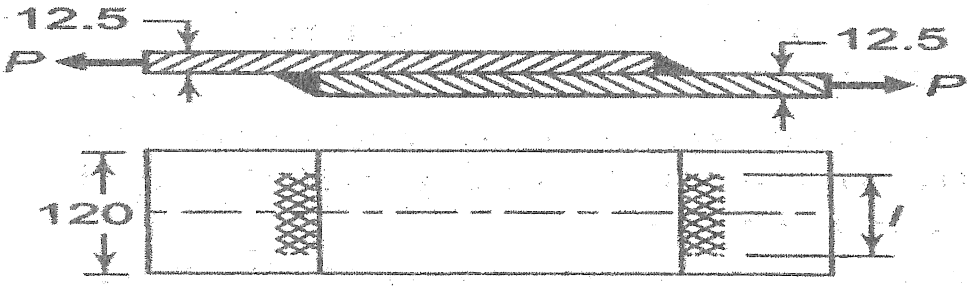

Fig.1

8 (a) Discuss in detail the strength of welded joints?

(b) A welded connection of steel plates is shown in Fig.2, It is subjected to an eccentric force of 50 kN. Determine the size of the weld, if the permissible shear stress in the weld is not to exceed 70 MPa.

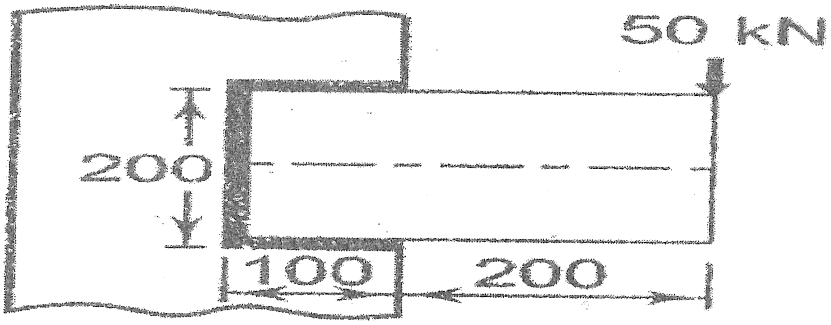

Fig.2

SECTION – V

9 (a) Where do you use cotter joint? Give practical examples?

(b) It is required to design a knuckle joint to connect two circular rods subjected to an axial tensile force of 50 kN. The rods are co axial and a small amount of angular movement between their axes is permissible. Design the joint and specify the dimensions of its components. Select suitable material for the parts.

10 A centrifugal pump is driven by 10 kW power 1440 rpm electric motor. There is a reduction gear box between the motor and the pump. The pump shaft rotates at 480 rpm. The design torque is 150% of the rated torque. The motor and pump shafts are made of plain carbon steel 40C8 (S_{yt} = 380 MPa) and the factor of safety is 4. Assume (S_{xy} = 0.5 S_{yt}), calculate (i) diameter of the motor shaft and (ii) diameter of the pump shaft

Code : 13EE3213

B.TECH. DEGREE EXAMINATION, APRIL 2016

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 operation of SCR with the help of its schematic diagram
(b) Explain about the static characteristics of an SCR.

2 (a) Explain the operation of an SCR with two transistor analogy
(b) Explain the need of commutation circuits. What are the different methods of communication schemes?

SECTION – II

3 (a) Discuss the effect of source inductance on the performance of single phase full converter.
(b) What are the advantages and disadvantages of a single phase bridge converter over single phase midpoint converter?

4 (a) A single phase full converter delivers ripple free current to RL load with R=15 Ohm. The source voltage is 23 V, 50 H. for a firing angle 0f 30^0, calculate power factor, displacement factor and ripple factor.

(b) For the above data calculate active and reactive power and T.H.D.

SECTION – III

5 (a) Explain the operation of Type-A chopper and derive the output current ripple expression.
(b) For a Type-A chopper source voltage=220 V, chopping frequency is 500 Hz. T_{ON}=800 micro seconds, R=1 Ohm, L=1mH, E=72 V. Calculate the values of average output voltage and average output current.

6 (a) For a step down chopper derive the expressions for output voltage and current with RL load.

(b) Explain the operation of MORGAN's chopper with circuit diagram and waveforms.

SECTION – IV

7 (a) Discuss the operation of single phase bridge inverter with various loads.
(b) Explain the sinusoidal pulse modulation as used in PWM inverters.

8 Explain the operation of a series inverter. In a series inverter R=4 Ohms, L=50 micro H and C= 6 micro F. The DC input voltage is 200 V DC and output frequency is 6 kHz. SCR turn off time is 6 micro seconds. Find (a) Available circuit turn off time. (b) Maximum possible frequency.

SECTION – V

9 Compare the operational features of single phase, midpoint and bridge type cyclo-converters for RL loads with circuit diagrams and waveforms. Mention their limitations and applications.

10 (a) Discuss the operation of integral cycle control of AC voltage controller?

(b) Derive the power factor expression in case of integral cycle control of AC voltage controller.

13 Ec 32 E1

Code : 13ME42E3

B.TECH. DEGREE EXAMINATION, APRIL 2016

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

* * *

SECTION - I

1 (a) Explain the organization of the brain in detail

(b) Explain about Mc-Culloch-Pitts Model for Artificial Neuron. Realize AND and NAND gates using this model.

2 (a) Write in detail about delta learning rule

(b) Write in detail about ouster learning rule

SECTION - II

3 (a) What are the advantages and disadvantages of perceptron?

(b) Explain the concept of multilayer perceptron with two hidden layers.

4 With neat block diagram and flow chart, explain error back propagation algorithm

SECTION - III

5 What is Self-Organizing Map? Describe its architecture and learning algorithm for Kohonen Self Organizing Map with an example.

6 (a) Explain the neural network applications in Control applications.

(b) Explain how plant inverse learning is used in process identification.

SECTION - IV

7 (a) Define classical set

(b) Differentiate fuzzy set from classical set and name the properties of classical sets

8 (a) Mention some applications of Fuzzy logic.

(b) Explain Fuzzy compliment and Fuzzy relation

SECTION - V

9 List the various defuzzifiction techniques. Explain each of them in detail

10 Design a Fuzzy Logic Controller for Temperature Settings of Storage water heater by assuming necessary conditions

Code :13CE32E1

B.TECH. DEGREE EXAMINATION, APRIL 2016

III B.Tech II Semester

INDUSTRIAL STEEL STRUCTURAL DESIGN

(Civil Engineering)

Time : 3 hours Max. Marks :60

Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks
Use of IS: 800-2007,801-1968,811-1987,1166-1968 and structural steel tables is permitted.
Assume any missing data suitably if necessary
Wherever necessary, give neat dimensional sketches.

SECTION - I

1 Design a cross section of riveted plate girder to carry u.d.l of 60 kN/m excluding the self weight of the girder. In addition the girder has to support two concentrated loads at the top of flange at one-third points. Each concentrated load is 400 kN. The effective span of the girder is 18 m. Also design stiffeners required for the plate girder.

2 Design the cross section and connections of a welded plate girder of span 16 m and carries an uniformly distributed load of 100 kN/m excluding its self weight.

SECTION - II

3 Design an elevated rectangular pressed steel tank having capacity of 1,25,000 litres. The height of staging is 12 meters. Sketch the design details neatly.

4 A cylindrical steel tank with hemispherical bottom has to hold 1,50,000 litres. Height upto top of the columns is 15 m. Design :

a. The cylindrical plates ;
b. The hemispherical bottom;
c. Rivets in the horizontal joints and circumferential joints and neatly show the details by means of sketches.

SECTION - III

5 a) Explain the loads acts on roof trusses.

b) Design a suitable purlin section for trussed roof from the following data:
Span of roof = 12 m

Spacing of truss = 5 m,
Spacing of purlins along the slope of roof truss = 2 m
Slope of truss = 1 vertical to 2 horizontal
Wind load on roof surface normal to roof = 1200 N/m^2
Vertical load from roof sheets, etc. = 500 N/m^2

6 a) Explain different load combinations to be considered for design of steel roof trusses.
b) Design a roof truss of span 18 m. The pitch of the truss is 1/5. The height of truss at eaves level is 15 m. The spacing of trusses is 4 m. The building is situated at New Delhi. Take yield strength of steel as 310 MPa.

SECTION - IV

7 a) Explain about architectural treatment for Masonry chimneys

b) Explain in detail design of procedure of Masonry chimneys

8 A hollow square masonry chimney has inside dimensions of 1.2 m X 1.2 m at the top and 2.4 m x 2.4 m size at its bottom. It has a uniform thickness of 0.6 m throughout its height of 15 m. Check the stability of the chimney at its base, for an uniform wind pressure intensity of 1.3 kN/m^2. Take unit weight of brick masonry as 20 kN/m^3 and permissible compressive stress as 2 N/mm^2

SECTION - V

9 a) Explain the terms Stiffened compression elements and un-stiffened compression elements.

b) A light gauge steel rectangular box section 180 x 90 x 2 mm is used for a column. The effective length of column is 3.6 m. Determine the safe load carrying capacity of the section. Take basic allowable design stress as 145 MPa.

10 Two channels 200 x 50 mm with bent lips are connected with webs to act as beam. The thickness of plate is 2.5 mm and the depth of lips in 25 mm. The beam has an effective span of 4.5 m and R_i = 5.5 mm. Determine safe uniformly distributed load on the beam including its self weight if the beam laterally supported throughout its length. Also determine the deflections at the allowable load. The steel has an yield strength of 240 N/mm^2 and $E = 2 \times 10^5$ N/mm^2.

Code : 13ME32E5

B.TECH. DEGREE EXAMINATION, APRIL 2016

III B.Tech. II Semester

SOLAR ENERGY ENGINEERING
(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) Calculate the sun's altitude and azimuth angles at 10.a.m. solar time on October 10 at latitude 24^0N.

(b) Describe the working of any one Pyrheliometer.

2 (a) Calculate the day-length on May 10, for a south facing surface situated at Delhi 28^0N, 78^0E and tilted at an angle of 40^0.

(b) Define the terms
(i) Zenith angle (ii) Incidence angle (iii) Solar azimuth angle.

SECTION - II

3 (a) Describe the constructional details of a typical Flat plate collector with diagram.

(b) Define collector efficiency and explain heat transfer mechanism involved in a flat plate collector.

4 (a) Explain the installation procedure involved in flat plate collector system used for water heating application with reference to geographical location and the angle of tilt

(b) What are the different absorbing surface areas with a sketch and mention their merits and demerits.

SECTION - III

5 (a) Sate the reasons to select parabolic collectors over flat plate collectors.

(b) Describe the working of parabolic collector with a sketch.

6 (a) Why sun tracking of concentrating collectors is needed? What are the methods of sun tracking?

(b) Define optical efficiency. How optical losses in focusing collectors are minimized?

SECTION - IV

7 (a) Classify energy storage systems and explain how thermal energy can be stored.

(b) Explain about various materials used for phase change energy storage.

8 (a) Explain the principle of solar pond used for thermal storage and what are the advantages of it

(b) Calculate the sensible heat stored per unit volume for the following heat storage mediums, when their temperature is increase by 27^0C.

(i) For water density = 100 kg/m^3, Cp=4.187 kJ/kg L

(ii) For rock density = 2250 kg/m^3, Cp = 0.900 kJ/kg K.

SECTION - V

9 (a) Describe the working of solar desalination plant with a sketch.

(b) Explain the working of Solar cooker for commercial applications.

10 (a) Illustrate the feasibility of Solar energy for Urban applications.

(b) Explain the working principle production of hydrogen by using solar energy.

Code : 13CS32E1

B.TECH. DEGREE EXAMINATION, APRIL 2016

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. (a) Define Wireless communication. Explain about Signal Propagation.
   (b) Explain Multiplexing and its types.
2. (a) Explain , what is meant by medium access control?
   (b) Discuss about CDMA in detail.

SECTION - II

3. Describe briefly about GSM and System architecture with the help of a diagram.
4. Explain about Radio interface, localization and calling of GSM.

SECTION - III

5. Briefly explain about agent discovery in Mobile IP.
6. (a) What is meant by Optimization? Explain the different types of optimized messages in mobile IP.
   (b) Explain about mobile ad-hoc networks in brief.

SECTION - IV

7. (a) Explain about Congestion control in mobile transport layer.
   (b) Write a short note on
   (i) Indirect TCP (ii) Snooping TCP.
8. Explain about selective re- transmission.

SECTION - V

9. (a) Explain about wireless datagram protocol.
   (b) Discuss about wireless transport layer security.
10. Explain PUSH architecture and PUSH services.