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CODE: 13CE3012   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular & Supplementary Examinations, October-2017
DESIGN AND DRAWING OF CONCRETE STRUTURES -I
(Civil Engineering)

Time: 3 Hours   Max Marks: 70

<u>PART-A</u>

ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. a) Define the term lever arm.
   b) Define the term singly reinforced section.
   c) Define the term characteristic load.
   d) List out types of shears.
   e) Draw a neat sketch for flexural shear failure.
   f) Write the minimum percentage of tension reinforcement for slabs as per I s codes.
   g) Define the term effective flange width.
   h) Define the term eccentrically loaded column.
   i) Write the maximum diameter of reinforcement bar for solid slabs.
   j) What is the importance of distribution reinforcement for slabs?

Answer One Question from each unit   **[5 x 12 = 60 M]**

<u>UNIT-I</u>

2 .a) State the loads to be considered in the design of reinforced concrete elements.   [3M]
   b) A reinforced concrete beam of rectangular section having a width of 400 mm and over
      all depth 650 mm is reinforced with 5 bars of 25 mm diameter on the tension side and 4
      bars of 20 mm diameter on the compression side at an effective cover of 50 mm for
      both steels. Use M20 and Fe415 grades. Determine
      i) Actual neutral axis
      ii) Critical neutral axis
      iii) The safe moment of resistance of the section
      Use working stress method.   [9M]

(OR)

3. A reinforced concrete beam is simply supported over an effective span of 6.0 m and it
   carries a uniformly distributed load of 30 KN/m including its self weight. If the depth of
   beam is restricted to 500 mm. Design the beam. Use M20 grade concrete and fe415 grade
   concrete.   [12M]

<u>UNIT-II</u>

4. a) What are the advantages of limit state design over other methods.   [3M]
   b) Find the ultimate moment of resistance of a rectangular beam of size 230 X 460 mm
      effective depth, reinforced with 2 # 16 mm diameter bars as compression reinforcement
      at an effective cover of 40 mm and 4 # 20 mm diameter bars as tension reinforcement.
      Use M20 & Fe415 grades.   [9M]

(OR)

5. a) Draw the stress- strain curve for concrete in compression and explain.   [4M]
   b) Derive the stress block parameters.   [5M]
   c) Write a note on partial safety factors of materials and loads.   [3M]

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UNIT-III

6. A simply supported beam of 6.0 m span carries a characteristic load of 40KN/m. Check for shear and development length. Use M20 grade concrete & Fe415 grade steel.   [12M]

(OR)

7. A rectangular beam of 300 mm wide and 550 mm deep is subjected to a bending moment of 60 KN-m, shear force of 50 KN and twisting moment of 30 KN-m . Design the beam adopts M20 grade concrete and fe415 grade steel. Use Limit State Method.   [12M]

UNIT-IV

8. Design a helically reinforced circular column to carry a factored load of 1500 KN. Use M20 grade concrete and Fe415 grade steel.   [12M]

(OR)

9. A short column of size 400 mm x 400 mm is subjected to an axial factored load of 2000 KN and factored moment about one of the axis of 150 KN-m . Design the column. Adopt M20 and Fe250 grade steel.   [12M]

UNIT-V

10. Design an interior panel of size 4.0 m x 6.0 m esting on 230 mm thick beams and slab carries a live load of 4 KN/m^2, floor finishes 1.2 KN/m^2. Use M25 grade concrete and HYSD bars of grade Fe415.   [12M]

(OR)

11. Design one of the flights of a doglegged staircase of a school building spanning between landing beams, to suit the following data.
    No. of steps of a flight = 12
    Width of Tread = 300 mm
    Riser = 160 mm
    Width of landing beam = 400 mm
    Use M20 grade concrete & Fe415 grade steel. Also draw a neat sketch showing the details of   reinforcement in the waist slab.   [12M]

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
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III B.Tech I Semester Regular & Supplementary Examinations, October-2017

ELECTRICAL MEASUREMENTS
(Electrical and Electronics Engineering)

Time: 3 Hours   **Max.Marks:70**

PART-A
ANSWER ALL QUESTIONS   **[1x10=10M]**

1.(a) What is the reason for using MI instruments on both AC and DC?
  (b) Why a voltmeter should have high resistance?
  (c) How the current transformer and potential transformer are connected in a circuit?
  (d) What is the use of compensation winding in a wattmeter?
  (e) What is the major cause of creeping error in an energy meter
  (f) What is mean by Phantom Load?
  (g) What is the advantage of Kelvin double bridge?
  (h) Which type of detector is used in AC bridges?
  (i) State the advantage of AC potentiometers
  (j) What is purpose of finding hysteresis loop?

PART-B

Anser one question from each unit   **[5x12=60M]**
UNIT-I

2. (a) Explain the working of attraction type and repulsion type moving iron instruments
     with neat diagrams.   [6M]
   (b) A moving coil milli-ammeter having a resistance of 10 ohm gives full scale deflection
       when a current of 5 mA is passed through it. Find the resistance of instrument can be used
       for measurement of (i) current upto 1 A   and (ii) voltage upto 5V.   [6M]

(OR)

3. Describe the construction and working of a permanent magnetic moving coil
   Instruments   [12M]

UNIT-II

4. Derive expression for actual transformation ratio, ratio error and phasor angle error
   of a P.T.   [12M]
(OR)

5. (a) Explain the three phase reactive power measurement using single wattmeter
       method.   [6M]
   (b) The power input to a 3-phase induction motor is read by two wattmeters. The
       readings are 920W and 300W. Calculate the power factor of the motor.   [6M]

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UNIT-III

6. What are the different tests conducted on a single phase energy meter and explain with neat sketch.   [12M]

(OR)

7. (a) Explain the lag adjustment devices of single phase energy meter   [6M]
   (b) A 5A, 230V meter on full load unity power factor test makes 60 revolutions in 360 seconds. If the normal disc speed is 520 revolutions per kWh, what is the percentage error?   [6M]

UNIT-IV

8. (a) Describe the circuit of Kelvin double bridge used for measurement of low resistance. Derive the conditions for balance.   [6M]

   (b) Explain Maxwell Bridge and justify that it is limited to the measurement of medium Q coils.   [6M]

(OR)

9. Describe the working of Schering Bridge. Derive the equations for capacitance, dissipation   factor and its applications   [12M]

UNIT-V

10. What is standardization .Explain the working of DC potentiometer and its applications?   [12M]

(OR)

11.(a) Explain the polar type AC potentiometer   [6M]
   (b) Explain the working of flux meter   [6M]

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DESIGN OF MACHINE MEMBERS - II
(Mechanical Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) Give an expression for coefficient of friction in a journal bearing
   b) List the basic assumptions used in the theory of hydrodynamic lubrication
   c) Mention the ratio of the bearing characteristic number to the bearing modulus when a bearing is subjected to large fluctuations of load.
   d) Identify the types of stresses induced in crank shaft
   e) What is the range of the length of a piston used in an IC engine when its diameter is D
   f) Define the term 'Creep' in the context of belt drives
   g) Write an expression for the ratio of driving tensions in a V belt.
   h) What is the relation between pitch of the chain and pitch circle diameter of the spocket.
   i) What is the condition that must be satisfied so that a pair of spur gears may have a constant velocity ratio?
   j) Write an expression for efficiency of self-locking screws.

PART-B

Answer one question from each unit   [5x12=60M]

UNIT-I

2. (a) What are rolling contact bearings? Discuss their advantages over sliding contact bearings.
   (b) A ball bearing is subjected to a radial load of 5 kN is expected to have a life of 8000 hours at 1450 rpm with a reliability of 99%. Calculate the dynamic load capacity of the bearing so that it can be selected from the manufacturer's catalogue based on a reliability of 90%.

(OR)

3. (a) What is the reason for heat generation in a Journal Bearing. Show an expression to estimate the heat generated in a journal bearing.
   (b) A 100 mm long and 60 mm diameter journal bearing supports a load of 2500 N at 600 rpm. If the room temperature is 20^0 C , what should be the viscosity of the oil to limit the bearing surface temperature to 60^0C. The diametrical clearance is 0.06 mm and the energy dissipation coefficient based on projected area of bearing is 210 W/m^2/^{0}C

UNIT-II

4. A connecting rod is required to be designed for a high speed, four stroke IC engine. The following data are available: Diameter of piston=88 mm, mass of the reciprocating parts= 1.6 kg, length of the connecting rod (centre to centre) = 300mm, stroke =125 mm, rpm=2200 (when developing 50 kW), possible over speed=3000 rpm, compression ratio=6.8:1, probable maximum explosion pressure at 3^0 after dead centre =3.5 N/mm^2.

(OR)

5   Design a side crank shaft for a 500X600 mm gas engine. The weight of the flywheel is 80 kN and the explosion pressure is 2.5 N/mm^2. The gas pressure at maximum torque is 0.9 N/mm^2 when the crank angle is 30^0. The connecting rod is 4.5 times the crank radius. Any other design data required for the design may be assumed.

UNIT-III

6   Design a piston for a four stroke diesel engine consuming 0.3 kg of fuel per kW of power per hour and produces a brake mean effective pressure of 0.7 N/mm^2. The maximum gas pressure inside the cylinder is 5 N/mm^2 at a speed of 3500 rpm. The cylinder diameter is required to be 300 mm with stroke 1.5 times the diameter. The piston may have 4 compression rings and an oil ring. The following data can be used for design: Higher calorific value of fuel = $46X10^3$ kJ/ kg, Temperatures at piston centre and edge are 700K and 475K, Heat conductivity factor=46.6 W/m/K, Heat conducted through top= 5% of the heat produced, permissible tensile strength= 27 N/mm^2, Pressure between rings and piston=0.04 N/mm^2, Permissible tensile stress in rings=80 N/mm^2, permissible pressure on piston barrel=0.4 N/mm^2, Permissible pressure on the piston pin=15 N/mm^2, Permissible stress in piston pin=85 N/mm^2. Any other data required for the design may be assumed.

(OR)

7   (a)   Sketch the cross section of a V belt and label its important parts.
    (b)   Power is transmitted between two shafts by a V-belt whose mass is 0.9 kg/m length. The maximum permissible tension in the belt is limited to 2.2 kN. The angle of lap is 170^0 and the groove angle is 45^0. If the coefficient of friction between the belt and pulleys is 0.17, then find (i) velocity of the belt for maximum power, (ii) power transmitted at this velocity.

UNIT-IV

8   A motor shaft rotating at 1500 rpm has to transmit 15 kW to a low speed shaft with a speed reduction of 3:1. The teeth are 14 $1/2^0$ involute with 25 teeth on the pinion. Both the pinion and gear are made of steel with a maximum safe stress of 200 MPa. A safe stress of 40 MPa may be taken for the shaft on which the gear is mounted and for the key. Design a spur gear drive to suit the above conditions. Also sketch the spur gear drive. Assume starting torque to be 25% higher than the running torque.

(OR)

9   A pair of helical gears consists of a 20 teeth pinion meshing with a 100 teeth gear. The pinion rotates at 720 rpm. The normal pressure angle is 20^0 while the helix angle is 25^0. The face width is 40 mm and the normal module is 4 mm. The pinion as well as gear are made of steel having ultimate strength of 600 MPa and heat treated to a surface hardness of 300 BHN. The service factor and factor of safety ate 1.5 and 2 respectively. Assume that the velocity factor accounts for the dynamic load and calculate the power transmitting capacity of the gears.

UNIT-V

10   The mean diameter of the square threaded screw having pitch of 10 mm is 50 mm. A load of 20 kN is lifted through a distance of 170 mm. Find the work done in lifting the load and the efficiency of the screw, when (i) the load rotates with the screw, (ii) The load rests on the loose head which does not rotate with the screw. The external and internal diameters of the bearing surface of the loose head are 60 mm and 10 mm respectively. The coefficient of friction for the screw and the bearing surface may be taken as 0.08.

(OR)

11   A Screw jack carries a load of 22 kN. Assuming the coefficient of friction between screw and nut as 0.15, design the screw and nut. Neglect collar friction and column action. The permissible compressive and shear stresses in the screw should not exceed 42 MPa and 28 MPa respectively. The shear stress in the nut should not exceed 21 MPa. The bearing pressure on the nut is 14 N/mm^2. Also determine the effort required at the handle of 200 mm length in order to raise and lower the load. What will be the efficiency of the screw?

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Time: 3 Hours   **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1.
   a) The limitation of delta modulation is slope of the message signal. Why?
   b) Quantization in PCM system is irreversible process. Why?
   c) What are the merits of M-ary modulation schemes over binary modulation schemes?
   d) What is the significance of entropy in information theory?
   e) Error probability of PSK is lower over ASK. Why?
   f) If (N-1) messages have zero probability out of N messages and the probability of one message is unity. Then what is the entropy of this information?
   g) Give the mathematical expression for channel capacity in terms of bandwidth and signal to noise ratio.
   h) What is the significance of syndrome in channel coding?
   i) Differentiate source and channel coding.
   j) Give the significance of state diagram in convolution codes.

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2. (a) What is quantization? Differentiate uniform and non-uniform quantization and derive the quantization error in terms of step size.
   (b) What is the need for companding in pulse code modulation? Discuss various companding schemes.

(OR)

3. (a) DPCM system is bandwidth efficient over PCM system. Justify. Describe DPCM system with neat block diagram.

   (b) Describe adaptive delta modulation system with neat block diagram

UNIT-II

4. (a) Bit error rate performance of QAM is better over PSK for the same order of modulation. Why?

   (b) Define Matched filter and derive the expression for its probability of error.

(OR)

5　(a)　What is the need for M-ary digital modulation in communication systems?

　　(b)　Describe the generation and detection of QPSK signal. And discuss the advantages of QPSK over BPSK.

UNIT-III

6　(a)　Define and give the significance of entropy and channel capacity in communication systems. Derive the expression for entropy.

　　(b)　An analog signal band limited to 10 kHz is quantized in 8 levels of a PCM system with probabilities of 1/4, 1/5, 1/5, 1/10, 1/20, 1/20, and 1/20 respectively. Find the entropy and rate of information.

(OR)

7　(a)　Discuss Shannon- Fano and Huffman coding algorithms with an example and compare them.

　　(b)　Discuss the mutual information for noise free channel communication system.

UNIT-IV

8　(a)　Consider (6,3) linear block code with given generator matrix and determine code words and their weights.

$$G = \begin{bmatrix} 1\,0\,0\,0\,1\,1 \\ 0\,1\,0\,1\,0\,1 \\ 0\,0\,1\,1\,1\,0 \end{bmatrix}$$

　　(b)　Give algebraic structure of Binary Cyclic codes.

(OR)

9　(a)　Explain about Block codes in which each block of k message bits encoded in to n bits with an example.

　　(b)　For a (6,3) systematic linear block code parity check bits are formed from the following. $C_4=d_1 \oplus d_3$, $C_5=d_1 \oplus d_2 \oplus d_3$, $C_6=d_1 \oplus d_2$. Construct generator matrix and all possible code words.

UNIT-V

10　(a)　Design a rate ½ convolutional encoder with constraint length v=3 and d=4. Construct the state diagram for this encoder.

　　(b)　Compare linear block codes and convolution codes.

(OR)

11　(a)　Illustrate sequential decoding for convolution code.

　　(b)　Describe the procedure for Decoding of convolution codes using Viterbi algorithm.

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular & Supplementary Examinations, October-2017

COMPUTER NETWORKS
(Computer Science and Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   **[1 X 10 = 10 M]**

1.   a. Define Port address.
     b. Define topology.
     c. What is stuffing?
     d. Define collision.
     e. Define flooding
     f. Define multicast
     g. What is fragmentation?
     h. What is multiplexing and de multiplexing?
     i. what is the meaning of .ORG in DNS
     j. What is SMTP?

PART-B

Answer one question from each Unit   **[5 x 12=60M]**

UNIT – I

2.   a) Describe the importance of Layered architecture.
     b) Explain about the components of data communication.

(OR)

3.   a) Explain the functionality of OSI layers in detail .
     b) Describe the merits of TCP / IP protocol suite over OSI model.

UNIT – II

4.   a) Explain the design issues of data link layer.
     b) Explain about Sliding window protocol.

(OR)

5.   a) Explain about GO back – N protocol.
     b) Describe the HDLC protocol with format.

UNIT – III

6.   a) Differentiate Virtual circuit and datagram subnets.
     b) Define congestion. Explain different congestion control algorithms

(OR)

7.   a) How optimality principle achieved in Shortest path routing .
     b) Differentiate IP V4 and IP V6

UNIT –IV

8.   a) Explain the service primitives of transport layer.
     b) Explain the connection establishment in transport layer.

(OR)

9.   a) Describe the transmission policy of transport layer.
     b) Describe the format of TCP segment.

UNIT-V

10. Write a short notes on following
     a) DNS   b) SNMP   c) WWW architecture

(OR)

11. a) Define E-mail. Explain about architecture
     b). Explain about Hyper text protocol.

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CODE: 13IT3001   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular & Supplementary Examinations, October-2017
COMPUTER GRAPHICS
(Information Technology)

Time: 3 Hours   **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS   **[1 x 10=10M]**

1. a) What is refresh display file?
   b) List the Applications of random scan display devices.
   c) Define persistence.
   d) Define Frame Buffer.
   e) What is point clipping?
   f) Give the matrix representation for 2D rotation transformation.
   g) What is projection?
   h) Explain 3d object translation transformation.
   i) What is morphing?
   j) Define the term key frame.

PART-B

Answer one question from each unit   **[5 x 12=60M]**

UNIT-I

2. (a) Explain how refresh cathode ray tube works with a neat diagram.   [6M]
   (b) Explain how thin- film electroluminescent display works with a neat diagram.   [6M]

(OR)

3. (a) Define computer graphics and list any four applications of computer graphics.   [6 M]
   (b) Distinguish between raster and random scan systems?   [6 M]

UNIT-II

4. (a) Derive Digital Differential Analyzer algorithm.   [6M]

   (b) Explain scanline polygon fill algorithm.   [6 M]

(OR)

5 (a) Derive midpoint ellipse generating algorithm.   [6 M]
   (b) Explain how normalized device coordinates can be obtained through   [6 M]
   viewing pipeline.

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UNIT-III

6 (a) Define composite transformation and explain it with an example   [6 M]

   (b) Give the matrix representation for the reflection transformation of an object   [6 M]
        about the lines x=0,y=0 and x=y.
                                    (OR)

7 (a) Explain how window to viewport mapping can be done with an example.   [6 M]
   (b) Explain how an object can be reflected about any given arbitrary line y=mx+c.   [6 M]

UNIT-IV

8   (a) Explain 3d fixed point scaling transformation.   [6M]
     (b) Explain Uniform B-Splines.   [6M]
                                    (OR)
9   (a) What are the types of projection transformations and explain   [6M]
     (b) Explain cubic Bezier curve with an example.   [6M]

UNIT-V

10   (a) Explain scanline algorithm.   [6M]
     (b) Define animation and explain animation languages.   [6M]
                                    (OR)
11   (a) Explain Painter's algorithm..   [6M]
     (b) Explain Warnock's algorithm.   [6M]

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