AR13 **Set 01**

Code: 13CE2001

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January, 2016
STRENGTH OF MATERIALS-I
(CIVIL ENGINEERING)

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

PART-A

Answer all Questions [10X1=10M]

1. a. Draw the stress strain diagram for mild steel and show significant points.
   b. Define lateral strain.
   c. Draw the bending moment diagram for cantilever beam having uniformly distributed load throughout its length. Show its value.
   d. Define point of contra flexure.
   e. Define neutral axis. Write the location of neutral axis.
   f. Write the assumptions in theory of simple bending.
   g. Define moment of resistance.
   h. Draw the shear stress distribution for circular section. Show the maximum value.
   i. Write the differential equation for deflection.
   j. State second moment of area theorem.

PART – B

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

UNIT – I

2. a) Derive an expression for modulus of Elasticity and Bulk modulus
   b) An axial load of 56 kN is applied to a bar of 36 mm diameter and 1 m length. The extension of the bar is measured to be 0.265 mm where as the reduction in diameter is 0.003 mm. Calculate Poisson's ratio and the value of Young's modulus, Bulk modulus & Modulus of Rigidity. [6M+6M]

(OR)

3. A 15 mm diameter steel road passes centrally through a copper tube 50 mm external diameter and 40 mm internal diameter. The tube is closed at each end by rigid plates of negligible thickness. The nuts are tightened lightly on the projecting path of the rod. If the temperature of the assembly is raised by 60^0C. Calculate the stress developed in Copper tube and Steel rod. $\alpha_s = 12 \times 10^{-6}$ /^{0}C, $\alpha_c = 18 \times 10^{-6}$ /^{0}C, Es = 200×10^3 N/mm^2, Ec = 100×10^3 N/mm^2 [12M]

UNIT - II

4. Draw shear force and bending moment diagram for the beam shown in fig.1 [12M]

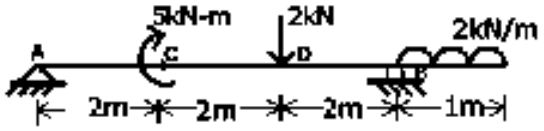

fig-1

(OR)

5. Draw shear force and bending moment diagram for the beam shown in fig. 2 [12M]

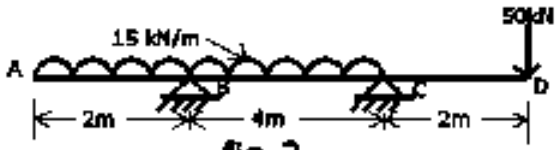

fig-2

UNIT - III

6 Write the assumptions in theory of simple bending. Derive equation for theory of simple bending. [12M]

(OR)

7 The tension flange of 'I' section is 240 mm x 40 mm, Where as the compression flange is 120mm x 20 mm. The web is 300 mm deep and 20 mm thick. If the girder is used as simply supported beam of 8 m span. Determine the load per m run if the allowable stress is 90 N/mm^2 in compressions and 30 N/mm^2 in tension. Also sketch the stress distribution shows the corresponding values. [12M]

UNIT - IV

8. A simply supported beam carries a uniformly distributed load of intensity 2.50 kN/m over entire span of 5m. The cross section of beam is a' T' section having the dimensions as shown in fig. 3. Sketch the shear stress distribution across the section and show the significant values. [12M]

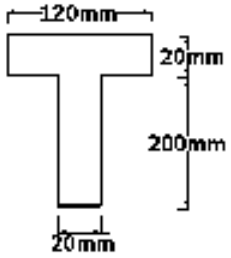

fig-3

(OR)

9 Determine the maximum and minimum shear stress in the web of wide flange section in fi. 4. If the shear force V= 100 kN. Also compute the percentage of vertical shear carried by the web of the beam . [12M]

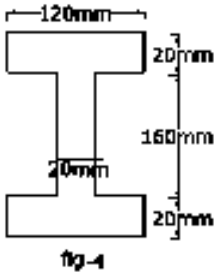

fig-4

UNIT - V

10. A steel girder of uniform section 14m long is simply supported at its ends. It carries concentrated loads of 90 kN and 60 kN at two points 3m and 4.50m from two ends. Calculate
    i) The deflection of the girder at the points under the two loads.
    ii) Maximum deflection $I = 64 \times 10^{-4}$ m^4 and $E = 210 \times 10^6$ kN/m^2 [12M]

(OR)

11. A cantilever of uniform section is loaded with 20 kN at the free end. In addition to this a uniformly distributed load of 10 kN/m run is provided over entire span. Calculate the maximum deflection and slope. The cantilever is 3 m long, 10cm wide and 30 cm deep $E = 210 \times 10^6$ kN/m^2 use moment of area method. [12M]

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AR13

Code: 13EC2003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B. Tech. I Semester Supplementary Examinations, Jan / Feb-2016
SWITCHING THEORY AND LOGIC DESIGN
(COMMON TO ECE & EEE)

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

PART-A

Answer all questions **[1 x 10=10M]**

1. a) What is the minimum distance of BCD and XS-3 code?
   b) What is the merit of Hamming code?
   c) Which gates are called universal gates?
   d) What are the basic logic gates used in Boolean algebra?
   e) What is the advantage of tabular method?
   f) How are a 2-square, 4-square, and 8-square called?
   g) What are the applications of Multiplexers?
   h). Which logic gate is a basic comparator?
   i) How many Flip-Flops are required for storing n bits of information?
   j) What is the other name of Asynchronous counter?

PART - B

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

UNIT-I

2. a. Add the numbers 204.6 and 185.56 in (I) BCD and (II) XS-3 codes. [6M]
   b. Convert the following (I) $3E7.DA_{16}= (\ )_2$ (II) $360.15_8 = (\ )_{10}$ [6M]

(OR)

3. a. Given that $16_{10} = 100_b$, find the value of b. [4M]
   b. Convert the Gray number 1 0 1 1 0 0 1 0 into (i) hex, (ii) octal, (iii)decimal [8M]

UNIT-II

4. a Simplify the following logic expressions using De-Morgan's Theorem?
   I. $Y = \overline{(A+B+C)(\overline{A}+\overline{B}+\overline{C})}$ [6M]
   II. $Y = \overline{A+BCD}$ III. $Y = \overline{(A+B+\overline{C}\,\overline{D})AB}$
   b. Expand $A(\overline{A}+B)(\overline{A}+B+\overline{C})$ to maxterms and minterms. [6M]

(OR)

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Code: 13EC2003 **SET-1**

5. a. Obtain the Complement of the functions [4M]

(i) $\left(\overline{ABC}\right)\left(\overline{A+B+C}\right)$ and (ii) $\overline{A}B+A\overline{BC}+\overline{A}BCD+\overline{A}\overline{B}\overline{C}\overline{D}E$

b. Simplify the following Boolean expression to a minimum number of literals. (i) $x\left[y+z\left(\overline{xy+xz}\right)\right]$ and (ii) $\overline{\left(\overline{x}\,\overline{y}+z\right)}+z+xy+wz$ [8M]

UNIT-III

6. Simplify the logic function $F\left(A,B,C,D\right)=\prod\left(3,5,6,11,13,14,15\right)+d\left(4,9,10\right)$ using K-map in SOP and POS form [12M]

(OR)

7. Simplify the function $F=\sum\left(1,2,3,6,7,8,10,11,12,14,17,18.20,21,22,24,28,29,31\right)$ using Quine Mclusky method [12M]

UNIT-IV

8. a. Implement the Boolean function $F\left(A,B,C\right)=\sum m\left(1,2,4,7\right)$ using a 4X1 multiplexer? [6M]

b. Design Full adder with minimum number of NAND gates? [6M]

(OR)

9. What is the difference between a parallel adder and a carry look-ahead adder? Explain the operation of carry look-ahead adder with diagram? [12M]

UNIT-V

10. Explain the operation of 3-stage Ring and Johnson counters with circuit diagram, truth table and timing diagram? [12M]

(OR)

11. a. Construct a 4-bit bidirectional shift register using D flip flops and explain its operation? [8M]

b. Realize T flip flop using JK flip flop. Give the truth table. [4M]

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AR13 **Set 01**

Code: 13ME2004

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January, 2016
MECHANICS OF SOLIDS
(MECHANICAL ENGINEERING)

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

PART – A

Answer all Questions [10X1=10M]

1. a) Draw the stress-strain curve for brittle material.
   b) Write the relation between young's modulus, rigidity modulus and poission's ratio.
   c) What is meant by principle stress
   d) Draw the schematic representation of simply supported beam with central point load
   e) Define point of contra flexure
   f) Write bending equation
   g) What is the maximum bending moment in a simply supported beam of length (L) carrying uniformly distributed load(W)
   h)What is the moment of inertia of a rectangle having width(b)and height(h) about the axis parallel to side(h)
   i) Write an equation for longitudinal stress in thin cylinder.
   j) Write an equation for hoop stress in thin cylinder.

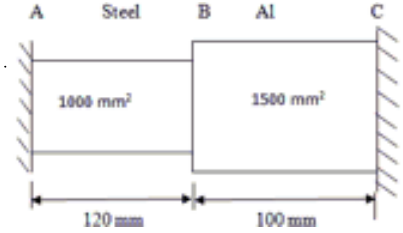
PART-B

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

UNIT-I

2. a) Briefly explain the stress-strain curve for mild steel material with a neat sketch. [4 M]

   b) A bar made of steel and aluminum as shown in figure is held between two rigid support at A and C. Find the stresses in each material if temperature rise by 20^0. Take E_s=2.1 X 10^5 N/mm^2 & E_a=0.7 X 10^5 N/mm^2, α_s = 11.8 X 10^{-6} /^{0}C & α_a = 24 X 10^{-6} /^{0}C. [8 M]



(OR)

3. The stress on two mutually perpendicular planes through a point in a body are160 Mpa and 40 MPa, both tensile along with a shear stress of 60 MPa. Determine
   1) The magnitude and direction of principle stresses.
   2) The planes of maximum shear stresses [12 M]

UNIT-II

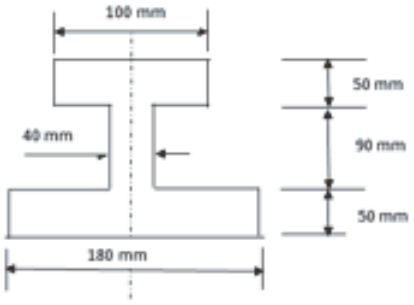
4. A simply supported beam of 7m span with overhangs rests on supports which are 4 m apart. The left end overhanging is 2m. The beam carries loads of 30 kN and 20 kN on the left and the right end respectively apart from a uniformly distributed load of 25 kN/m between the supporting points. Draw the shear force and bending moment diagrams. [12 M]

(OR)

5. A Simply supported beam AB, 8 m long carrying a point load 3 kN at 2m from end A and a point load 2 kN at 5m from A and a uniformly distributed load of 2 kN/m between the point loads. Determine the position and magnitude of maximum bending moment. Draw shear force and bending moment diagrams. [12 M]

UNIT-III

6. A cast iron beam has unsymmetrical I section as shown in figure. Find the safe uniformly distributed load that the beam can carry over a simply supported span of 5m, if allowable tensile stress and compressive stress be 40 N/mm^2 and 70 N/mm^2 respectively. [12 M]



(OR)

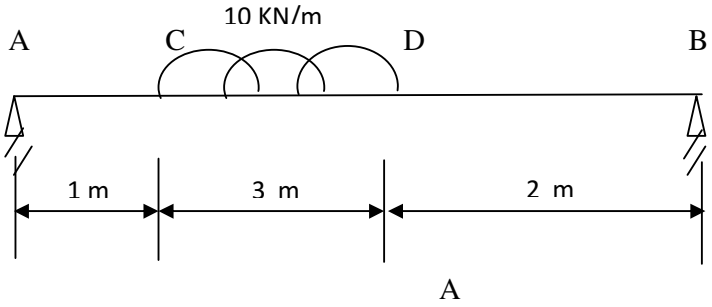
7. A beam of I section 400 X 200 mm has a web and flange thickness 20mm. Calculate the maximum intensity of shear stress across the section and sketch the shear stress distribution across the section of the beam, if it carries a shearing force of 300 kN at a section. [12 M]

UNIT-IV

8. A simply supported beam ABCD of 9m length and carries two loads of 60 kN each acting at a distance of 3m and 6m from left end support. Find (1) the deflection under the load (2) Maximum deflection of the beam. Take E= 1.5 X 10^4 N/mm^2 & I= 2.5 X 10^{9}mm^4. [12M]

(OR)

9. Find the maximum deflection at the simply supported beam as shown in figure. Take E= 2 X 10^4 N/mm^2 & I= 1.1 X 10^{9}mm^4. [12 M]



UNIT-V

10. a) A cylindrical shell of 800 mm internal diameter, 2 m long and 10mm wall thickness. If the shell is subjected to an internal pressure of 1.5 MPa. Find the (1) Maximum intensity of shear stress induced (2)the change in dimensions of the shell. [6 M]

    (b) A cast iron pipe of 750mm diameter is used to carry water under a head of 60m. Determine the thickness of the pipe, if the permissible stress is to be 20 MPa. [6 M]

(OR)

11. A pipe 100mm external diameter and 20 mm thickness carries water at a pressure of 20 MPa. Determine the maximum and minimum intensities of hoop and radial stresses across the thickness of pipe. Also plot the variation of radial and hoop stresses across the thickness

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Code: 13CS2003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANANGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech. I Semester Supplementary Examinations, Jan / Feb-2016

MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE
(Common to CSE and IT)

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

PART-A

Answer all questions **[1 x 10=10M]**

1.(a) Let P:5 is a positive integer q:√5 is a rational number then what is truth value of disjunction of p and q .
(b) Write the following statement in symbolic form "If x is odd, then x is not divisible by 2".
(c) State Division Theorem
(d) What is the value of $1^3+2^3+3^3+.....n^3$
(e) What is regular graph?
(f) Why trees are always non-Hamiltonian graphs?
(g) Is the set of natural numbers N, a group under the operation of addition?
(f) What is totally ordered set.
(i) What is generating function.
(j) What is the coefficient of x^{12} in $x^3(1-2x)^{10}$

PART –B

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

UNIT - I

2. (a) Obtain PDNF for $p\rightarrow[(p\rightarrow q)\wedge\sim(\sim q\vee\sim p)]$
(b) Prove that r is valid conclusion from the premises $p\rightarrow(q\rightarrow r); \sim q\rightarrow\sim p ; p$ [6M +6M]

(OR)

3. (a) Show that $\exists x\, Q(x)$ is a valid conclusion from premises $\forall x\,(p(x)\rightarrow Q(x))$
$\exists x\, p(x)$
(b) Write each of the following in symbolic form

(i) All birds can fly (ii) Not all birds can fly (iii) All babies are illogical (iv) There is a student who like mathematics but not history (v) All trees are grapes (vi) some numbers not real [6M +6M]

UNIT –II

4 (a) Find gcd of 427 and 616 and express it in the form 427 x +616 y

(b) Using the principle of Mathematical Induction prove that p(n) =
1.3+3.5+.....n(n+2) = $n(n+1)(2n+7)/6$ [5M +7M]

(OR)

5 (a) For any $n\in I$ prove that the integers 8n+3 and 5n+2 are relatively prime.

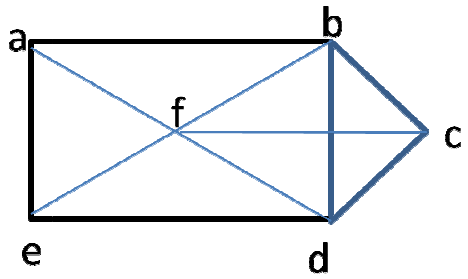
(b) By the principle of mathematical induction show that $3^{4n+2}+5^{2n+1}$
Is a multiple of 14 for all positive integral value of n including zero [6M +6M]

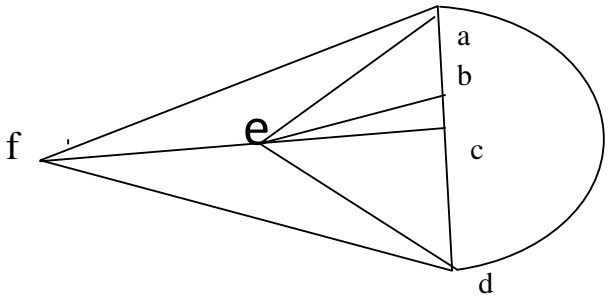
AR13

Code: 13CS2003 **SET-1**

UNIT-III

6. Define isomorphic graphs. Show that the graphs are isomorphic [12M]





7. Define a complete bipartite graph $k_{m,\ n}$. Show that a complete bipartite graph $k_{m,n}$ is planar if $m \leq 2$ or $n \leq 2$ [12M]

UNIT-IV

8. Determine whether the set G = { (a,b): a,b ∈ R, a ≠0} under the operation defined as (a,b) , (c,d) = (ac, bc + d) for all (a,b) , (c,d) ∈ G is an abelian group [12M]

(OR)

9. What is poset, explain with one example.Draw Hasse diagram of the poset

(S, ≤) Where S ={1,2,4,8,24,48 } and x ≤ y if x/y i.e x divides y. If A = {4,8} is a subset of S. Find upper and lower bounds, supremum and infimum of A. [12M]

UNIT – V

10. Find explicit formula for the sequence defined by $cn = 3c_{n-1} - 2c_{n-2}$ with initial conditions $c_1 = 5$, $c_2 = 3$ by using (i) Characteristic polynomial (ii)Generating function 12M]

(OR)

11. Solve the recurrence relation $a_n - 9a_{n-1} + 26\ a_{n-2} - 24\ a_{n-3} = 0$ for $n \geq 3$ [12M]