

Code: 13CE2001

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March, 2015

STRENGTH OF MATERIALS-I

(CIVIL ENGINEERING)

Time: 3 hours

Max. Marks: 70

PART – A

ANSWER ALL QUESTIONS

[1 X10=10 M]

1. a) How stress and strain are related in elastic region.
- b) Differentiate between Normal and Shear Stress.
- c) List various types of supports in beams.
- d) Write the relationship between shear force (V) and bending moment (M).
- e) What do you mean by pure bending?
- f) What is section modulus for rectangular cross section of width 'b' and height 'h'?
- g) In a cross section where the bending stress is maximum
- h) What is the ratio of maximum shear stress to average shear stress in a Circular cross section.
- i) When the Macaulay's method is preferred to calculate the deflections in beam.
- j) What is Moment Area theorem – I.

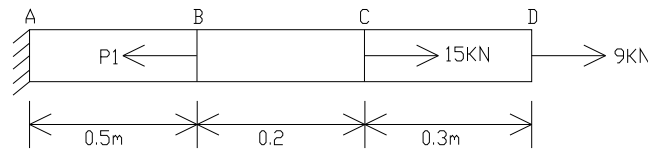
PART – B

Answer one question from each unit

[5X12=60 M]

UNIT – I

2. A steel bar ($E=200\text{GPa}$) is supported and loaded as shown in the figure. The cross sectional area of the bar is 250mm^2 . Determine the force P_1 so that the net deflection in the bar is zero. Also find the stresses in each member. [12M]

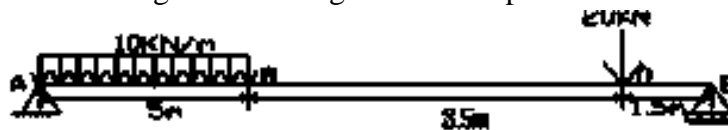


(OR)

3. Determine an expression for the deflection of a uniformly tapered bar subjected to an axial load P. The cross section is circle. The diameter at the big end is d_1 and the diameter at the small end is d_2 . [12M]

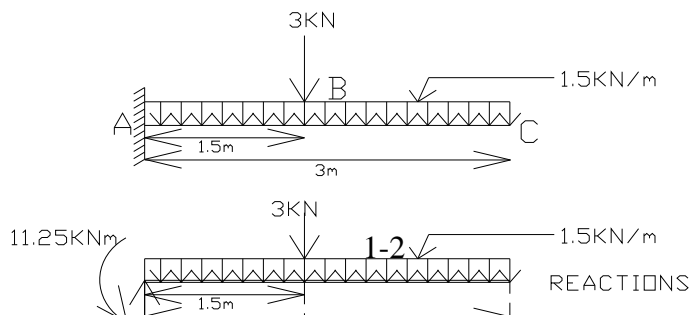
UNIT – II

4. Draw the shear force and bending moment diagram of a simple beam loaded as shown in the Fig. [12M]



(OR)

5. Draw the shear force and bending moment diagram of a cantilever beam loaded as shown in the Fig. [12M]

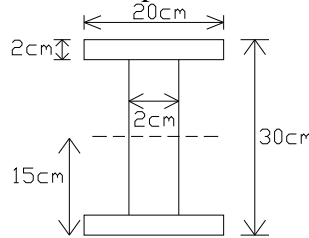


UNIT –III

6. An I section beam has following dimensions. Top flange 6cm wide, 1cm thick. Bottom flange 12cm wide, 1cm thick. Web 1cm thick. Total depth of the section is 12cm. The beam is 5m long simply supported over a span 3m, overhanging both supports by the same amount and it carries a point load of 2KN each end. Find the maximum stress in the material due to bending. [12M]

(OR)

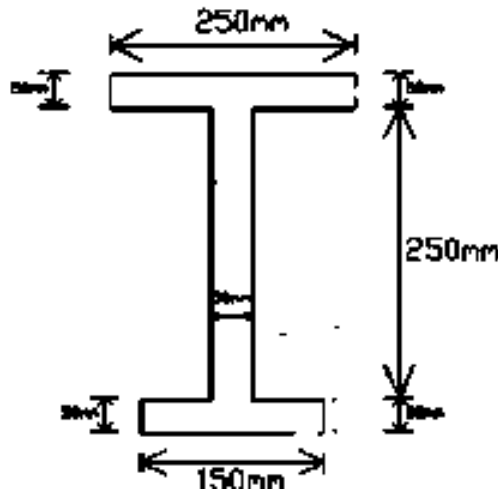
7. A steel beam having an I- section as shown in the Fig. is 4m long and is simply supported at the ends. If the safe stress in tension for the beam is 30MPa, determine the permissible uniformly distributed load acting on the whole span of the beam. [12M]

UNIT – IV

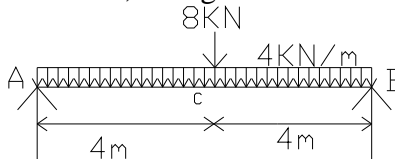
8. Determine and draw the Shear stress distribution for I section of flange width 'W', flange thickness 'T', Overall depth 'D', depth of web 'd' and web thickness 't'. [12M]

(OR)

9. A CI bracket subjected to bending has I cross section with unequal flanges as shown in Fig. below. Draw the shear stress distribution if shear stress is 80KN. [12M]

UNIT – V

10. Find the deflection at the center and slope at the supports of simply supported beam loaded as shown in the Fig. Take $EI = 2 \times 10^7 \text{ Nm}^2$, Using Moment Area Method. [12M]



(OR)

11. A steel bar of circular cross section is used as cantilever beam over a span of 2m. It carries two concentrated loads each of 2KN, one at the free end and other at the midpoint. Determine the diameter of the bar if the allowable deflection at the free end is 10mm. Take $E = 2 \times 10^5 \text{ N/mm}^2$ [12M]

Code: 13EC2003**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech I Semester Supplementary Examinations, March, 2015
SWITCHING THEORY AND LOGIC DESIGN****(Common to EEE & ECE)****Time: 3 hours****Max. Marks: 70****PART – A****Answer all Questions****[10X1=10M]**

1. a) Convert $(25B)_H$ to its octal equivalent?
- b) Find the Base-2 equivalent of the following $(0.00625)_{10}$
- c) Draw the symbols and Boolean expressions of XOR and XNOR gates?
- d) Why are NAND and NOR gates are called as universal gates?
- e) Design full adder using only NAND gates?
- f) What are multiplexers?
- g) Write the differences between Combinational and sequential circuits?
- h) What is race around condition and how it is avoided?
- i) Convert the following decimal numbers to excess-3 code
i) $(18)_{10}$ ii) $(56)_{10}$
- j) Convert gray code number 1110 to its BCD equivalent?

PART – B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. What are Weighted and non-Weighted codes? Explain with examples? [12M]
(OR)
3. a) Encode the binary word 1011 into seven bit even parity hamming code? [6M]
b) Write short notes on error correcting codes? [6M]

UNIT-II

- 4.a) State and prove Demorgan's Theorem? [6M]
b) Prove $xy + x'z + yz = x'z + xy$ [6M]
(OR)

5. Simplify the following three variable expressions using Boolean algebra [12M]
i) $Y = m(1,3,5,7)$
ii) $Y = M(3,5,7)$

UNIT-III

- 6) Reduce the following function using K-map technique and implement using basic gates
 $F(A,B,C,D) = A'B'D + ABC'D' + A'BD + ABCD'$ [12M]
(OR)
- 7) Design a combinational circuit whose input is 4-bit binary number and whose output is 2's complement of input number? [12M]

UNIT-IV

- 8) Design a full adder? Realize full adder using 2-half adders and explain the circuit operation? [12M]
(OR)
- 9) Implement the following Boolean function with 8:1 multiplexer
 $F(A,B,C,D) = m(0,2,6,10,11,12,13)$ [12M]

UNIT-V

- 10) Design a MOD-5 synchronous counter using JK-Flip-flops and implement it? [12M]
(OR)
- 11) Design Asynchronous decade counter using T-FF's? [12M]

Code: 13ME2004

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March, 2015

MECHANICS OF SOLIDS
(MECHANICAL ENGINEERING)

Time: 3 hours

Max. Marks: 70

PART – A

Answer all Questions

[10X1=10M]

1.
 - a) Write the usual assumptions made in strength of materials .
 - b) Define bulk modulus
 - c) Define the term principle plane
 - d) List the types of loads
 - e) Define point of inflexion
 - f) What is the section modulus for the Solid circular section
 - g) What is the meaning of 'strength of a section' ?
 - h) Define the slope and deflection ?
 - i) What are the assumptions that are made to derive the lami's equation ?
 - j) What type of stresses are induced in thick & thin cylinders ?

PART-B

Answer one question from each unit

[5X12=60M]

UNIT-I

2. Three tubes A,B,&C are fitting loosely one over the other. Tube A is inside and tube C is outside. Each tube has thickness of 10mm on length of 300mm, inner tube A has an internal diameter of 100mm. If an axial thrust of 150kN is applied, find for the each tube (a) Load carried, (b) Stress developed and (c) shortening due to load. Take $E_A=200\text{GPa}$, $E_B=100\text{GPa}$ and $E_C=50\text{GPa}$. [12M]

(OR)

3. For the stress condition shown in the Fig: (1). For a point in a body, Find the normal and shearing stress in the plane shown, What is the resultant stress and the direction? [12M]

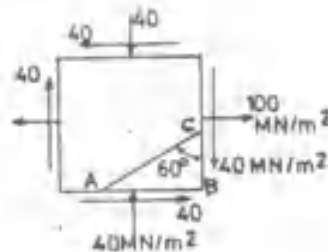


Fig:(1)

UNIT-II

4. A cantilever beam 1.5m long is carrying a point loads of 1000N each at a distances of 0.5m, 1m and 1.5m from the fixed end .Draw the shear force and bending moment diagrams for the cantilever beam . [12M]

(OR)

5. Draw the shear force and bending moment diagrams for the beam shown in the Fig: (2) and mention the values at important points . Also find the point of contra flexure, if any. [12M]

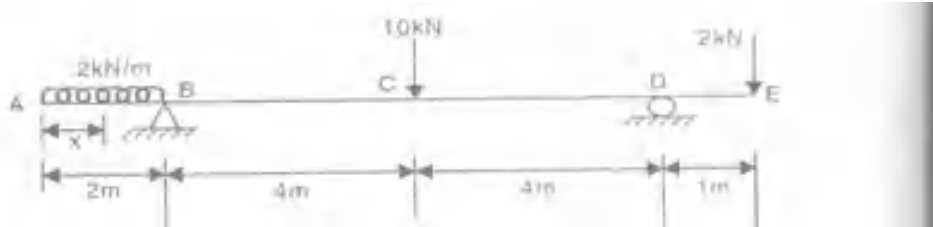


Fig: (2)

UNIT-III

6. a) What are the assumptions made in the theory of simple bending? [3M]
 b) Prove the relation $\frac{M}{I} = \frac{\sigma}{Y} = \frac{E}{R}$ [9M]

(OR)

7. Determine the ratio of maximum shear stress to average shear stress in a Rectangular section. [12M]

UNIT-IV

8. A beam of length 5m and of uniform rectangular section is simply supported at its ends. It carries a uniformly distributed load of 9 KN/m run over the entire length. Calculate the width and depth of the beam if permissible bending stress is 7 N/mm² and central deflection is not to exceed 1cm. Take E for beam material= 1X10⁴ N/mm². [12M]

(OR)

9. Derive the slope and deflections of a cantilever beam of length L, (a) Which carries a point load at free end (b) Which carries a uniformly distributed load. [12M]

UNIT-V

10. A cylindrical shell 3m long has 1m internal diameter and 15mm metal thickness . calculate the circumferential and longitudinal stress induced and also change in dimensions of the shell , If it is subjected to an internal pressure of 1.5 N/mm². Take E = 2x10⁵ N/mm² and poisons ratio =0.3 . [12M]

(OR)

11. A compound thick cylinder is formed by shrinking a tube of external diameter 30 cm over another tube of internal diameter 15 cm after the shrinking , the diameter at the junction of the tube is found to be 20cm and radial pressure as 28 N/mm². Find the Original difference in radii at the junction .Take E for the cylinder metal as 2x10⁵ N/mm². [12M]

Code: 13CS2003

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, March, 2015

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

(Common to CSE and IT)

Time: 3 hours

Max. Marks: 70

PART – A

Answer all Questions

[10X1=10M]

1. a) Define contingency and illustrate with an example.
- b) Write in symbolic form the statement 'The crop will be destroyed if there is a flood'.
- c) Determine g.c.d. of 2210 and 493.
- d) What is the value of $2+4+6+8+\dots+2n$
- e) Define spanning tree.
- f) Define chromatic number of a graph.
- g) Solve the recurrence relation $4a_r - 5a_{r-1} = 0$, $r \geq 1$, $a_0 = 1$.
- h) For the group $G = \{0, 1, 2, 3, 4\}$ with respect to addition modulo 5, write the inverse of each element.
- i) If $G = \{1, S, S^2\}$ is a group with respect to multiplication, then write order of each element in G.
- j) Define complemented Lattice.

PART-B

Answer one question from each unit

[5X12 = 60M]

UNIT-I

2. a) Obtain the PCNF of the formula S given by $(\neg P \rightarrow R) \wedge (Q \leftrightarrow P)$
 - b) Show that $R \wedge (P \vee Q)$ is a valid conclusion from premises
 $P \vee Q, P \rightarrow M, Q \rightarrow R$ and $\neg M$, where \neg is negation. [6M+6M]
- (OR)

3. a) What is well defined formula?
- b) i) Construct the truth table for $(P \rightarrow Q) \wedge (Q \rightarrow P)$.
- ii) Construct the truth table for $\neg(P \wedge Q) \leftrightarrow (\neg P \vee \neg Q)$. [6M+6M]

UNIT-II

4. a) If $d = \gcd(826, 1890)$, using Euclidean algorithm compute d and then express d as a linear combination of 826 and 1890.
 - b) Using mathematical induction, prove that
 $1 + \frac{1}{1+2} + \frac{1}{1+2+3} + \dots + n \text{ terms} = \frac{2n}{n+1}$. [6M+6M]
- (OR)
5. a) Using Euclidean algorithm, determine $\gcd(a, b)$ and $\gcd(a, b, c)$ if $a = 858, b = 728, c = 325$.
 - b) Using Mathematical induction, prove that
 $1.2 + 2.3 + 3.4 + \dots + n(n+1) = \frac{(n(n+1)(n+2))}{3}$, for $n \geq 1$. [6M+6M]

UNIT-III

6. Show that the following graphs are planar

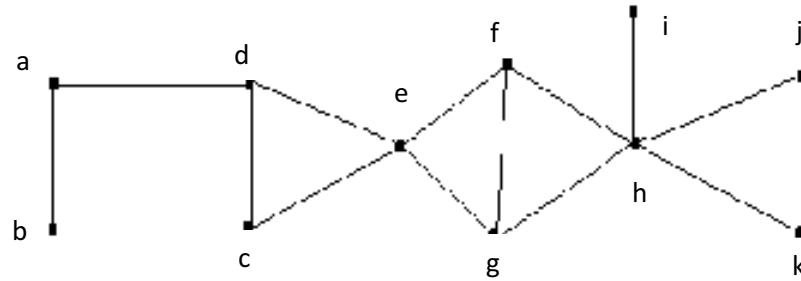
i) Graph of order 5 and size 8.

[6M+6M]

ii) Graph of order 6 and size 12.

(OR)

7. Write the steps in BFS algorithm and find spanning tree for the following graph.



[12M]

UNIT-IV

8. a) If Q denotes the set of rational numbers, then show that $Q - \{1\}$ is a group with respect to the operation $*$ defined by $a*b = a + b - ab$, $\forall a, b \in Q - \{1\}$

b) Prove that set $\{1, 2, 3, 4, 5, 6\}$ is a group under multiplication modulo 7.

[6M+6M]

(OR)

9. What is Poset, explain with one example. Prove that $(P(S), \subseteq)$ is a Lattice, where $S = \{1, 2, 3\}$ and \subseteq is set inclusion. Prove that $P(S)$ (Power set of S) is a distributive lattice.

UNIT-V

10. Compute the coefficient of generating function $\sum_{r=0}^{\infty} d_r x^r = \frac{x^2 - 5x + 3}{x^4 - 5x^2 + 4}$. [12M]

(OR)

11. a) Find the generating function for the sequence 1, 8, 27, 64, 125, ...

b) If a_n is a solution of $a_n + 1 = ka_n$ for $n \geq 0$ and $a_3 = \frac{153}{49}$ and $a_5 = \frac{1377}{2401}$, find the value of k .

[6M+6M]