

Code No.: 3015

FACULTY OF ENGINEERING

B.E. II/IV Year (Civil) II Semester (Main) Examination, May/June 2011

STRENGTH OF MATERIALS – II

Time : 3 Hours]

[Max. Marks : 75

Answer **all** questions from Part A.

Answer any **five** questions from Part B.

Part A — (Marks : 25)

1. How do you find slopes in beam by moment area method. 3
2. The B.M at a section of a conjugate beam represents what? 2
3. What is the difference between “elastic” and “rigid” props? 3
4. In a fixed beam of 4m span carrying a central load of 10KN, what is the fixed and moment developed. 2
5. Name 5 theories of failure. 3
6. What do you understand by “angle of twist”. 2
7. Write the formula for finding deflection in a closely coiled helical spring subjected to an axial twist. 2
8. What is the difference between “impact load” and “suddenly applied load”. 3
9. Write the secant formula. Explain the terms involved. 3
10. For the analysis of space trusses which method you prefer. 2

Part B — (Marks : 5 × 10 = 50)

11. A simply supported beam of span L carries a uniformly varying triangular load of intensity zero at left support and “w” at right support. Find the slope at left support and central deflection.
12. A fixed beam of span 6m carries a point load of 10KN at 4 m from left support. Find the fixed end moments and sketch the B.M and S.F diagrams marking the salient values.
13. Analyse the 3-span continuous beam loaded as shown below in fig.1. Sketch the B.M and S.F diagrams.

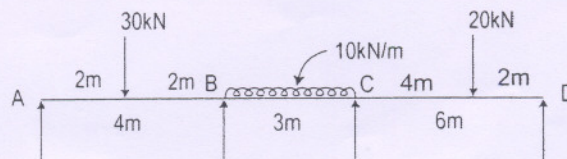


Fig.1.

14. (a) Derive the formula for finding the critical load in a long column of length  $L$ , fixed at both ends, having flexural rigidity  $= EI$ .

Or

(b) Write the effective lengths ' $L_e$ ' for 4 different conditions, taking the actual length of each column as  $L$ .

15. (a) At a point in a strained material there are direct stresses (tensile)  $P_x$  and  $P_y$  acting at right angles to one another accompanied by a state of simple shear "of". Draw the Mohr's circle of stress and explain the determination of principal stresses and principal planes.

(b) Calculate the max torque a shaft of 120mm dia can transmit if the max angle of twist is  $1^\circ$  in a length of 1.5 m if its rigidity modulus  $= 70\text{GPa}$ .

16. Find the thrusts in each leg of a tripod subjected to a vertical load  $W$ . The length of each leg is  $L$ . The feet of 3 legs form an isosceles triangle of side " $L$ " on the ground. Use tension coefficient method.

17. (a) Using castigliano's theorem find the deflection at the free end of a cantilever of length  $L$ , carrying a u.d.l. of " $w$ " per m.

(b) Derive the deflection formula in the case of a carriage spring. Assume other details and give a neat sketch also.