

## FACULTY OF ENGINEERING

B.E. 2/4 (Civil) II-Semester (Old) Examination, December 2012

Subject : **Strength of Materials - II**

Time : 3 Hours

Max. Marks: 75

**Note: Answer all questions of Part - A and answer any five questions from Part-B.**

### PART – A (25 Marks)

1. How do you find deflection in beam by moment area method? (3)
2. The S.F. at a section of conjugate beam represents what? (2)
3. What is the deflection in an elastic prop having stiffness = 10kN/mm, if the load coming on it is 100 KN? (2)
4. In a fixed beam of span 4m, having u.d.l. of 30 KN/m throughout, what is the fixed end moment developed? (2)
5. Explain the term "Ellipse of stress". (3)
6. Differentiate between "strength" and "stiffness" of a circular shaft. (3)
7. What are carriage springs? (2)
8. Write Prof Perry's formula. Explain the terms involved. (3)
9. State Maxwell's theorem of Reciprocal deflection. (3)
10. What is "tension coefficient"? (2)

### PART – B (5x10=50 Marks)

11. A simply supported beam AB of span L carries a load W at a distance of "a" from A and "b" from B. If  $a > b$  find the slope at end A, deflections at mid-span and under the load ( $EI = \text{constant}$ )
12. A propped cantilever of span L carries a central load W. Find the reaction of the rigid prop P at the free end. Find the deflection under the load.
13. Analyse the 2-span continuous beam loaded as shown below in figure 1. Sketch the B.M. and S.F. diagram.

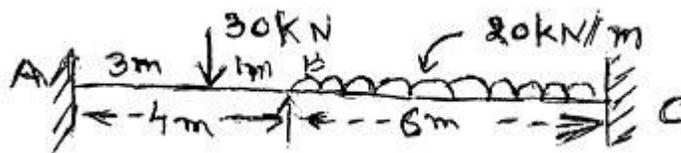
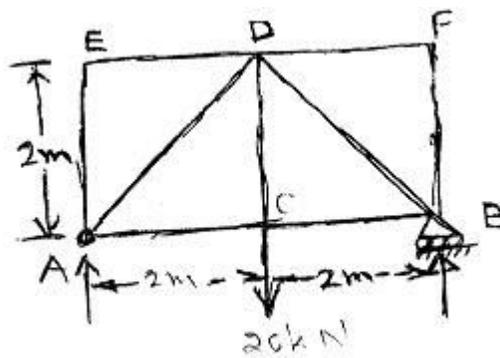


Fig.1

- 14.(a) Derive the Euler's formula for finding the critical load in a long column of length L, hinged at both ends, having flexural rigidity EI.  
(b) Compare the Rankines formula with the Euler's formula.
- 15.(a) Briefly explain the essence of any two theories of failure.  
(b) A solid shaft of 120 mm dia. transmits 200 kW power running at 100 rpm. If the angle of twist is not to exceed  $2^\circ$ , find the length of shaft taking its modulus of rigidity as 90 GPa.

..2..

- 16.(a) A carriage spring is to carry a central load of 1.0 kN. The spring is 900 mm long. The width of each plate is 80 mm and thickness 10mm. Find the number of plates in the spring and the initial deflection of the top spring. Take  $E = 2 \times 10^5 \text{ N/mm}^2$ .
- (b) Illustrate application of Castigliano's theorem to find the slopes and deflection in beams.
17. Using tension coefficient method find the forces in all the member of the plane, simple truss loaded as shown below in fig.2.



20kN

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