Code No. : 5328/S

FACULTY OF ENGINEERING
B.E. 2/4 (Civil) (I Semester) (Suppl.) Examination, June 2012
STRENGTH OF MATERIALS – I

Time : 3 Hours] [Max. Marks : 75

Note : *1) Answer **all** questions in Part **A** and **any five** questions from Part **B**.*
2) Missing data, if any, may suitably be assumed.

PART – A **(25 Marks)**

1. Explain with an example the meaning of point of contra flexure.
2. Define Rigidity modulus and write its relation with Young's modulus.
3. Explain with an example the meaning of core of section.
4. Write the differential equation for bending.
5. What is meant by statically indeterminate problem ? Explain with the help of an example.
6. Calculate the elastic sectional modulus for a hollow circular section of external and internal diameter 'D' and 'd' respectively.
7. Sketch the flexural stress and flexural shear stress distribution across a rectangular section.
8. What is meant by a perfect truss, deficient truss and over rigid truss ? Explain with examples.
9. What is meant by a flitched beam ?
10. What is meant by dilation ? Derive the expression for the same.

PART – B (50 Marks)

11. The change in the diameter of a bolt of diameter 80 mm and length 120 mm is measured as the nut is tightened. Knowing that Young's modulus E = 190 GPa and Poisson's ratio v = 0.3 and the diameter is observed to decrease by 10 μm, determine the force acting of the bolt, change in volume and rigidity modulus.

12. A simply supported beam of span 10 m is subjected to a uniformly distributed load of 25 kN/m. If the cross section of the beam is T section of flange dimension 250 mm × 60 mm and web dimension 200 mm × 80 mm, sketch the flexural shear stress distribution at a section 3 m from the support.

13. A compound cylinder is formed by shrinking one cylinder over another, the final internal diameter, external diameter and diameter at junction are 150 mm, 250 mm and 200 mm respectively. If the radial pressure at the junction of shrinkage is 40 MPa, calculate the initial stresses in the cross section of the tube. If the fluid pressure of 80 MPa is admitted in the compound tube, calculate the final stresses in the cross section of the compound cylinder. Sketch the variation of hoop and radial stresses.

14. A cast iron water pipe of 500 mm inside diameter and 20 mm thick is supported over a span of 10 m. Find the maximum stress in the pipe metal, when the pipe is running full. Take density of cast iron as 70.6 kN/m^2 and that water is 9.8 kN/m^2.

15. Sketch the SFD and BMD for the overhanging simply supported beam loaded as shown in Fig. 1. Also find the point of contra flexure.

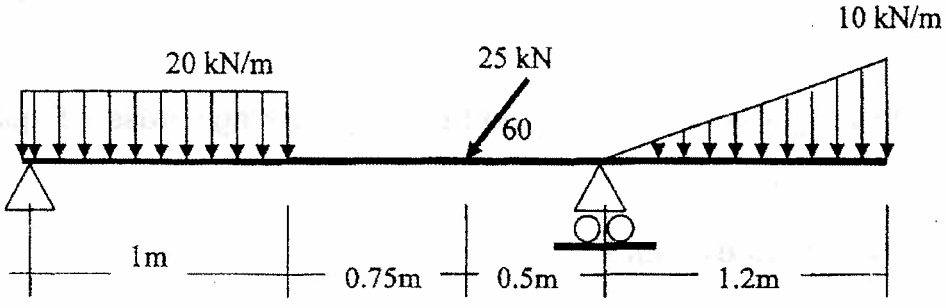

Fig. 1

16. Find the forces in the members BD, BC and CD for the pin jointed truss loaded as shown in Fig. 2.

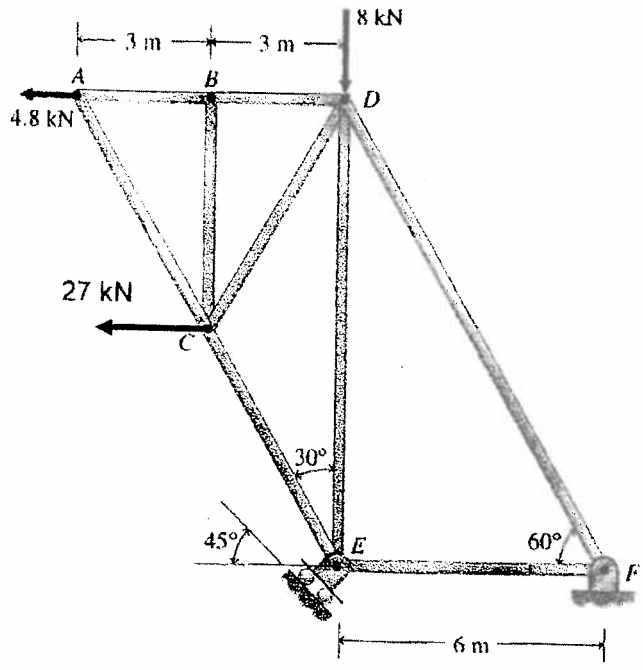

Fig. 2

17. Draw the SFD and BMD for a simply supported beam loaded as shown in Fig. 3 using Graphical method.

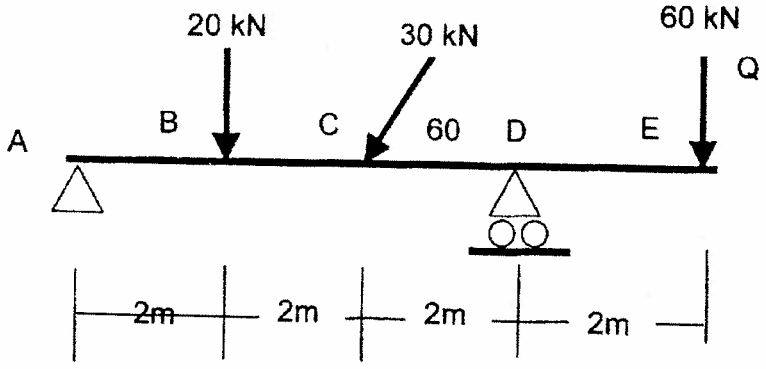

Fig. 3