SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act,1956)

Course & Branch :B.Arch - ARCH
Title of the Paper :Applied Mechanics — Max. Marks :80
Sub. Code :621204 — Time : 3 Hours
Date :11/12/2009 — Session :FN

PART - A (8 x 4 = 32)

Answer ALL the Questions

1. State triangular and parallelogram law of forces.

2. Describe the various types of loads on structures.

3. Draw the stress – strain diagram for mild steel rod.

4. Define Hook's law and Poisson's ratio.

5. Differentiate between centre of gravity and centroid.

6. State and prove parallel axis theorem.

7. Discuss the different types of supports.

8. A simply supported beam of span 9m carries a uniformly varying load from zero at left end to 900 N/m at right end. Calculate the reactions at the two ends of the support.

PART – B (4 x 12 = 48)

Answer All the Questions

9. Four forces of magnitude 10kN, 15kN, 20kN and 40kN are acting at a point O. The angles made by 10kN, 15kN, 20kN and 40kN with X-axis are 30º, 60º, 90º and 120º respectively. Find the magnitude and direction of the resultant force.

(or)

10. Find the forces in the members AB, AC and BC of the truss as shown in figure 1.

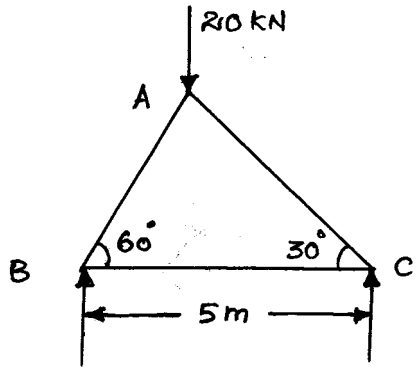

Figure. 1.

11. A cylindrical bar is 2cm in diameter and 100 cm long. During a tensile test its is found that the longitudinal strain is four times the lateral strain. Calculate the modulus of rigidity and the bulk modulus, if its elastic modulus is $1x10^6 kg/cm^2$. Find the change in volume, when the bar is subjected to hydrostatic pressure of 1000 kg / cm^2.

(or)

12. The following data refer to a tensile test conducted on a mild steel bar. Diameter of the bar = 30mm, gauge length = 200mm, extension at a load of 100kN is = 0.139mm, load at elastic limit = 230kN, maximum load = 360kN, total extension = 56mm and diameter of the rod at failure = 22.25mm. Calculate the (a) Young's modulus (b) stress at elastic limit (c) Percentage elongation (d) percentage decrease in area.

13. Determine the moment of inertia of the section shown in figure 2. about the horizontal and vertical axes passing through the centre of gravity of the section.

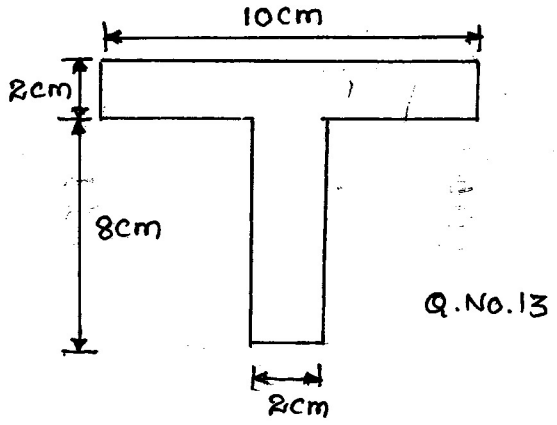

Figure. 2.

(or)

14. Find the moment of inertia of the shaded area as shown in figure 3. about edge AB.

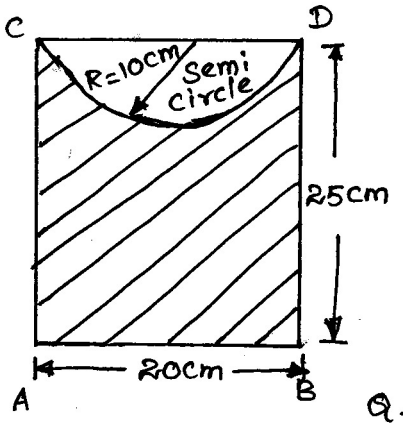

Figure. 3.

15. Draw the shear force and bending moment diagrams for the figure 4.

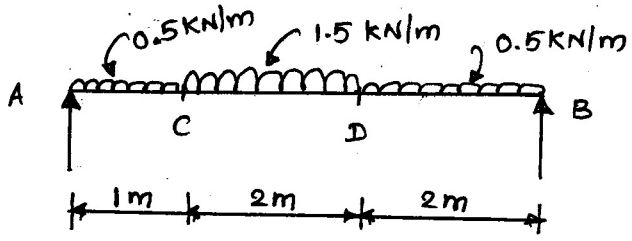

Figure. 4. Q.No: 15

(or)

16. Draw the shear force and bending moment diagrams for the figure 5.

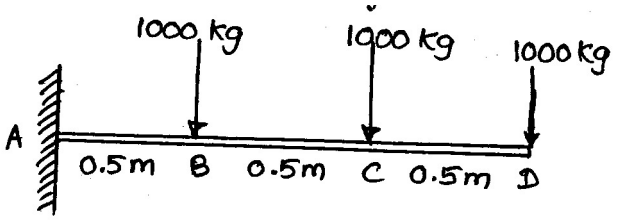

Figure. 5. Q. No. 16