Code No: 09A40102 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B.Tech II Year II Semester Examinations, June-2014
STRENGTH OF MATERIALS–II
(Common to CE, CEE)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1. A fixed beam is loaded as shown in the figure 1. Determine the fixing moments and reactions at the ends and also draw the shear force and bending moment diagrams.

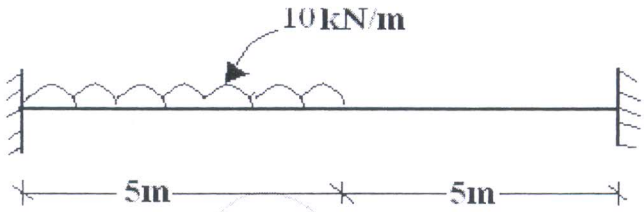

Figure: 1

2. A continuous beam is supported and loaded as shown in the figure 2. Draw the shear force and bending moment diagrams.

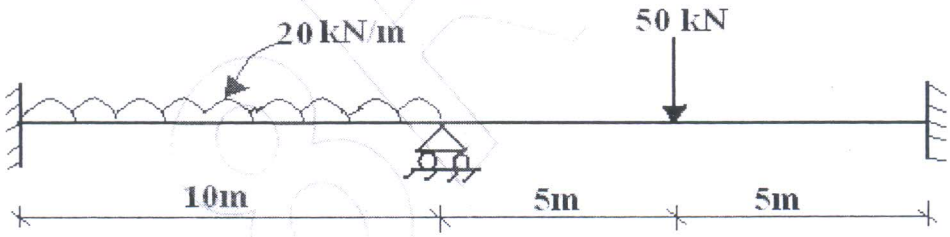

Figure: 2

3. A hollow rectangular column is having external and internal dimensions as 2.8m × 2.0m and 2.0m × 1.2m respectively. Calculate the safe load that can be placed at an eccentricity of 50 cm on a plane bisecting the longer side, if the maximum compressive stress is not to exceed 5 Mpa.

4. A hollow circular cast iron column is 8m long with one end fixed other end hinged. Determine the maximum diameter of the column if it is to carry a safe load of 250 kN with a factor of safety 5. Take internal diameter as 0.8 times the external diameter. Take $\sigma_c = 550$ Mpa and $\alpha = 1/1600$.

5. A shaft transmits 300kW power at 120 r.p.m. determine:
   a) The necessary diameter of the solid circular shaft
   b) The necessary diameter of hollow circular section, the inside diameter being 2/3 of the external diameter. The allowable shear stress is 70 N/mm^2.
   Taking the density of material is 77 kN/m^3; calculate the % saving in the material if hollow shaft is used.

6. A semi-circular beam of radius 5 m is simply supported on three equally spaced simple supports. The beam is subjected to a uniformly distributed load of intensity 30 kN/m over the entire length. Determine the angle θ between the supports so that the bending moment is equal.

7. A horizontal strut is 4m long, having pin joints at the ends. It carries an axial load of 10kN in compression and uniformly distributed load of 5kN/m. The cross section is 60mm×40mm. Determine the maximum stress developed in the section. Take E = 200 Gpa.

8. A simply supported beam of span 5.0 m has I-section 125 mm×250 mm×10 mm. The beam is subjected to a concentrate load of 100 kN at the mid-span in a plane making an angle 20^0 with respect to vertical and passing through the centroid of the section. Determine the maximum stresses developed at the section.

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