S–2004

Total No. of Pages : 3

Seat No.	

S.E. (Civil) (Semester - III) (Revised) Examination, December - 2015

STRENGTH OF MATERIALS

Sub. Code : 63340

Day and Date : Wednesday, 16 - 12 - 2015 **Total Marks : 100**

Time : 10.00 a.m. to 01.00 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Use of electronic calculator is permitted.**
4) **Assume suitable data if necessary and mention it clearly.**

Q1) Attempt any two : **[2 × 10 = 20]**

a) A copper sphere of 100mm dia. is immersed in sea water to a depth of 1600m. Find the change in volume of sphere. Take E = 110GPa and $\mu = 0.3$

b) A beam ABCD is 7m long and supported at A and C AB = 3m, BC = CD = 2m. Portion AB is subjected to u.d.l. of 12kN/m, a point load of 20kN acts at B and portion CD is subjected to u.d.l. of 8 kN/m Draw B.M.D. What are maximum sagging and hogging B.M.

c) A solid circular shaft transmits 75kW power at 200r.p.m. Calculate the required diameter of shaft for

i) shear stress is not to exceed 50 MPa and

ii) angle of twist is not to exceed 1° in length of 2m.

Take G = 100 GPa

Q2) a) Draw stress-strain curve for ductile and brittle materials giving the significance of all salient points. **[5]**

P.T.O.

OR

Derive the relationship for volumetric strain in terms of longitudinal strains for 3-D state of stress. **[5]**

b) A simply supported beam is subjected to uniformly increasing load as shown in fig. 1 Locate the point of max. B.M. and its value. **[10]**

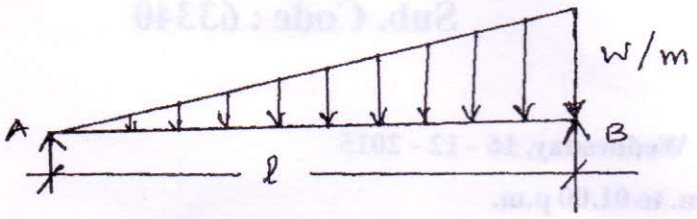
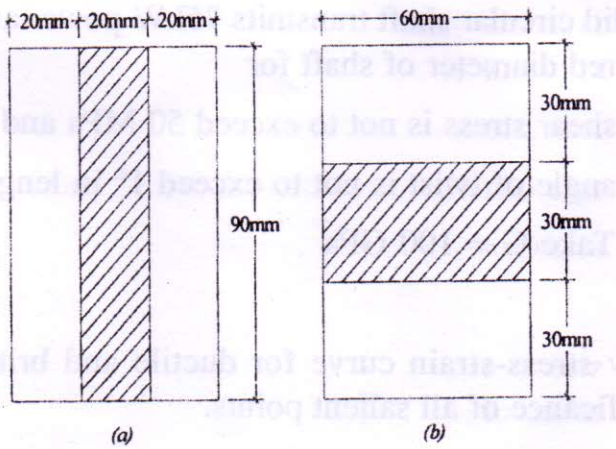


FIG. 1 Q.2(b)

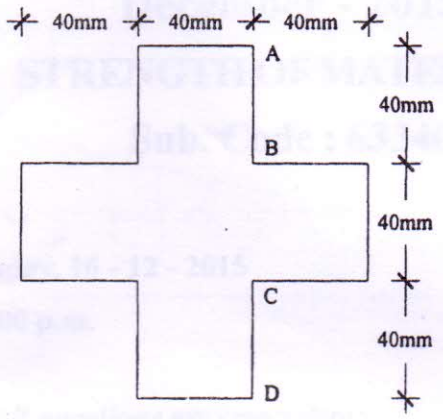
Q3) a) Derive the expression for power transmitted by shaft subjected to torque 'T' and rotating at speed of 'N' r.p.m. **[5]**

b) A prism of dimensions 300 (L) × 100 (B) × 40 (T) mm is acted upon by force of 500kN (Tensile) along length, 600kN (Tensile) along breadth and 400kN (Tensile) along thickness. Compute the change in volume of prism. Take E = 200kN/mm^2 and μ = 0.25. **[10]**

Q4) Figure a) and (b) shows the cross section of a beam subjected to a bending moment M. Calculate what proportion of M is resisted by the shaded area in each case. **[17]**



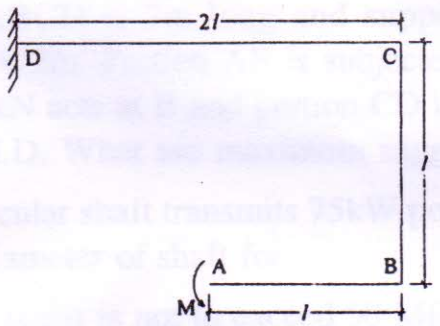
Q5) Figure shows cross section of beam subjected to a shear force of 200kN. Draw the shear stress distribution diagram showing the shear stress values at A, B, C, D and neutral axis. **[17]**



Q6) A beam 4m in length is simply supported at the ends and carries a uniformly distributed load of 6 kN/m. Determine the strain energy stored in the beam. Take, E = 200GN/m^2 and I = 1440cm^4. **[16]**

OR

A continuous member ABCD is bent in one plane and loaded in the same plane as shown in figure. It is rigidly fixed at D and moment M is applied at the free end. Find the vertical movement of A. Flexural rigidity of member = EI.



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