Total No. of Printed Pages:3

SUBJECT CODE NO:- K-210
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(CIVIL) Examination Oct/Nov 2016
Strength of Materials
(Revised)

[Time: Three Hours] **[Max. Marks:80]**

Please check whether you have got the right question paper.

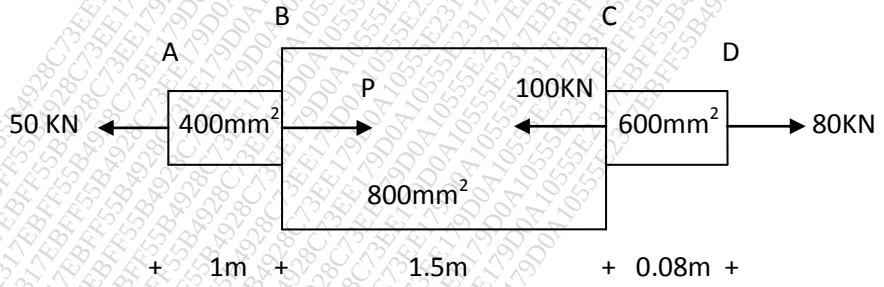
N.B i) Question No.1 and Q.No.6 are compulsory. Attempt any two from remaining for each section.
ii) Figure to the right indicates full marks.
iii) Assume suitable data if necessary.

Section A

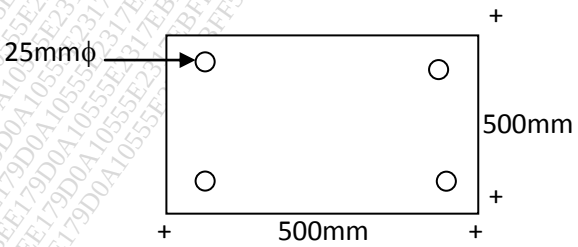
Q.1 Attempt any five 10

1. Define elastic body.
2. Define Poisson's ratio.
3. Define modulus of elasticity.
4. Define bending moment.
5. Explain point of contra flexure.
6. What do you mean by section modulus?
7. Draw stress strain diagram for ductile material.
8. Define modular ratio.

Q.2 a) Find unknown force 'P' necessary for equilibrium & determine total elongation of bar. Take $E = 210 \times 10^3$ n/mm^2 08



b) A reinforced concrete column 500mmX500 mm in section is reinforced with four steel bars of 25mm diameter one in each corner. The column is carrying a load of 1000KN. Find the stress in concrete & steel bar. Take $Es = 210 \times 10^3$ n/mm^2 & $Econ = 14 \times 10^3$ n/mm^2 07



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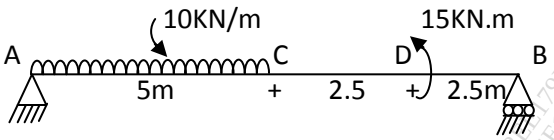
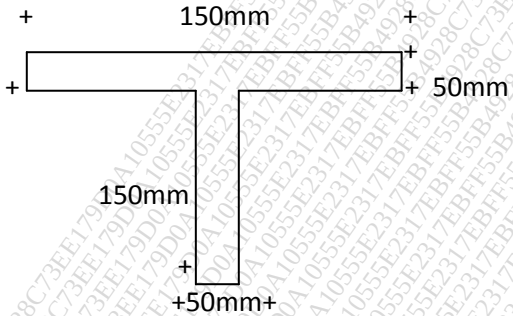
Q.3 a) Explain types of supports. 03

b) Draw S.F.D, B.M.D & maximum bending moment for the beam shown in figure. 12



Q.4 The C/S of a beam is shown in fig. determine maximum tensile & compressive stress occurring in the beam C/S for bending moment of 3.4Kn/m for S.S.B 15



Q.5 a) A bar of length of 10m elongates through 8mm under the action of axial pull of 5KN. if diameter of bar is 25mm. Find stress strain & modules of elasticity. 07

b) Derive flexural formula. 08

Section -B

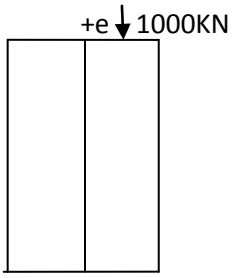
Q.6 Attempt any five. 10

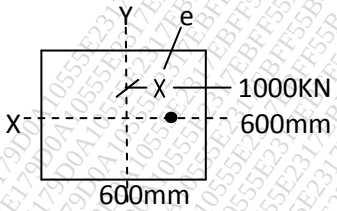
a) What is angle of twist?
b) Write down the torsional formula.
c) Define principal plane.
d) Write formula for power transmitted by shift.
e) Define column.
f) Define Hoop stress.
g) Types of loading in strain energy.
h) Write down assumptions in theory of torsion.

Q.7 a) A hollow circular shaft 200mm external diameter& 160mm internal diameter , transmitting power at 180 RPM the angle of twist at a length of 2m is found to be 0.55^{o} calculate power transmitted & maximum shear stress. Take $G=0.8 \times 10^{5}$ N/mm^2 08

b) A vertical bar of uniform c/s area 400mm^2 and 1.5m long is fixed at top end & is provided with a circular disc at the bottom. if a weight of 500 N falls on the disc from a height of 100mm. Determine the stress developed in the bar & what will be the strain energy stored in bar. E=200Gpa. 07

Q.8 a) A short masonary pillar is 600mm × 600 mm in section, the pillar carries a point load of 1000KN acting on the centroidal axis of the section shown in fig. and at eccentricity of 80mm from the longitudinal axis find the minimum & maximum stress in the section 08

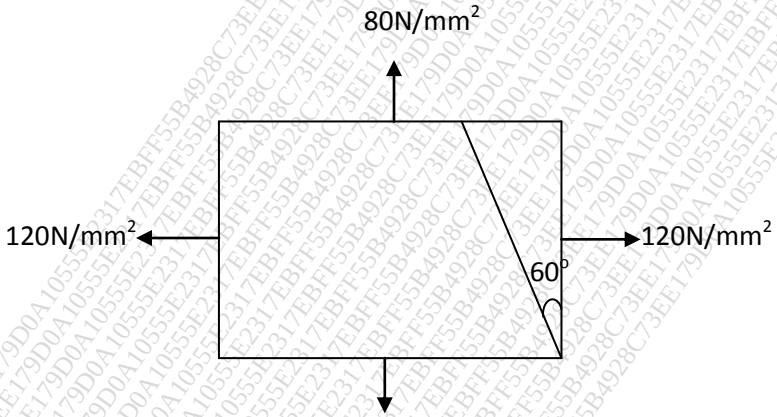




b) 07

A boiler shell 2m diameter 4m long is subjected to internal fluid pressure of 2N/mm^2. If maximum tensile stress allowed in steel is 100N/mm^2 find thickness change in diameter length & volume of the shell. Take E=200Gpa μ =0.25

Q.9 The principal stresses at a point across the perpendicular plane are 120N/mm^2& 80N/mm^2 both positive. find normal stress tangential stress, resultant stress & angle of obliquity across a plane passing through point inclined at 60^o to the plane of 120N/mm^2 15



Q.10 A 1.5m long column has a circular C/S of 50mm diameter. One of the end of the column is fixed and the other end is free considering factor of safety as 3, calculate safe load using. 15

1. Rankin's formula when $Ec = 560N/mm2$
   $\propto = 1/1600$
2. For Euler's formula E= 1.2× 10^5 N/mm^2

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