Total No. of Printed Pages:3

SUBJECT CODE:- 459
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(CIVIL) Examination Nov/Dec 2015
Strength of Materials
(Revised)

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

"Please check whether you have got the right question paper."

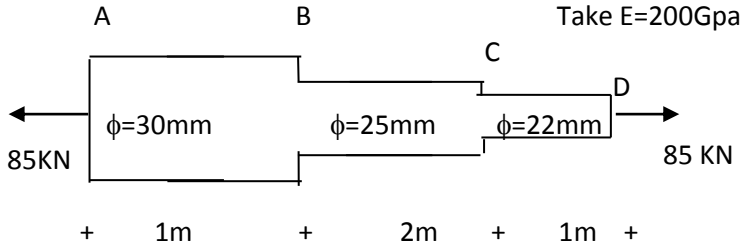
N.B i) Question No. 1 and 6 is compulsory. Attempt any two questions from remaining for each section.
ii) Figure to the right indicate full marks.
iii) Assume suitable data if necessary.

Section A

Q.1 Attempt any five. 10

a) Define stress.
b) Define Poisson's ratio.
c) Define temperature stress.
d) What are the types of beams?
e) What are the assumptions in pure bending?
f) What do you mean by point of contra flexure?
g) Define shear force.
h) Define lateral strain.

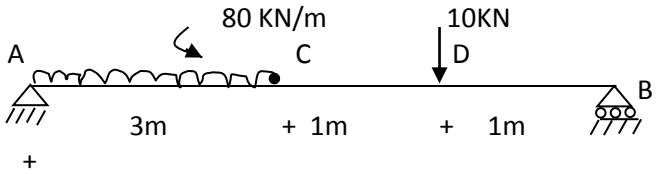
Q.2 a) Find elongation of bar shown in figure 08



b) A steel rod 1m long is subjected to rise in temperature 40°c. find amount of elongation in the length of rod also calculate the magnitude & nature of stress develop in rod. If rod is rigidity connected at both ends. 07
Take E= 200 KN/mm^2
$\propto = 12 \times 10^{-6}$ /°c

Q.3 a) Explain types of load. 03

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



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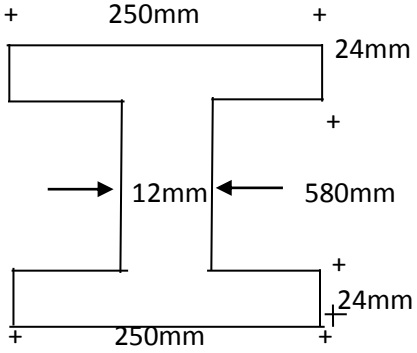
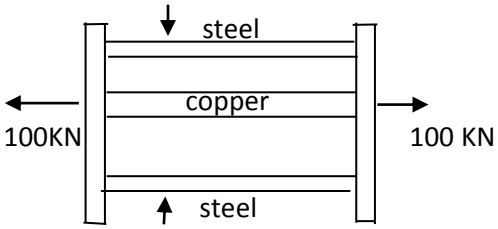
Q.4 A rolled steel joist of I section has the following dimension Top & bottom flange 250 mm x 24 mm. web 580 mm deep & 12 mm thick if the beam carries a u. d. I of 40 KN/m on span of 6m. Calculated the maximum stress produced due to bending the beam is simply supported out both the ends. 15



Q.5 a) An I-section with rectangular ends has the following dimensions. Flanges 180mm x 20mm. web 350mm x 15mm. find maximum sheering stress developed in the beam for a shear force of 80 KN. 07

b) A composite bar having copper rod 36mm dia is rigidly attached to both ends to the inside of steel tube 50mm external diameter & 5mm thick. And it is subjected to axial pull of 100KN. Find stresses in each metal. 08
Take
$E_S = 200KN/mm^2$
$E_C = 110KN/mm^2$



Section – B

Q.6 Attempt any five 10

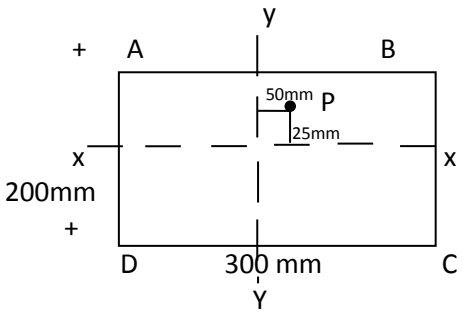
a) Define torsion
b) Define polar modulus
c) What are the assumptions in theory of torsion
d) Define strain energy
e) Explain principal stress
f) Define angle of obliquity
g) Define hoop stress
h) Define struts

Q.7 a) A hollow shaft of external diameter 120mm transmits 300KW power at 200 RPM. Determine the maximum internal diameter, if the maximum stress in the shaft is not to exceed 60 N/mm^2 07

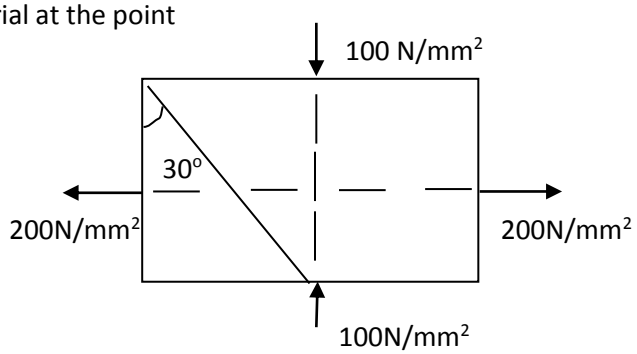
b) A rod 12.5mm in diameter is stretched 3.2mm under a steady load of 10KN what stress would be produced in the bar by a weight of 700N falling through 75mm before commencing to stretch, the rod being initially in stressed. Take $E=2 \times 10^5$ mpa. 05

Q.8 a) A cylindrical shell 3m long, 1m in diameter & is subjected to an internal pressure of 1 N/mm^2. If the thickness of shell is 20mm find the circumferential & longitudinal stress 05

b) A rectangular column 300 mm $\times$ 200 mm is subjected to a compressive load of 450 KN at a point 'P' as shown in figure. Find the intensities of stress at all the four corners of column 10



Q.9 The principal stress at a point in a bar are 200 N/mm^2 & 100N/mm^2. Determine the resultant stress in magnitude & direction on a plane inclined at 30^o to the axis of major principal stress. Also determine the maximum intensity of shear stress in the material at the point 15



Q.10 Calculate the buckling load for a strut of T-section as shown in figure having length 6m one end of strut is hinged & other end is fixed. Calculate buckling load using Euler's formula 15
Take E = 200 GPa