Total No. of Printed Pages:4

SUBJECT CODE NO:- P-179
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(CIVIL) Examination MAY/JUNE-2016
Strength of Materials
(Revised)

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

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

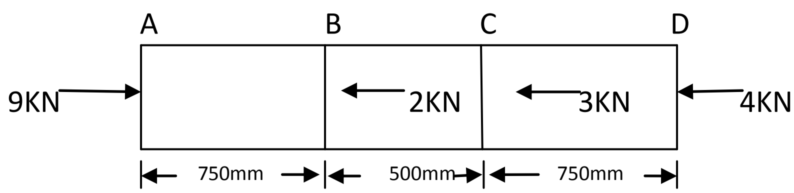
N.B
i) Question No.1 and 6 are compulsory. Attempt any two from remaining for each section.
ii) Figures to the right indicate full marks.
iii) Assume suitable data, if necessary.

Section A

Q.1 Attempt any five. 10

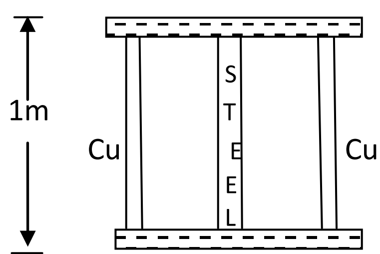
a) State Hooke's law.
b) Define modulus of rigidity.
c) Explain types of stress.
d) Define volumetric strain.
e) What are the types of beam?
f) Define section modulus.
g) Write flexural formula.
h) Define shear force.

Q.2 a) A steel bar $600mm^2$ c/s area is carrying the load as shown in figure. Find elongation at bar. Take E=200GPa. 08



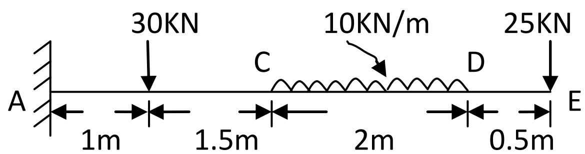
b) Three rods each of length 1m and CIS area $200mm^2$ are connected to the rigid plate at the ends. If the temperature of assembly is raised by 25^0C determine stress in each rod. 07

Take:- E_s = 200Gpa $\alpha_s = 120 \times 10^{-6}/^0c$
E_c = 120Gpa $\alpha_c = 18.5 \times 10^{-6}/^0c$
$A_s = A_c = 200mm^2$



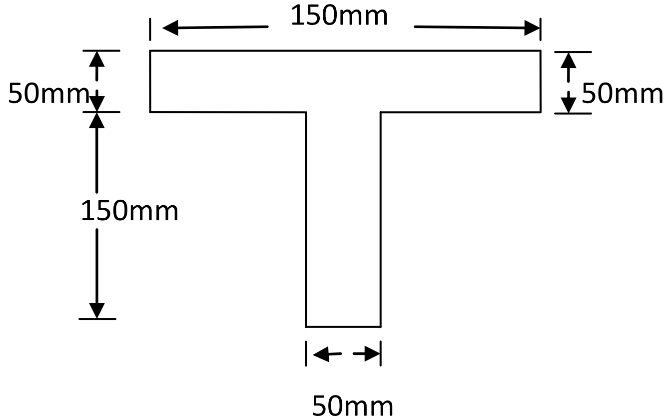
Q.3 a) Define point of contra flexure. 03

b) Draw S.F.D and B.M.D for cantilever shown in figure. 12

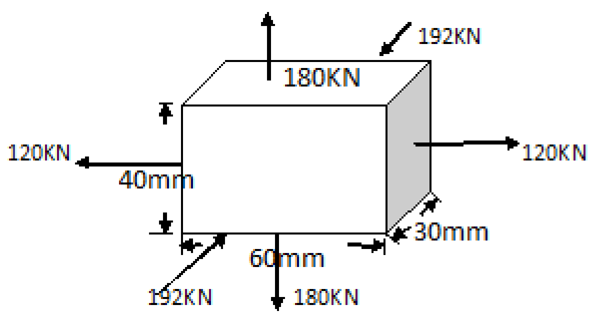


Q.4 a) Write down the assumptions made in theory of simple bending. 07

b) The cross section of beam is as shown in figure. Determine maximum bending stress induced in C/S 0f beam for bending moment of 4.5KN.M. For simply supported beam. 08



Q.5 a) Forces acting on piece of material as shown in fig. Find strain in each direction and change in volume. Take $E = 2 \times 10^5 N/mm^2$ Poisson Ratio = 0.25. 08



b) Derive expression for sheer stress at a section in loaded beam. 07

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Section B

Q.6 Attempt <u>any five:</u> 10

a) Define proof resilence.
b) Define circumferential stress.
c) Write down torsional formula.
d) Write down the assumptions in theory of torsion.
e) Write down the formula for longitudinal stress.
f) Write down the types of load in strain energy.
g) Explain core or kernel of section.
h) What are the limitations in Eulers theory.

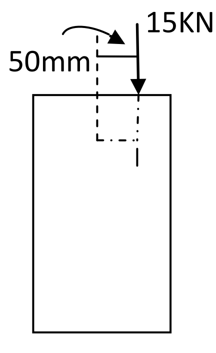
Q.7 a) A solid circular shaft transmits 75KW at 200RPM. Calculate the shaft diameter if the twist in the shaft is not to exceed 1^0 in 2m length of shaft ,if the shearing stress is limited to 50N/mm^2. Take$G = 100 \times 10^3 N/mm^2$. 08

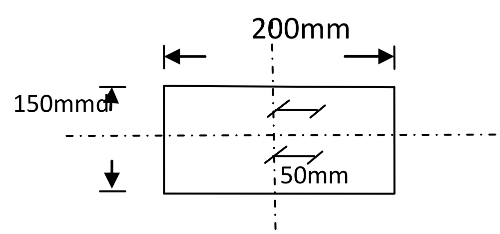
b) A bar 1m in length is subjected to a pull such that maximum stress is equal to 150N/mm^2. Its area of cross section is 200mm^2 over a length of 950mm and for middle 50mm length the c/s area is 100mm^2. If E= 200 Gpa, calculate strain energy stored in a bar. 07

Q.8 a) A cylindrical thin drum 1m in diameter and 3m long has a shell thickness of 10mm. If the drum is subjected to an internal pressure of 2.5N/mm^2. Find 07

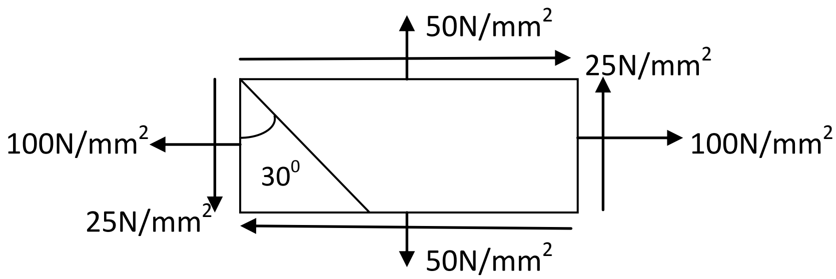
a) Change in diameter
b) Change in length
c) Change in volume.
Take $E = 2 \times 10^5 N/mm^2$ $\mu = 0.3$

b) A rectangular column 200mm wide and 150mm thick is carrying a vertical load of 15KN at an eccentricity of 50mm in a plane bisecting the thickness. Determine the maximum and minimum intensities of stress in the section. 08





Q.9 A component is subjected to stresses as shown in fig. Find the normal stress, shear stress and resultant stress on an oblique plane 30^0 inclined to a vertical face as shown in figure. 15



Q.10 A hollow cast iron column of external diameter 250mm and internal diameter 200mm is 10m long with both ends fixed. Find the safe axial load with a factor of safety of 4. Take $F_c = 550N/mm^2, \alpha = {}^{1}/_{1600}$ by Rankine's method. 15