Total No. of Printed Pages:2

SUBJECT CODE NO:- P-98
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(Mech /Prod) Examination MAY/JUNE-2016
Strength of Material
(Revised)

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

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

N.B i) Q.No.1 Q.No.6 are compulsory.
ii) Attempt **any two** questions from the remaining questions in each section.
iii) Assume suitable data, if necessary.

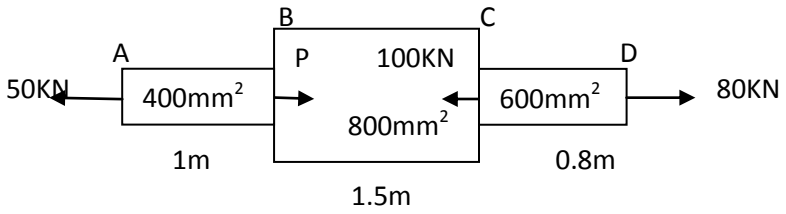
Section A

Q.1 Attempt **any five.** 10

1) Define stress.
2) State Hooke's law.
3) Define temperature stress.
4) Define beam.
5) Define shear force & bending moment.
6) Define bending stress.
7) Define moment of Resistance.
8) Define bulk modulus.

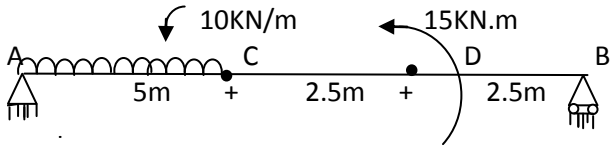
Q.2 a) Draw stress strain diagram for ductile (M.S) material. 07

b) A steel bar of varying section is subjected to axial force as shown in fig. find 'p' necessary for equilibrium & determine total elongation. E=210 KN/mm^2 08



Q.3 a) Define point of contraflexure. 03

b) Draw S.F.D & B.M.D & locate maximum bending moment for a beam. Loaded as shown in fig. 12



Q.4 a) Derive shear stress equation for the beam. 07

b) A rolled steel joist of I-section has the following dimensions. Top & bottom flange 250×24mm.Web 580 mm deep &12mm thick if beam carries a U. D. l of 40KN/m on span of 6m. Calculate the maximum stress produced due to bending the beam is simply supported at both the ends. 08

Q.5 a) A copper tube 20mm inside diameter & 2mm thick is heated on steel rod 20mm dia. Find stress induced in each metal due to temperature rise is 60°. Take Es=2× 10^5N/mm^2 08
E_c=160× 10^3N/mm^2 $\alpha_s = 11 \times 10^{-6}$/℃ , $\alpha_c = 16 \times 10^{-6}$/℃

b) An axial pull of 9KN is applied through a rod of 15mm dia. It is found to undergo an extension of 0.12mm. Find modulus of elasticity of material If value of $\mu = 0.28$ also find modulus of rigidity, Bulk modulus. The length of bar is 470mm. 07

Section B

Q.6 Attempt **any five** 10

1) Define torque
2) Write down the torsional formula
3) Define torsional rigidity
4) Define principle stress.
5) Define proof resistance.
6) Define deflection of beam.
7) Define kernel of section of column.
8) What is Mohr's stress circle?

Q.7 a) A solid circular shaft of 100mm diameter is required to transmit 100KW at 120 RPM. Determine the magnitude of Shear stress produced in the shaft. 07

b) A hollow circular column having external & internal dia. Of 300mm &250mm respectively carries a vertical load of 20KN at an outer edge of column. Calculate minimum & maximum intensities of stress in the section. 08

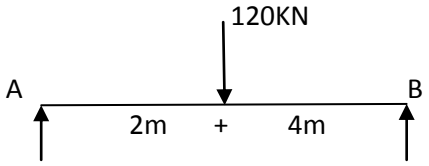
Q.8 a) A vertical cylinder oil tank is made from 8mm thick plate and has a diameter of 9m. Find out the height up to which oil can be filled in the tank so that maximum stress in the tank is 50mpa. Sp. Gravity of oil is 0.82. 08

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 initially being unstressed Take E=2× 10^5 mpa 07

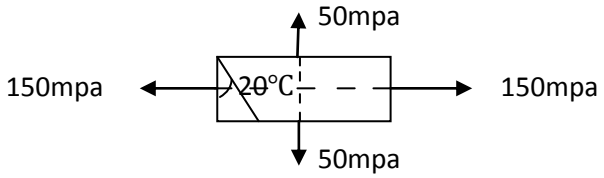
Q.9 A simply supported beam carrying a point load is shown in figure. Determine slope at point A & B & maximum deflection using McCauley's method. 15

E=200Gpa

I=60×10^6mm^4



Q.10 a) At a point in strained material subjected to 150mpa & 50 mpa as shown in figure .Find normal & tangential stress on a plane. Also find resultant stress & angle of obliquity. 08



b) A compound shift is composed of a 1m length of solid copper 150mm in diameter join to a 2m length solid steel shaft 200mm diameter .A torque of 26KN.m is applied at the end of the shaft in opposite direction. Find maximum shear stress in each material and total angle of twist of the entire shaft. 07

Take Gc=30× 10^3 N/mm^2

Gs=85× 10^3 N/ mm^2