

Total No. of Questions : 4]

PC432

SEAT No. :

[Total No. of Pages :2

[6359]-552

**S.E. (Robotics and Automation/Production Engineering Industrial/
Production sand wich) (Insem)**

STRENGTH OF MATERIAL

(2019 Pattern) (Semester- III) (211082)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) *Solve any Two Questions.*
- 2) *Figures to the right indicates full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Assume suitable data, if necessary.*
- 5) *Use of Logarithmic Table, Slide rule is ~~Electronic~~ pocket calculator is allowed.*

- Q1)** a) State and Explain the Hooks law for Brittle Material. [4]
b) Find the Minimum diameter of a steel wire, which is used to raise a load of 4000N if the stress in the rod is not to exceed $95 \times 10^6 \text{ N/mm}^2$. [5]
c) A steel bar 4m long is 32 mm in diameter for 1m length, 28mm in diameter for 2m and 25mm diameter for remaining 1m. The bar is in tension the stress on the smallest section being 110 N/mm^2 find the total elongation of bar $E=2.1 \times 10^5 \text{ N/mm}^2$. [6]

OR

- Q2)** a) Explain the concept of Thermal Stresses in Composite Bar and also derive the expression for same. [5]
b) A Stepped bar ABCD for the following dimensions Portion AB: Length 1.2m, Diameter 40 mm Portion BC: Length 0.8m, diameter 20mm CD: Length 1.0m, Diameter 30 mm. It is subjected to four-point load find the Value of P FOR equilibrium and then the change in length of bar $E=200 \text{ GPa}$. [5]
c) A short concrete column section of $300 \text{ mm} \times 300 \text{ mm}$ section is reinforcing axially with four symmetrically placed steel bars each 200 mm^2 in the area. If the applied load $P = 750 \text{ kN}$, Compute the stresses developed in each material assume modulus of elasticity for steel 13 Times that of concrete. [5]

P.T.O.

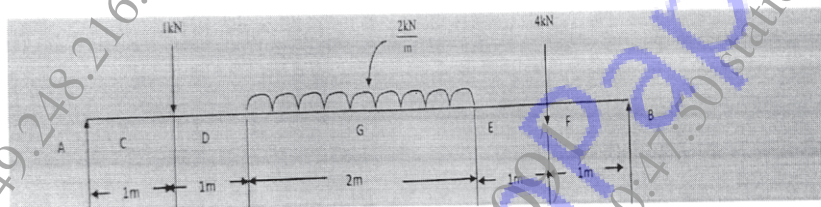
Q3) a) State the Different Types of Beam along with Figure. [3]

b) Draw the rules to draw the shear force and Bending Moment Diagram. [4]

c) Draw the shear Force and bending moment diagram AB of length 8m having point load of 4kN, 10kN, and 7kN at 1.5m, 4m, 6m from end A respectively [8]

OR

Q4) a) Draw the Shear force and Bending Moment Diagram for the following Problem. [7]



b) A Mild steel, steel rod of 20 mm diameter and 300 mm long is enclosed centrally inside a hollow copper Tube and external diameter 30mm and internal diameter 25 mm. This composite bar is subjected to an axial pull of 40kN. Find the Stresses developed in rod and Tube take $E_s=200 \text{ KN/mm}^2$ $E_C=100 \text{ KN/mm}^2$ [8]

