

No. of Printed Pages : 4
Roll No.

180732/120732

3rd Sem./ Civil Engineering/Highway Engg.
Subject : Structural Mechanics

Time : 3 Hrs. M.M. : 100

SECTION-A

Note: Multiple choice Questions. All questions are compulsory
(10x1=10)

- Q.1 The ability of a material to deform without breaking is called (CO-1)
a) Plasticity b) Elasticity
c) Creep d) None of these
- Q.2 The ratio of the lateral strain to the linear strain is called (CO-2)
a) Poisson's ratio
b) Bulk modulus
c) Modulus of elasticity
d) Modulus of rigidity
- Q.3 The rate of change of bending moment is equal to (CO-3)
a) Slope b) Deflection
c) Shear force d) Poisson's ratio
- Q.4 The moment of inertia of an area is always least with respect to (CO-4)
a) Bottom most axis b) Vertical axis
c) Radius of gyration d) Centroidal axis
- Q.5 When a simply supported beam is loaded transversely, the maximum tensile stress is developed on the (CO-5)
a) Neutral Axis
b) Top layer
c) Bottom layer
d) Every cross-section

- Q.6 The ratio of the average shear stress to maximum shear stress for a circular section. (CO-6)
a) $\frac{2}{3}$ b) $\frac{3}{2}$
c) 2 d) $\frac{3}{4}$
- Q.7 A column that fails due to direct stress is called (CO-8)
a) Long Column b) Short Column
c) Slender Column d) Medium Column
- Q.8 The Rankine formula holds good for (CO-8)
a) Long Column
b) Short Column
c) Medium Column
d) Both short and long column
- Q.9 Conditions of equilibrium are (CO-9)
a) $\sum V=0, \sum H \neq 0, \sum M=0$
b) $\sum V=0, \sum H=0, \sum M \neq 0$
c) $\sum V=0, \sum H=0, \sum M=0$,
d) $\sum V \neq 0, \sum H=0, \sum M=0$
- Q.10 If $n > (2j-3)$, the frame will be (CO-9)
a) Perfect frame b) Deficient frame
c) Redundant frame d) None of these
- SECTION-B**
- Note:** Objective type questions. All questions are compulsory.
(10x1=10)
- Q.11 The tensile strength of brittle material is much _____ than their compressive strength (CO-1)
- Q.12 Toughness of metals decreases by heating. (True/False) (CO-1)
- Q.13 The ratio of the change of dimension to the original dimension is known as _____ (CO-2)
- Q.14 _____ is defined as the algebraic sum of all the vertical forces acting on one side of the section (CO-3)
- Q.15 Units of radius of gyration is _____ (CO-4)
- Q.16 Moment of resistance = _____ X section modulus (CO-5)
- Q.17 The stress caused by the shearing force at a section of a beam is called _____ (CO-6)

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180732/120732

(2)

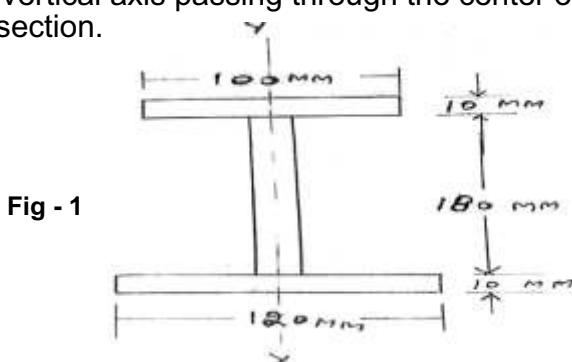
180732/120732

- Q.18 The distance between adjacent points of inflection is called _____ length. (CO-8)
- Q.19 The maximum limiting load at which the column tends to have lateral displacement is called _____. (CO-8)
- Q.20 A frame in which, $n=2j-3$ equation satisfied is known as _____. (CO-9)

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

- Q.21 Write classification of materials and explain any one of them in detail. (CO-1)
- Q.22 State and explain the Hook's law. (CO-2)
- Q.23 Write and derive the expression for deformation of a body due to self-weight. (CO-2)
- Q.24 Draw the stress-strain diagram for mild steel and mention briefly its salient features. (CO-2)
- Q.25 Write down the points to be considered for drawing the shear force and bending moment diagrams. (CO-3)
- Q.26 Write the name of the different types of beams along with their diagrams. (CO-3)
- Q.27 Calculate the BM and draw BMD for a cantilever beam carrying UDL over the whole span. (CO-3)
- Q.28 Find the moment of inertia of I-section as shown in fig-1 about vertical axis passing through the center of gravity of the section. (CO-4)



- Q.29 Write the assumption made in the theory of simple banding. (CO-5)

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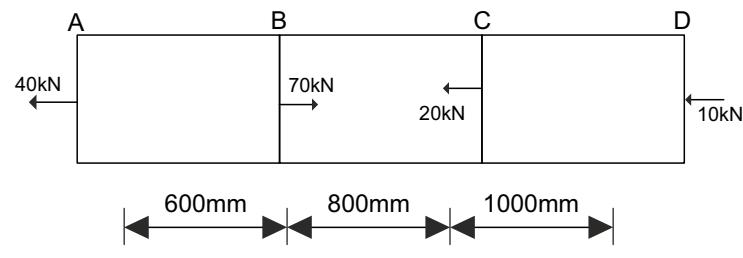
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- Q.30 A steel plate of width 60mm and of thickness 10mm bent into a circular arc of radius 10m. Determine the maximum stress induced. Take $E=2\times 10^5 \text{ N/mm}^2$ (CO-5)
- Q.31 Draw the detailed shear stress distribution diagram for a rectangular section. (CO-6)
- Q.32 A simply supported beam of length 5m carries a UDL of 9kN/m over the entire length. It also carries a concentrated load of 20kN at the center of span. Calculate the maximum deflection of the beam (CO-7)
- Q.33 Derive the expression for maximum slope and deflection for a simply supported beam carrying a UDL. (CO-7)
- Q.34 Write the different end conditions of a loaded column along with their diagrams. (CO-8)
- Q.35 Write the assumptions made in finding out the forces in a frame. (CO-9)

SECTION-D

Note: Long answer type questions. Attempt any two out of three questions. (2x10=20)

- Q.36 A brass bar, having cross-sectional area of 900mm^2 , is subjected to axial forces as shown in fig.-2, Find the total change in length of the bar. Take $E=1\times 10^5 \text{ N/mm}^2$ (CO-2)



- Q.37 A simply supported beam is carrying a UDL of 2.5kN/m over a length of 2.5m from the right end. The length of the beam is 5 m . Draw the SF and BM diagrams for the beam (CO-3)
- Q.38 Explain the different types of end supports of a beam along-with their neat sketches. (CO-3)

(Note: Course outcome/CO is for office use only)

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180732/120732