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Q.8 The load at which the column just buckles, is known as (CO-8)

M.M. : 100

a) Critical load b) Bucking load
c) Crippling load d) Any of these

Q.9 A structure consisting of a number of members connected to each other to support external load without going any geometrical distortion is known as _____ (CO-9)

- Q.10 For a perfect frame, the relation between number of joints 'J' and number of members "n" is (CO-9)
- a) $n = 2j - 3$ b) $n = 2j$
 c) $n - 3 = 2j$ d) $n = 2j + 3$

Note : Objective type questions. All questions are compulsory.
(10x1=10)

- Q.15 Units of radius of gyration is _____ (CO-4)

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

- Q.21 Draw and explain the salient features of stress-strain diagram for mild steel. (CO-1)

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- Q.22 Define temperature stresses and temperature strain for Yielding supports. (CO-2)
- Q.23 State and explain Hook's law. (CO-2)
- Q.24 A load of 5.75 kN is to be raised with the help of a steel wire. Find the minimum diameter of the steel wire, if the stress is not to exceed 150 MPa. (CO-2)
- Q.25 Calculate the bending moment and draw the BMD for a simply supported beam carrying a uniform distributed load over the whole span. (CO-3)
- Q.26 A cantilever beam of length 4 m carries a gradually varying load. Zero at free end to 2 kN/m at the fixed end. Draw the SF and BM diagrams for the cantilever. (CO-3)
- Q.27 Write the different types of load along with their neat sketches. (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)

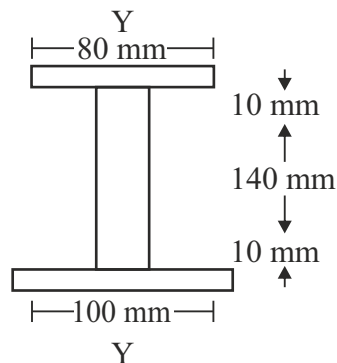


Fig. 1

- Q.29 Write the assumptions made in the theory of simple bending. (CO-5)
- Q.30 A steel plate of width 120 mm and of thickness 20 mm is bent into a circular arc of radius 10 m. 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 circular section. (CO-6)

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- Q.32 A simply supported beam is of I-section. Span of the beam is 6 m and moment of inertia of the cross-section is $180 \times 10^6 \text{ mm}^4$. Calculate the point load at the center of the beam to produce a deflection of 6 mm under the load. (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 various stresses responsible for the failure of a column. (CO-8)
- Q.35 Write down the steps to determine the forces in members of a truss as per methods of sections. (CO-9)

SECTION-D

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

- Q.36 A brass bar, having cross-sectional area of 1000 mm^2 is subjected to axial forces as shown in fig-2. Calculate the force P necessary for equilibrium of bar and determine the total elongation of the bar. Take $E = 1.05 \times 10^5 \text{ N/mm}^2$. (CO-2)

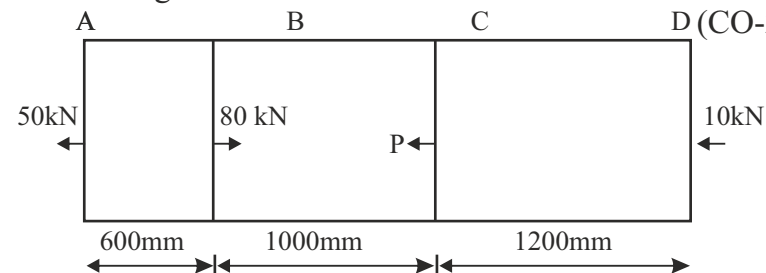


Fig. 2

- Q.37 Explain the different types of end supports of a beam along with their neat sketches. (CO-3)
- Q.38 A simply supported beam 6 m long is subjected to two point loads of 2.2 kN and 5.5 kN at 2 m and 4 m respectively from the left end. Draw the SF and BM diagrams for the beam. (CO-3)
- Note** Outcome (CO) mentioned in the question paper is for official purpose only.

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