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3rd Sem / Civil

Subject : Structural Mechanics

Time : 3 Hrs. M.M. : 60

SECTION-A

Note: Multiple choice questions. All questions are compulsory (6x1=6)

Q.1 Hooke's law states that within elastic limit (CO1)

a) Stress Strain
b) Stress x Strain-1
c) Stress/Strain =Constant
d) None

Q.2 A beam is said to be continuous if (CO2)

a) It has more than two supports
b) It has only one support
c) It is infinitely long
d) None

Q.3 Maximum shear force in a cantilever beam subjected to udl of w/unit length? (CO2)

a) $wl^2/2$ b) wl
c) $wl^2/6$ d) wl/2

Q.4 The product of EI is known as (CO3)

a) Polar moment of inertia
b) Stiffness
c) Flexural rigidity
d) Modulus of rigidity

Q.5 The steel bars are embedded in a concrete beam (CO4)

a) Near top section b) Near bottom section
c) In center d) None

Q.6 Slenderness ratio has dimension of (CO5)

a) cm b) cm^{-1}
c) cm^2 d) Dimensionless

SECTION-B

Note: Objective/ Completion type questions. All questions are compulsory. (6x1=6)

Q.7 Mild steel is a_____material. (CO1)

Q.8 The point of contra flexure is also called_____ (CO2)

Q.9 Radius of gyration is given by k=_____ (CO3)

Q.10 The bending stress on the neutral axis is_____ (CO4)

Q.11 Bending equation is _____ (CO4)

Q.12 Eulers's formula is applicable for _____columns only. (CO5)

SECTION-C

Note: Short answer type questions. Attempt any eight questions out of ten questions. (8x4=32)

Q.13 Explain temperature stresses and temperature strains for rigid supports. (CO1)

Q.14 Give the relation between three elastic constants. (CO1)

Q.15 Draw shear force and bending moment diagram for a simply supported beam carrying uniformly distributed load on the whole span. (CO2)

Q.16 A Simply supported beam AB, 5 m long carries a concentrated load of 70 N at a distance of 3 m from end A. Draw shear force and bending moment diagram. (CO2)

Q.17 State and prove the theorem of perpendicular axis. (CO3)

Q.18 What do you understand by second moment of area? (CO3)

Q.19 A cantilever beam of 5 m span is 40 mm wide and 120 mm deep . uniformly distributed load of 5 KN/m is acting on its full span. Calculate maximum bending stresses induced. (CO4)

Q.20 Explain stiffness of a beam? (CO4)

Q.21 Define

a) Actual length

b) Critical load

c) Safe load

d) Buckling factor (CO5)

Q.22 Define perfect frame, redundant frame and deficient frame (CO5)

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x8=16)

Q.23 A circular steel bar of 20 mm diameter carries a tensile load of 30 KN. Find the tensile stress in the bar and the elongation in the length of 300 mm if $E=2x10^5 N/mm^2$ (CO1)

Q.24 Explain the moment area method for calculating the slope and deflection of a beam. (CO4)

Q.25 Explain the relation between equivalent length and actual length by considering all end conditions of the column. (CO5)