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3rd Sem / Automobile, Mechanical Engg., Mecatronics, Prod, T&D, Plastic, GE, CNC, CAD/CAM, Found. & Forg, Metallurgy, Print Making Tech., Mech (Ad. Manu.Tech.), Mech Engg (Fabrication Tech), Rubber Tech, Polymer Tech, AME, Mech. Engg. (Prod.)

Subject : Strength of Materials / Mechanics of Solids / Basic Mech. Engg.

Time : 3 Hrs. M.M. : 60

SECTION-A

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

Q.1 Unit of Shear Stress -

a) $N\text{-}m^2$ b) N-m

c) N/m^2 d) N/m^3

Q.2 A beam having more than 2 supports is called

a) Fixed Beam

b) Continuous Beam

c) Propped Cantilever Beam

d) Cantilever Beam

Q.3 Rankine's constant for Cast Iron is

a) 1/1600 b) 1/9000

c) 1/2000 d) 1/7500

SECTION-D

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

Q.23 Derive Bending Equation.

Q.24 A simply supported beam of span 5m carries a U.D.L. of 2KN/m starting from a point at a distance of 2m from the left-hand support. Draw S.F.D. and B.M.D. for the given beam.

Q.25 Define :

a) Temperature

b) Thin cylindrical shell

c) Ductility

d) Proof Stress

Q.4 The springs in brakes and clutches are used

a) to apply forces

b) to measures forces

c) to absorb shocks

d) to absorb strain energy

Q.5 The shear stress is minimum at

a) anywhere inside the shaft

b) outer surface of the shaft

c) axis of the shaft

d) none of the above

Q.6 The point where shear force is zero

a) Bending moment is maximum

b) Bending moment is minimum

c) Bending moment is zero

d) none of the above

SECTION-B

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

Q.7 State the relation between Modulus of Elasticity (E) and Modulus of Rigidity (G).

Q.8 Define Stiffness.

Q.9 Moment of Inertia of a plane figure is also known as _____.

Q.10 Full form of B.M.D. is_____.

Q.11 Define Poission's ratio.

Q.12 Define Closed coiled helical Spring.

SECTION-C

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

Q.13 Give the classification of load.

Q.14 Draw stress-strain curve for a brittle material say cast iron.

Q.15 Define :

a) Strain Energy

b) Modulus of Resilience

Q.16 State and explain theorem of perpendicular axis.

Q.17 Give the classification of beams.

Q.18 State four assumptions in theory of simple bending.

Q.19 A member of a pin-jointed structure is 2mm long with a cross-section of 10mm X 30mm. Find the loas at which it will buckle. Take E=80GPa for the material of member.

Q.20 A solid shaft 50mm diameter and 800 mm long transmit 60KW at 270rpm. Calculate maximum shear stress induced in the shaft. Take G=80 GPa for the material of member .

Q.21 What do you understand by springs in parallel.

Q.22 Define :

a) Column

b) Slenderness Ratio