No. of Printed Pages : 4 220331
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3rd Sem. / Automobile Engg., Mechanical Engg,.

Subject : Strength of Materials

Time : 3 Hrs. M.M. : 60

SECTION-A

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

Q.1 Unit of shear strain-

a) N-m b) $N\text{-}m^3$

c) N/m d) No unit

Q.2 A beam having both ends freely resting on supports is called

a) Cantilever Beam

b) Simply supported Beam

c) Overhanging Beam

d) Fixed Beam

Q.3 Rankine's Constant for Wrought Iron is

a) 1/9000 b) 1/5000

c) 1/7500 d) 1/6000

Q.4 In springs balance, the spring is used

a) to apply forces

b) to measures forces

c) to absorb shocks

d) to absorb strain energy

Q.5 The shear stress is maximum at

a) anywhere inside the shaft

b) outer surface of the shaft

c) axis of the shaft

d) None of the above

Q.6 At point of contraflexure

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 Bulk Modulus (K) and Modulus of Elasticity (E).

Q.8 Define Ductility.

Q.9 The S.I. unit for second moment of area is

Q.10 Full Form of S.F.D. is_____.

Q.11 Define Pure Torsion.

Q.12 Define Open coiled helical Spring.

SECTION-C

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

Q.13 Mention various types of stains.

Q.14 Draw stress-strain curve for a ductile material say mild steel.

Q.15 Define:

a) Resilience

b) Proof Resilience

Q.16 State and explain theorem of parallel axis.

Q.17 Define sagging and hogging in bending of beams.

Q.18 State four assumptions in theory of pure torsion.

Q.19 A member of a pin-jointed structure is 1.5mm long with a cross-section of 10mm X 25mm. Find the loas at which it will buckle. Take E for the material of member 70GPa.

Q.20 A solid shaft 60mm diameter and 900mm long transmits 40KW at 250rpm. Calculate maximum shear stress induced in the shaft. Take G=90GPa for the material of member.

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

Q.22 Define:

a) Strut

b) Equivalent length of column

SECTION-D

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

Q.23 Derive Torsion Equation for a solid shaft.

Q.24 A simply supported beam of span 6m carries a U.D.L. of 3KN/m starting from a point at a distance of 3m from the left-hand support. Draw S.F.D. and B.M.D. for the given beam.

Q.25 Define:

a) Stiffness

b) Limit of proportionality

c) Percentage elongation

d) Working Stress