Q.27 Define and explain the theorem of perpendicular axes.

Q.28 Find the moment of inertia of a circular section of diameter 40 mm about its centroid axis.

Q.29 Draw stress-Strain diagram for Ductile meterials.

Q.30 Find out the MOI of a rectangular section 50 cm x 100 cm about horizontal axis passing through centroid.

Q.31 Explain different types of springs.

Q.32 Explain Fuler's Formula for calculating Buckling Load.

Q.33 Explain all the three types of columns.

Q.34 Explain Power transmitted Lay shaft.

Q.35 What are the assumption made in the theory of pure torsion?

SECTION-D

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

Q.36 A bar 20mm in diameter is subjected to a pull of 6000N. The measured extension over a gauge length of 250mm is 0.1 mm and the change in diameter is 0.004mm. Calculate the poisson's ratio and the value of modulus of elasticity.

Q.37 Derive the Bending Equation giving its assumptions.

Q.38 Give a comparison between solid and hollow shaft with regard to their strength and weight.

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Roll No. .....

1st Sem. / Mech. Engg. (MSIL)

Subject : Strength of Materials

Time : 3 Hrs. M.M. : 100

SECTION-A

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

Q.1 The dimension of strain is?

a) LT^2 b) N/m^2

c) N d) Dimension less

Q.2 The property of a material by which it can be beaten or rolled into thin plates is called_____?

a) Malleability b) Plasticity

c) Ductility d) Elasticity

Q.3 The strain energy stored in a specimen when stained within the elastic limit is known as _____.

a) Resilience b) Plasticity

c) Malleability d) Stain energy

Q.4 On bending of a beam, which is the layer which is neither elongated nor shortened?"

a) Axis of load

b) Neutral axis

c) Center of gravity

d) None of the mentioned

Q.5 What is the unit of radius of gyration?

a) m^4 b) m

c) N d) m^2

Q.6 What is the moment of inertia of a rectangular section about an horizontal axis through C.G.?

a) $bd^2/6$ b) $bd^2/12$

c) $b^2d^2/12$ d) $bd^2/12$

Q.7 The point of contraflexure occurs in case of :

a) Cantilever Beams

b) Simply Supported Beams

c) Overhanging Beams

d) All type of Beams

Q.8 _____ is a vertical member subjected to direct compressive force.

a) Strut b) Beam

c) Column d) Post

Q.9 Unit of load is

a) N

b) Nm

c) N/m^2

d) None of the above

Q.10 Torsional sectional modulus is also known as _____.

a) Torsion modulus

(b) Sectional modulus

(c) Polar modulus

(d) Torsional rigidity

SECTION-B

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

Q.11 Define stress.

Q.12 Define proof resilience.

Q.13 Define factor of safety.

Q.14 Define radius of gyration.

Q.15 What is moment of inertia?

Q.16 UDL stands for _____.

Q.17 What is material for spring?

Q.18 Define slenderness ratio.

Q.19 Define angle of twist.

Q.20 Define torque.

SECTION-C

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

Q.21 State and explain Hook's law.

Q.22 A steel rod of 20mm diameter is subjected to an axial pull of 40KN. Determine the tensile stress induced in the rod and elongation if original length is 5m. Take E = 210 GN/m^2.

Q.23 Derive an expression for strain energy stored due to suddenly applied load.

Q.24 Explain the concept of proof resilience and co-efficient of resilience.

Q.25 What is beam? Give the various types of supports used for beams.

Q.26 Explain the concentrated load and distributed load.