Q.31 Draw the shear force and bending moment diagram of a cantilever beam carrying a point load At the free end.

Q.32 What is the section modulus of
i) Rectangular section   ii) Circular section

Q.33 Classify the columns.

Q.34 A mild steel rod 20mm diameter is subjected to an axial pull of 40 KN. Determine the tensile Stress induced in the rod and the elongation if the unloaded length is 5 m. Take E=210 GN/m^2

Q.35 Write the assumptions made in the theory of pure bending.

SECTION-D

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

Q.36 Drive torsion equation for the solid shaft

Q.37 A simply supported beam 5 m long is subjected to two point loads of 2KN and 3 KN each at distance of 1 m and 3m respectively from the left hand support. Draw the S.F.D AND B.M.D. for the beam.

Q.38 A brass rod 2 cm diameter and 1.5 m long is subjected to an axial pull of 4 tonnes . Find the stress, strain and elongation of the bar, if modulus of elasticity for the brass is 1.0 x 10^6 kg/cm^2.

Mechanical Engineering
Subject:- Strength of Material

Time : 3Hrs.   M.M. : 100

SECTION-A

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

Q.1 A shear force acts
a) Point load at the free end
b) Point load at the middle of its length
c) Along the surface of a body
d) None of these

Q.2 Hook's law is applicable upto
a) Elastic   b) Proportional limit
c) Plastic limit   d) None of these

Q.3 The following is a probable value of Poisson's ratio in a metal
a) 0.26   b) 0.5
c) 1   d) 0.76

Q.4 Moment of Inertia of a lamina is its
a) First moment of area
b) Second moment of area
c) Third moment of area
d) None of these

Q.5 A beam that is encasted at both its ends is called

a) Cantilever beams
b) Simply supported beam
c) Fixed beam
d) None of these

Q.6 Point of contraflexure is associated with
a) Cantilever beams
b) Simply supported beam
c) Fixed beam
d) Overhanging beam

Q.7 Bending moment at the two ends of a simply supported beam is
a) Zero   b) Negative
c) Positive   d) None of these

Q.8 Bending stress are due to
a) Shear force   b) Thrust
c) Bending moment   d) All of the above

Q.9 In a short column, the slenderness ratio
a) Is less than 32   b) Is greater than 32
c) is greater than 120   d) None of these

Q.10 Following is a function of a spring
a) To measure the forces b) To store energy
c) To absorb shock   d) All of the above

SECTION-B

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

Q.11 Define twisting load.
Q.12 Write the S.I unit of load.
Q.13 Modulus of resilience is equal to_____

Q.14 Write the S.I unit of section modulus.
Q.15 Define cantilever beam.
Q.16 What is UDL?
Q.17 Write the bending equation.
Q.18 Define column.
Q.19 Define torque.
Q.20 The springs are used to absorb_____

SECTION-C

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

Q.21 Define stress . And types of stresses.
Q.22 Draw stress strain curve for a ductile material.
Q.23 Derive the expression for strain energy stored due to gradually applied load.
Q.24 State and explain theorem of perpendicular axis.
Q.25 What is sagging bending moment and hogging bending moment ?
Q.26 What is the flextural formula?
Q.27 What can be the end conditions of the columns when loaded?
Q.28 Write the assumptions made in the theory of pure torsion.
Q.29 A closed coiled helical spring has to carry a load of 150 N and the mean coil diameter is 6 times of wire diameter. Calculate the wire diameter if the maximum shear stress is not to exceed 50 N/mm^2 (CO9)
Q.30 State and explain theorem of parallel axis.