Q.30 Explain the working of laminated spring.

Q.31 Define various supports on a beam.

Q.32 Drive an expression for hoop's and longitudinal stress in a thin seamless cylindrical shell.

Q.33 Explain various types of springs.

Q.34 Explain any five mechanical properties of a metal.

Q.35 Define sagging and hogging in a beam.

SECTION-D

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

Q.36 A steel bar of 20 mm diameter and 2.5 long is rigidly fixed between the two walls. The temperature of the bar is raised by $50^{o}C$. If co-efficient of thermal expansion of steel is $13.5x10^{-6}/^{o}C$. Take E= 210GPA. Determine:

(a) Stress develop in the bar

(b) Force exerted by the wall on the bar

(c) Nature of force exerted .

Q.37 A cantilever beam of length of 5m carries a uniformly distributed load of 2kN/m over a whole span and a point load of 3kN at the free end. Draw shear force and bending moment diagram.

Q.38 Drive the Torsion equation for the hollow shaft.

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4th Sem / Auto & Mech

Subject:- Strength of Materials

Time : 3Hrs. M.M. : 100

SECTION-A

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

Q.1 S.I. unit of stress is

a) kg/cm^2 b) N/m^2

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

Q.2 The ratio of lateral strain to longitudinal strain is called

a) Modulus of elasticity

b) Modulus of rigidity

c) Poisson's ratio

d) Bulk modulus

Q.3 For a thin cylindrically shell, the ratio of wall thickness to the diameter should be less than

a) 1/10 b) 1/15

c) 1/20 d) 1/12

Q.4 Strain energy of a body may be defined as work done on it

a) To deform it b) To resist elongation

c) To resist shortening d) All of the above

Q.5 The moment of inertia of a circular section about an axis perpendicular to the section is

a) $\pi d^3/32$ b) $\pi d^4/64$

c) $\pi d^3/64$ d) $\pi d^4/32$

Q.6 The rate of change of bending moment is equal to

a) Shear force b) Slope

c) Deflection d) None of the above

Q.7 The section modulus, Z is given by

a) I.y/2 b) I/y

c) y/I d) 21/y

Q.8 A column whose slenderness ratio is greater than 120 is known as

a) Short column b) Long column

c) Medium column d) Composite column

Q.9 Shear stress varies from center to the surface of the shaft with

a) Uniform rate b) Varying rate

c) Remain same d) Decreasing rate

Q.10 When a closed coil helical spring is subjected to an axial load, it is said to be under

a) Bending b) Shear

c) Torsion d) Crushing

SECTION-B

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

Q.11 Name the types of stress.

Q.12 The valve of Poisson's ratio for steel is_____.

Q.13 A load applied with some velocity is called_____.

Q.14 According to theorem of perpendicular axis, I_{zz}= _____+_____.

Q.15 What is uniform varying load?

Q.16 Define the moment of resistance.

Q.17 In which beam, point of contra flexure occurs?

Q.18 What is the equivalent length of a column. when both ends are fixed?

Q.19 Write the S.I unit of torque.

Q.20 Define the helix angle.

SECTION-C

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

Q.21 Explain the tensile test on a mild steel specimen.

Q.22 Prove that the longitudinal stress is half of the circumferential stress.

Q.23 Calculate the strain energy in a bar which is 4.5m long and 40 mm in diameter, when it is subjected to a tensile load of 90kN. Take E=210GPa.

Q.24 Explain the radius of gyration.

Q.25 Classify beams.

Q.26 Enlist the assumption made in the thoery of simple bending.

Q.27 Explain various end conditions of column.

Q.28 Classify the columns.

Q.29 State and explain theorem of perpendicular axis.