

- Q.32 A rod 2m long and 30 mm diameter is subjected to an axial pull of 30 KN. If the Young's modulus of the material of the rod is 2×10^5 N/mm², determine the stress, strain and the elongation of the rod (CO1)
- Q.33 State Rankine's and Euler's formula. (CO7)
- Q.34 Explain various and conditions in case of columns. (CO7)
- Q.35 Calculate the resilience and the modulus of resilience of a bar 150 mm long, 40mm wide and 20 mm thick subjected to a tensile load of 50KN applied suddenly. Take $E=2 \times 10^5$ N/mm². (CO2)

SECTION-D

- Note:** Long answer type questions. Attempt any two questions out of three questions. (2x10=20)
- Q.36 Determine the diameter of a solid shaft which will transmit 300 KW at 250 rpm. The maximum shear stress should not exceed 30 N/mm², angle of twist should not be more than 1° in a shaft length of 2m. Take modulus of rigidity = 1×10^5 N/mm². (CO8)
- Q.37 Find the moment of inertia of 1 section with upper flange 10 cm x 2 cm, lower flange 20 cm x 2 cm and web 10 cm x 2 cm about horizontal and vertical centroidal axis. (CO4)
- Q.38 A cantilever beam of length 3m carries a uniformly distributed load of 1KN/m which runs over a length of 2m from the free end in addition to a point load of 2KN at a distance of 2.5m from the free end. Draw the SFD and BMD. (CO3)

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1st Sem / Mech. Engg. (MSIL) Subject:- Strength of Materials

Time : 3Hrs.

M.M. : 100

SECTION-A

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

- Q.1 The ratio of lateral strain to longitudinal strain is called (CO1)
- a) Modulus of elasticity
 - b) bulk modulus
 - c) Modulus of rigidity
 - d) Poisson's ratio
- Q.2 Unit of strain is (CO1)
- a) Cm/cm
 - b) N/cm²
 - c) m/m
 - d) No unit
- Q.3 The SI unit of Torque is : (CO1)
- a) Nm
 - b) Nm²
 - c) N/m²
 - d) None of the above
- Q.4 The point of contraflexure occurs in case of (CO3)
- a) cantilever beams
 - b) overhanging beams
 - c) simply supported beams
 - d) All types of beams
- Q.5 Rankines formula holds good for: (CO5)
- a) Short columns
 - b) Medium columns
 - c) Long columns
 - d) Both a & b

- Q.6 The slenderness ratio is the ratio of (CO7)
a) Length of column to least radius of gyration
b) Moment of inertia to area of cross-section
c) Area of cross-section to moment of inertia
d) Least radius of gyration to length of column

Q.7 The shear stress is minimum at (CO8)
a) Axis of the shaft
b) outer surface of the shaft
c) Anywhere inside the shaft
d) None of the above

Q.8 The shafts are designed on the basis of: (CO6)
a) Rigidity b) Strength
c) Both a & b d) None of the above

Q.9 U.D.L stands for: (CO1)
a) Uniformly diluted Load
b) Uniformly distributed Load
c) Uniformly developed Load
d) Uniaxial distributed Load

Q.10 What is the Unit of radius of gyration (CO4)
a) m^4 b) N
c) m d) m^2

SECTION-B

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

- Q.11 Define Stress.

Q.12 Formula for bending equation is _____. (CO2)

Q.13 Define modulus of resilience. (CO2)

Q.14 Torque = force x _____. (CO8)

Q.15 Define radius of gyration. (CO3)

Q.16 Define Factor of Safety. (CO3)

- Q.17 Write the SI units of section modulus. (CO4)
Q.18 Define Slenderness Ratio. (CO5)
Q.19 What is Spring Index. (CO7)
Q.20 Define Spring Index.

SECTION-C

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

- Q.21 Draw stress-strain curve for a ductile material. (CO1)

Q.22 What do you understand by hogging and sagging bending moments. (CO3)

Q.23 State and explain Perpendicular Axis theorem. (CO4)

Q.24 Define beam. Explain various types of beams. (CO3)

Q.25 Write any five assumptions in the theory of simple bending. (CO5)

Q.26 Explain various loading modes. (CO2)

Q.27 A rectangular section is of breadth 12.5 cm and depth 25 cm. Find section modulus. (CO5)

Q.28 State and explain Hooke's Law. (CO1)

Q.29 Define Spring. How are they classified? (CO6)

Q.30 A circular shaft of 80mm diameter is required to transmit power at 120 rpm. If the shear stress is not to exceed 40MPa, find the power which can be transmitted by the shaft. (CO8)

Q.31 Define Strain. Explain the different types of strains. (CO1)