

- Q.29 Find out the MOI of a rectangular section 40cm X 80cm about
 a) Horizontal axis passing through centroid
 b) Vertical axis passing through centroid
- Q.30 Explain and drive the expression for torsional rigidity of a shaft.
- Q.31 Write the various functions and applications of a spring.
- Q.32 Explain Euler's theory of a Column.
- Q.33 Write a short note on pure bending.
- Q.34 Explain leaf springs and its applications.
- Q.35 Calculate the strain energy and modulus of resilience of bar 200mm long, 50mm wide and 40mm thick subjected to a tensile load of 60KN applied gradually.
 Take $E = 2 \times 10^5 \text{ N/mm}^2$

SECTION-D

- Note:** Long answer type questions. Attempt any two questions out of three questions. (2x10=20)
- Q.36 Drive the Torsion equation giving it assumptions.
- Q.37 Draw S.F.D. and B.M.D. for a simply supported beam of 4m Length having centre load of 10 N and a UDL of 2N/m for a length of 1 meter from left end.
- Q.38 Define and drive the formula for strain energy in a body due to impact load.

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4th Sem / Branch : 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 Bending stress occurs due to
 a) shear stress (force) b) bending moment
 c) thrust d) all of the above
- Q.2 Effect of compressive force is to _____ the length of body
 a) Decrease b) Increase
 c) Same d) None of the above
- Q.3 A column whose slenderness's ratio is greater than 120 is known as
 a) short column b) long column
 c) medium column d) composite column
- Q.4 The shaft are generally made of
 a) mild steel b) alloy steel
 c) copper alloy d) any of the above
- Q.5 The load at which a vertical compression member buckles is known as
 a) Critical Load b) Crippling Load
 c) Buckling Load d) All of the above

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- Q.6 The spring use in mechanical toys is
 a) leaf b) spiral
 c) helical d) all of the above
- Q.7 Strain energy of a body may be define as work done on it
 a) to deform it b) to resist it
 c) to resist shortening d) all of the above
- Q.8 SI unit of stress is
 a) kg/cm² b) N/m²
 c) kg/mm² d) kg/m²
- Q.9 Bending moment at support in case of simply supported beam always
 a) zero
 b) negative
 c) positive
 d) depends upon loading
- Q.10 Brittleness is opposite to
 a) toughness b) plasticity
 c) malleability d) none of the above

SECTION-B

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

- Q.11 Define shearing load.
- Q.12 1MPa= _____ N/mm².
- Q.13 Define point of contraflexure.
- Q.14 U.D.L. stands for _____
- Q.15 Define buckling load.

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- Q.16 Name the end conditions of a column.
- Q.17 Spring absorbs energy due to resilience. (T/F)
- Q.18 Rankine's formula holds good for _____.
- Q.19 Define hinged support.
- Q.20 Define stiffness.

SECTION-C

- Note:** Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)
- Q.21 Drive an expression for strain energy stored due to gradually applied load.
- Q.22 What is a strain? Explain different types of strain.
- Q.23 A brass rod 2CM diameter and 1.5 M long is subjected to an axial load of 400N. Find the stress, strain and elongation of the bar, if modulus of elasticity for the brass is 1.0×10^3 N/m²?
- Q.24 Define the following:
 a) Circumferential stress
 b) Longitudinal stress
- Q.25 Explain the theorem of perpendicular axis.
- Q.26 What is a load? Explain various types of loads.
- Q.27 A simply supported beam 5M long is subjected to two Point loads of 2 KN and 3KN each at a distance of 1m and 3m respectively from left support. Draw the SFD and BMD for the beam.
- Q.28 Differentiate between the sagging and hogging Bending moment.

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