

- Q.29 Find out the MOI of a rectangular section 40cm X 80cm about
- Horizontal axis passing through centroid
 - 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 its 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
- shear stress (force)
 - bending moment
 - thrust
 - all of the above
- Q.2 Effect of compressive force is to _____ the length of body
- Decrease
 - Increase
 - Same
 - None of the above
- Q.3 A column whose slenderness's ratio is greater than 120 is known as
- short column
 - long column
 - medium column
 - composite column
- Q.4 The shaft are generally made of
- mild steel
 - alloy steel
 - copper alloy
 - any of the above
- Q.5 The load at which a vertical compression member buckles is known as
- Critical Load
 - Crippling Load
 - Buckling Load
 - All of the above

- 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/cm^2 b) N/m^2
 c) kg/mm^2 d) kg/m^2
- 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 $1\text{MPa} = \underline{\hspace{2cm}} \text{N/mm}^2$.
 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 $1.0 \times 10^3 \text{ N/m}^2$?
 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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