4th Sem. / Arch
Subject : Structural Mechanics

Time : 3 Hrs.   M.M. : 100

SECTION-A

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

Q.1   A vector quantity is one which has
a) Magnitude only
b) Direction only
c) Both Magnitude & Direction
d) None of the above

Q.2   The necessary condition of equilibrium of a body is
a) $SH = 0$ b) $SV = 0$
b) $SM = 0$ d) All of the above

Q.3   Centroid lies at the intersection of the diagonals of
a) Square   b) Rectangle
c) Parallelogram   d) All of the above

Q.4   The ability of a material to deform without breaking is called
a) Resilience   b) Creep
c) Plasticity   d) Elasticity

Q.5   The point of contraflexure is also called
a) The point of inflexion   b) Factor of safety
c) Hinge   d) None of the these

Q.34   What are the assumption made in finding out the forces in a frame?

Q.35   Define and explain the term: imperfect frame and a redundant frame.

SECTION-D

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

Q.36   A simply supported beam 6m long is carrying a uniformly distributed load of 2kN/m over a length of 3m from the left end. Draw the S.F. and B.M. diagram for the beam and also calculate the maximum B.M. on the section.

Q.37   A rectangular beam 300 mm deep 150 mm wide is simply supported over a span of 8m. Find the maximum uniformly distributed load that the beam can carry, if the bending stress is not to exceed $120 \, \text{N/mm}^2$.

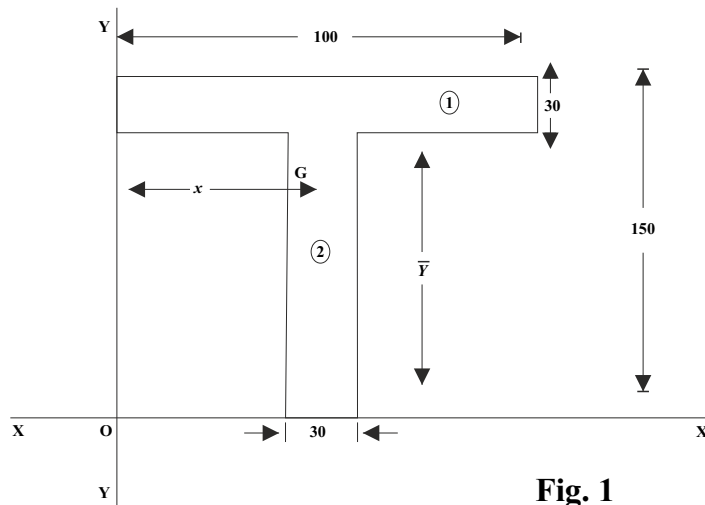Q.38   Find the position of centroid of a 100 mm x 150 mm x 30 mm T-Section (Fig. 1)

Fig. 1

Q.6 A simple supported beam of length L carrying a total U.D.L. of W will have maximum bending moment of
a) WL/8
b) WL/4
c) WL/2
d) WL/16

Q.7 Which of the following are statically determinate beam?
a) Cantilevers
b) Simply supported beams
c) Overhanging beam
d) All the above

Q.8 The section modulus (Z) is given by
a) I/Y
b) IxY
c) Y/I
d) E/I

Q.9 The section modulus of a circular section about an axis through its C. G is
a) d/2
b) $pd^2/4$
c) $pd^2/16$
d) $pd^3/32$

Q.10 The basic perfect frame is a
a) Triangle
b) Rectangle
c) Hexagon
d) Square

SECTION-B

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

Q.11 Coplanar forces lie in ....plane.

Q.12 Concurrent force cannot produce.............

Q.13 The moment of couple is known as.................

Q.14 One pascal (Pa) = ...

Q.15 The negative bending moment is also called.................

Q.16 A load acting at a point, is known as ....

Q.17 A beam supported on more than two supports is known as ....

Q.18 Bending stresses are also known as ....

Q.19 The moment of resistance of a flitched beam will be equal to the .... of moment of resistances of two materials.

Q.20 The member subjected to tension is called a ....

SECTION-C

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

Q.21 State Parallelogram law of forces with neat sketch.

Q.22 Describe coplanar force system.

Q.23 Explain Lami's theorem.

Q.24 State Parallel axis theorem with diagram.

Q25 Write moment of inertia of circular and triangular section.

Q.26 Explain Strain. What is the unit of strain? What are the different type of strains? Define them.

Q.27 Explain Hook's law.

Q.28 Define load. Write the S.I. unit of load. What are the different type of loads?

Q.29 Define beam. Write different types of beam with sketches.

Q.30 Give the sign convention for Bending moment in general with diagram.

Q.31 Draw the S.F. and B.M. diagrams for a cantilever beam carrying uniformly distributed load over its entire length.

Q.32 What do you mean by 'simple bending 'or' 'pure bending'?

Q.33 What do mean by section modulus? What is its significance?