Total No. of Questions – [4]

Total No. of Printed Pages – [2]

G.R. No.	

P118-111 (T1)

OCTOBER 2018 / IN - SEM (T1)
F. Y. M. TECH. (Structures) (SEMESTER - I)
COURSE NAME: (CVPB11181) Theory of Elasticity
(2018 PATTERN)

Time: [1 Hour] [Max. Marks: 20]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2, Q.3 OR Q.4**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1) Explain the state of stress at a point on an arbitrary plane in a Cartesian coordinate system. Obtain expression for Cartesian components of stress resultant T, acting on oblique plane.
Hint: Stresses acting on face of the tetrahedron. [10]

OR

Q.2) a) The state-of-stress at a point is given by the following array of terms.
$\sigma_x = 12MPa, \sigma_y = -5MPa, \sigma_z = 18MPa, \tau_{xy} = \tau_{yz} = \tau_{zx} = 15MPa$
Determine the stress components on which only normal stresses are acting. [6]

b) Explain the assumptions of linear elasticity problem? [4]

Q.3) a) Categorize is the given figures with reference to homogeneous or isotropic system? Explain the reasons for the correlations. [4]

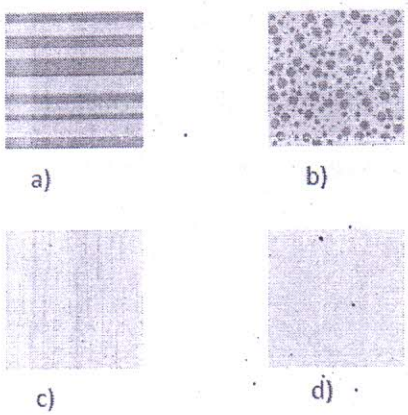

Fig. 1: Properties of structural system

b) What are stress invariants? Explain its significance in linear elasticity problem? [6]

OR

Q.4) Indian Standard hot rolled steel section is loaded as a fixed cantilever beam subjected to loading as shown in the fig. 2. Assume a linear elasticity problem. Draw the neat sketch of state of stress at a point for the following locations.

i) At support section- A, point-1; ii) At support section- A, point-2;
iii) At free end- B, point-2. [10]

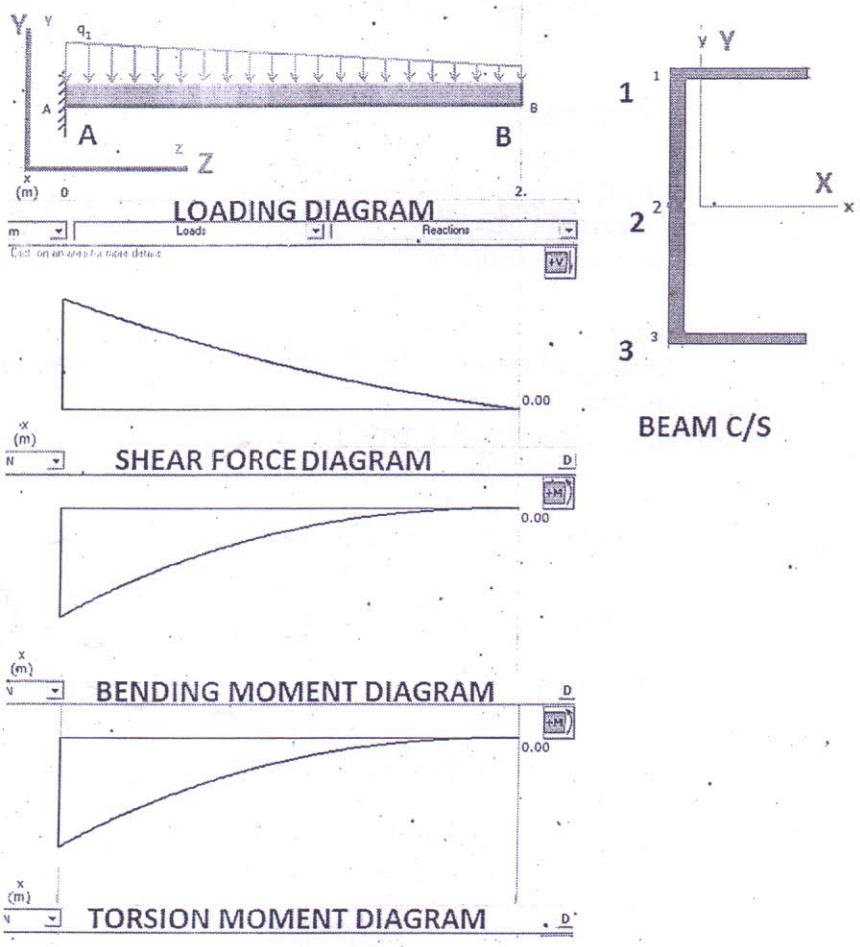

Fig. 2: State of stress problem

!!==Wish you all the best==!!