Hall Ticket Number :											R14

Code: 4PT618

M.Tech. I Semester Supplementary Examinations Aug/Sep 2016

Maintenance & Rehabilitation of Structures

(Structural Engineering)

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60Marks)

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UNIT–I

1. Explain the various remedial measures adopted to repair corroded structural elements. 12M

OR

2. Describe the procedure for conducting Pullout test in detail. 12M

UNIT–II

3. Under what circumstances FRP materials are preferred in rehabilitation of structures. Discuss. 12M

OR

4. Summarize the methods of rehabilitating structural cracks in detail. 12M

UNIT–III

5. How will you assess the damage of structures due to fire? Interpret the recommendations under such cases. 12M

OR

6. Explain about fibrocement jacketing. 12M

UNIT–IV

7. Write short notes on
   i) Rust eliminators 6M
   ii) Foamed concrete 6M

OR

8. Write short notes on
   i) Polymer coatings 6M
   ii) Epoxy injection 6M

UNIT–V

9. Suggest suitable measures to repair the deflection in the existing structure and to overcome low member strength. 12M

OR

10. a) Discuss about the effect of chemical disruption in concrete. 6M
    b) What are the principles followed in the assessment of a structure. 6M

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Hall Ticket Number :										

R14

Code: 4PT612

M.Tech. I Semester Supplementary Examinations Aug/Sep 2016

Theory of Elasticity

(Structural Engineering)

Max. Marks: 60 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 12 = 60Marks)

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UNIT–I

1. a) Explain deviatoric stress and hydrostatic stress 6M

   b) Prove that the rigid body displacement do not affect the strains at a point 6M

OR

2. a) Explain plain stress and plain strain problems with suitable examples 6M

   b) Derive equations of equilibrium and compatibility in terms of stresses for two dimensional plain stress problems with zero body forces 6M

UNIT–II

3. A cantilever beam of span l is subjected to a point load of P at end of section, for this beam
   i. Obtain the main equations that describe the bending behavior of the beam based on the conditions of equilibrium, compatibility and boundary conditions
   ii. Explain the stress function approach for solution in the above 3-dimensional problem. 12M

OR

4. a) Investigate what problem of plane stress is solved by the following stress function.
   $\Phi = [3F/4C\ (xy-(xy^3/3c^2))\ ]+Py^2/2$ 8M

   b) How does the stress function satisfy the bi harmonic equation? 4M

UNIT–III

5. a) Derive the differential equation of equilibrium for a two dimensional problem in polar coordinates 6M

   b) Obtain the general expression for stresses for an axis symmetric problem and arrive expressions for stresses in a hollow cylinder subjected to internal fluid pressure only. 6M

OR

6. A curved bar of constant narrow rectangular section has a circular axis. It is bent in the plane of curvature by couples or applied at end where ‘a’ and ‘b’ are the inner and outer radii of the bar. Obtain the stresses components satisfying all the boundary conditions. Assume that the bar is subjected to pure bending only. 12M

UNIT–IV

7. Determine the stress tensor at a point in a material subjected to the strains as given below.

$$\begin{bmatrix} +800 & +150 & +200 \\ +150 & -200 & -250 \\ +200 & -250 & -300 \end{bmatrix} \times 10^{-6}$$

12M

OR

8. Explain
   i. Principle of superposition
   ii. Uniqueness theorem
   iii. Reciprocal theorem
   iv. Homogeneous deformation 12M

UNIT–V

9. a) Explain the reason for the occurrence of zero stress at the corners of shafts with rectangular section subjected to torsion 6M

   b) Develop the contour lines of displacements of a shaft with elliptical section subjected to torsion. 6M

OR

10. a) Explain in brief the membrane analogy for torsion 6M

    b) A rectangular beam of width ‘2a’ and depth ‘2b’ is subjected to torsion. Derive the equation for obtaining maximum shear stresses. 6M

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