DUAL DEGREE B.SC.(H)-M. SC MATHEMATICS -ASSIGNMENT

Course Code: MAT624H **Course Title:** Applied Mechanics of solids **Sem.:** Xth

UNIT-I

Q.1. Derive Beltrami-Michell compatibility condition for plane stress deformation.

Q.2. Derive displacement components for plane strain deformation in terms of airy stress function

Q.3. Represent biharmonic function in terms of two analytic function.

Q.4. Derive displacement and stresses for thick-walled tube under external and internal pressure

UNIT-II

Q.1. Discuss the solution of beam stretched by its own weight

Q.2. Derive Neumann's problem for torsion of cylindrical bar

Q.3. Show that shear stress at the corners and centroid are zero and maximum at the middle point for torsion of beam with triangular cross-section.

UNIT-III

Q.1. Explain why dilatational wave are called primary wave or P-wave while rotational wave are called secondary wave or S-wave.

Q.2. Explain stationary type solution of wave equation on one and two-dimension

Q.3. Explain propagation of Love wave

UNIT-IV

Q.1. Explain Ritz method in one and two-dimensional and using Ritz method, find the approximate solution to the problem of extremising the functional:

I(z) = $\iint_D [z_x^2 + z_y^2 - 2z]\, dxdy$, where the region R is a sequence -a$\leq$x$\leq a$, -a$\leq y \leq a$ and z = 0 on the boundary of the sequence.

Q.2. Explain Galerkin method in one and two-dimensional and using Galerkin method, solve the problem ∇^2u = -1 , in the rectangle $|x| \leq a$, $|y| \leq b$, where u = 0 on the boundary

Q.3. Explain the following

(i) Trefftz methods

(ii) Rafalson method