8. Explain Ritz method for two dimensional case and find an approximate solution to the problem of extremising the functional :

$$I(z) = \iint_D \left[z_x^2 + z_y^2 - 2z \right] dxdy \qquad \mathbf{1}$$

where the region R is a square $-a \leq x \leq a$, $-a \leq y \leq a$ and $z = 0$ on the boundary of the square D.

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DD317

M.Sc. EXAMINATION, May 2019

(Fourth Semester)

(B. Scheme) (Main & Re-appear)

MATHEMATICS

MAT616B

Mechanics of Solids-II

Time : 3 *Hours*] [*Maximum Marks :* 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Explain generalized plan stress.

(b) Derive general solution of biharmonic equation.

2. (a) Derive displacement and stress of thick walled tube under external and internal pressure.

(b) Write a short note on first and second boundary value problem of plane elastic body in terms of airy stress function.

Unit II

3. (a) Define spring and despot. Drive constitutive equation of SLS model.

(b) Explain creep and relaxation phenomenon of Maxwell model.

4. Using correspondence principle of lenear viscoelasticity, derive displacement of Kelvin model in viscoelastic medium.

Unit III

5. (a) Show that maximum stress occurs on the boundary of the cross-section.

(b) Show that in the torsion of elliptic cylinder :

$$\tau = \frac{2\mu\alpha ab}{a^2 + b^2}\sqrt{a^2 - e^2x^2}$$

where $e = \frac{1}{a}\sqrt{a^2 - b^2}$.

6. Explain propagation of love wave.

Unit IV

7. (a) Show that potential energy of all displacement satisfying the given b.c., those which satisfy the $\equiv 1m$ equations make the potential energy as absolute minimum.

(b) Write a short note on deflection of an elastic string.