4. Consider the unrestricted plastic flow in a circular tube under internal pressure p_0 and initial radii a_0 and b_0. Find the pressure at any point within the tube. 15

M. Sc. Mathematics Examination, 2023

(2nd Year, 2nd Semester)

Mathematics

Paper – DSE-07 (B27)

[Solid Mechanics – IV]

Time : 2 hours Full Marks : 40

The figures in the margin indicate full marks.

Notations / Symbols have their usual meanings.

Answer question **no. 1** and ***any two*** from the rest.

1. State the properties of π-plane in stress space. Show that Tresca's yield criterion represents a regular hexagonal cylinder in stress space. 10

OR

Describe Lode's experiment regarding the role of intermediate principal stress on yield conditions. 10

2. Define deviatoric and spherical parts of a stress tension. Obtain matrices of stress tensors for deviatoric and spherical parts of stress. Also calculate the stress invariants in both the cases in terms of principal components of stresses. 15

3. A rectangular beam is bent by terminal couple of moment M. Prove that full plastic state is not physically possible by the application of finite moment. 15