POST GRADUATE DIPLOMA
Aerospace Structural Design
Subject: Aerospace Fasteners
Subject Code: APAS-107
Semester: First
September 2020
Theory (External): 35 Marks
Time: 03 Hours

INSTRUCTIONS TO THE STUDENTS

1. Read the questions carefully and write the answers in the answer sheets.

2. Wherever necessary, the diagram drawn should be neat and properly labelled.

3. This questions paper comprises of 8 questions out of which student need to attempt any 4 questions.

4. All questions carry equal marks.

5. The time allotted will be 3 hours for examinations including time of downloading of question paper to emailing of answer books to the concerned Dean/IC.

ESSAY TYPE QUESTIONS

1. What are principle stresses and deduce the expressions for maximum and minimum principle stress?

2. Discuss different types of failures in riveted joints with example. What do you mean by Caulking and Fullering processes in riveted joints? List some applications where we use these processes.

3. What do you mean by elastic failure of a mechanical component? Explain in detail the Maximum shear stress theory.

4. A rectangular block of material is subjected to a tensile stress of 100 MN/m^2 on one plane and a tensile stress of 50 MN/m^2 on a plane at right angles, together with shear stresses of 60 MN/m^2 on the same planes. Find:
   a) The direction of principle planes.
   b) The magnitudes of the principle stresses.
   c) The magnitude of the greatest shear stress.

5. A double-riveted double-strap butt joint is used to connect two plates; each of 12 mm thickness, by means of 16 mm diameter rivets having a pitch of 48 mm. The rivets and plates are made of steel. The permissible stresses in tension, shear and compression are 80, 60 and 120 N/mm^2 respectively. Determine the efficiency of the joint.

6. Derive the expressions for thin plate subjected to combined bending and twisting.

7. Derive the equation for determining the bend allowance while forming sheet metal. Explain with one example.

8. Discuss the importance of some aerospace grade fasteners:
   a) Tension Screws
   b) High Tension Bolts.

'END OF PAPER'