

17457

14115

3 Hours / 100 Marks

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. **Attempt any TEN of the following:** **20**
- a) Differentiate a boiler mounting and an accessory.
 - b) Define the terms; ‘pressure’ and ‘stress’ for a thin walled cylindrical pressure vessel subjected to internal pressure ‘P’.
 - c) Define what is load on pressure vessel? List any two.
 - d) Define what is a ‘ligament’ with a neat sketch.
 - e) A spherical shell of $D_i = 3\text{m}$, $P = 1.5 \text{ N/mm}^2$, $S = 90 \text{ MPa}$, $\epsilon = 75\%$. Find thickness, t ?
 - f) Explain what is stress concentration?
 - g) Classify the nozzles.

P.T.O.

- h) What is fatigue concentration?
- i) Explain why vertical elliptical hole is preferable?
- j) Draw the symbols for;
 - (i) Double bevel butt weld
 - (ii) Fillet weld
- k) Classify metals and differentiate them with one example each.
- l) Explain term 'stainless' for stainless steels. Classify them.
- m) List any four design considerations in the selection of materials for pressure vessel construction.
- n) List some factors in the selection of material for hydrogen service.
- o) List advantages of attaching the protective layers.

2. Attempt any TWO of the following: 16

- a) Explain with neat sketch any one boiler mounting or accessory.
- b) Explain the design approach for pressure vessels.
- c) Explain membrane stress analysis for torispherical head with neat sketch.

3. Attempt any TWO of the following: 16

- a) Explain with neat sketch, terminology of pressure vessel.
- b) What are the various stress categories? Explain what are primary and secondary stresses?
- c) Explain the design steps, with proper notations for a cylindrical pressure vessel with torispherical dish ends. Assume suitable data if needed.

- 4. Attempt any TWO of the following:** **16**
- a) Explain stress concentration in circular and elliptical openings for pressure vessels with neat diagrams.
 - b) List any four defects in welded joints. Explain their causes and remedies.
 - c) Write two properties and two applications for :
 - (i) Aluminium alloy (any one)
 - (ii) Copper alloy (any one)
- 5. Attempt any TWO of the following:** **16**
- a) What are stacked and built up plates? Explain with neat sketches.
 - b) List the various supports for pressure vessels. Explain skirts supports with neat sketches.
 - c) Draw neat diagrams (any four cases) to show how stress concentration can be reduced.
- 6. Attempt any TWO of the following:** **16**
- a) Explain theoretical advantages of using a spherical pressure vessel. Why cylindrical pressure vessel is preferred?
 - b) Draw neat sketch for flanged joint. Write the stresses acting on its different sections.
Classify gaskets giving suitable examples.
 - c) Explain the importance of visual inspection prior to other NDT. What is the cause and remedy for an 'undercut' in weld?
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