

# 17457

**11819**

**3 Hours / 100 Marks**

Seat No.

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

**Marks**

- 1. Attempt any FIVE of the following: **20****
- a) Define pressure vessel. State its types.
  - b) Define wind load and piping load.
  - c) Draw a neat labelled sketch of hemispherical head.
  - d) Describe any two methods of reducing stress concentration with neat sketch.
  - e) Compare welded and bolted joints.
  - f) State the general requirements for selecting a material for pressure vessel.
  - g) State the factors to be considered while designing earthquake loads.
  - h) List advantages of attaching protective layers.

P.T.O.

- 2. Attempt any TWO of the following:** **16**
- a) Differentiate a boiler mountings and accessories.
  - b) A cylindrical shell is subjected to an operating pressure of 1.5 MPa. If internal diameter of shell is 4m and maximum allowable stress is 160 MPa calculate -
    - (i) Thickness of shell
    - (ii) Thickness of conical head, if apex angle of cone is  $60^\circ$ . Take joint efficiency as 75% and corrosion allowance is 3 mm.
  - c) Explain stress concentration in circular and elliptical openings for pressure vessels with neat sketch.
- 3. Attempt any TWO of the following:** **16**
- a) What is intersecting sphere? List any four advantages.
  - b) Explain with neat sketch, terminology of pressure vessel.
  - c) State the design steps, with proper notations for a cylindrical pressure vessel with conical dish ends.
- 4. Attempt any FOUR of the following:** **16**
- a) List any four advantages of welded joints.
  - b) Describe any four materials used for construction of vessel for non-corrosive services.
  - c) Give the detailed classification of construction engineering material. Define ferrous metal.
  - d) Define :
    - (i) Dilation efficiency
    - (ii) Ligament efficiency
  - e) Classify gaskets giving suitable examples.
  - f) What is stress concentration? State any two causes.

**5. Attempt any TWO of the following:****16**

- a) State the design considerations for thermal stress.
- b) Draw and explain :-
  - (i) Support skirts
  - (ii) Saddler
  - (iii) Support legs
  - (iv) Stiffness
- c) What is nozzle reinforcement and explain its replacement procedure.

**6. Attempt any FOUR of the following:****16**

- a) List any four welding defects with one cause of each.
  - b) What are the steps to be considered in selection of material for hydrogen services?
  - c) Draw and explain stacked plate.
  - d) Why cylindrical pressure vessel is preferred?
  - e) Draw the symbol for
    - (i) Double bevel butt weld
    - (ii) Single transverse fillet weld
    - (iii) Double parallel fillet weld
    - (iv) Plug weld
  - f) Draw a neat sketch of flanged joint.
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