17457

21415

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each neat main Question on a new page.

(3) Assume suitable data, if necessary.

(4) Use of Non-programmable Electronic Pocket Calculator is permissible.

(5) 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:

(i) Dead load

(ii) Piping load

c) Draw a neat labelled sketch of semi-elliptical head.

d) What is stress concentration? How does it occurs?

e) List and draw the type of welding joints.

f) List any four bolting materials with its composition.

g) State the design considerations for pressure vessels.

h) Explain the method of attaching protective layers.

Marks

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

a) What is intersecting sphere? List any four advantages.

b) A cylindrical shell is subjected to an operating pressure of 1.5 MPa. If internal diameter of shell is 4 m and maximum allowable stress is 160 MPa Calculate:

(i) Thickness of shell

(ii) Thickness of conical head, if apex angle of cone is 55°.

Take joint efficiency as 80% and corrosion allowance as 3 mm.

c) What is nozzle reinforcement and explain its replacement procedure and shape?

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

a) Give the terminology of pressure vessel with neat sketch.

b) How pressure vessel is designed for bolt size numbers?

c) Describe any two methods of reducing stress concentration.

d) Describe any four materials used for construction of vessel for non corrosive services.

e) What are the steps to be considered in selection of material for hydrogen services?

f) Compare welded and bolted joint.

Marks

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

a) What is dialation of pressure vessel? Express the dialation for cylindrical vessel.

b) A pressure vessel consists of a cylinder of a meter inside diameter and is closed by hemispherical ends. The pressure intensity of the fluid inside the vessel is not to exceed 2 N/mm^2. The material of the vessel is steel whose ultimate strength in tension is 420 MPa. Calculate the required wall thickness of the cylinder and the thickness of hemispherical ends, considering, a factor of safety of 5. Neglect localised effects at the junction of cylinder and the hemisphere.

c) Define fatigue concentration. Explain stress concentration in circular and eliptical opening.

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

a) State the factors to be considered while determining earthquake loads.

b) Define:

(i) Dialation efficiency

(ii) Ligament efficiency

c) List any four welding defects with each cause.

d) List any four advantages of welded joints.

e) Describe with neat sketch the attachment of head to the shell in pressure vessel.

f) State the general requirements for selecting a material for pressure vessel.

Marks

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

a) Explain the accessories and mountings of pressure vessels.

b) State the design consideration for thermal stress.

c) Draw and explain:

(i) Support skirts

(ii) Support lugs

(ii) Saddles

(iv) Stiffeners.

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