17457

11718

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

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 FIVE of the following: **20**

a) How are pressure vessel classified? Define:

(i) Hoop stress

(ii) Longitudinal stress

b) Write the general design criterion of pressure vessel.

c) What is dilation of pressure vessel? Explain.

d) Define ligament efficiency. Write the use of stifners.

e) Draw the following types of heads used in pressure vessel.

(i) Spherical shell

(ii) Ellipsoidal head

P.T.O.

Marks

f) Define stress concentration. What are the causes of it?

g) What are the various defects observed in weld? Explain any one with neat sketch.

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

a) Discuss the steps to calculate the following types of loads:

(i) Wind load

(ii) Earth quake load

b) Write the design procedure of following parts of vessels

(i) Shell

(ii) Nozzle

c) What is fatigue concentration? How it is occur? Explain by giving suitable example.

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

a) List and explain accessories and mountings used in pressure vessels.

b) Write and explain any one welding process of a pressure vessel

c) What is non-corrosive service? Write the selection criterion of material for hydrogen service.

Marks

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

a) (i) How are stresses occurs in bi-metallic joints?

(ii) A cast iron cylinder of inside diameter 150 mm is subjected to a pressure of 15 N/mm^2. The permissible working stress for the cast iron may be taken as 25 MPa. If the cylinder is closed by a flat head cast integral with the cylinder walls, find the thickness of the cylinder wall and the flat head.

b) Why reinforcement is given to a nozzle? How stress concentration is occur in circular and elliptical opening? Explain.

c) Write the design procedure of following parts of vessel:

(i) Flanges

(ii) Bolt (Size and numbers)

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

a) Define Poisson's ratio. Explain its importance in design of pressure vessel. How deformation and stresses occurs in flanged joints?

b) Draw and explain in brief

(i) Supports skirts.

(ii) Support lugs

(iii) Saddles

(iv) Support legs

c) What are the general considerations for corrosive service? Explain the method of attaching protective layers.

Marks

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

a) State and explain the terminology used in pressure vessel.

b) Explain any two types of ends used for pressure vessel giving practical applications of each.

c) What are the design constructional features of pressure vessel.

d) What are the advantages and limitations of NDT of welds?

e) Define thermal stress. Write the formula to determine thermal stress in pressure vessel and state the meaning of each term used.

f) Compare ferrous and non-ferrous materials for corrosive service. (any four points)