17457

16117

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

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

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

(4) Illustrate your answers with neat sketches wherever necessary.

(5) Figures to the right indicate full marks.

(6) Assume suitable data, if necessary.

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

(8) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

(9) Use of Steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. Attempt any TEN of the following: **20**

a) Define ligament efficiency?

b) Differentiate accessories and mountings for a boiler.

c) Give the function of economizer and super heater?

d) What are pressure vessels? List some of them (any four).

e) List any two factors to be considered while calculating wind load.

f) Define what is Poisson's ratio.

g) What is design pressure? Explain.

Marks

h) Give the relation of circumferential and longitudinal stress with proper notations?

i) Draw a neat labelled sketch of a 'Torispherical head'?

j) Draw a neat labelled sketch of a 'Support lugs' for pressure vessel?

k) Draw a neat labelled sketch, depicting the methods for attaching shell to head in pressure vessel fabrication.

l) Define stress concentration?

m) What is nozzle reinforcement? Explain.

o) Draw welding symbols of the following:

(i) Spot weld

(ii) Plug weld

p) List two factors to be considered while selecting material for hydrogen service.

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

a) (i) Write the general design criterion of pressure vessel?

(ii) List the stresses induced in flanges and flanged joints?

b) Explain the ferrous materials for corrosive services used generally in pressure vessel construction.

c) State and explain the various defects that occur in welds? (any four)

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

a) Explain with neat labelled sketches, the stresses in a spherical vessel subjected to an internal pressure(P)?

b) Explain the importance of conducting visual inspection of welds. List some NDT methods?

c) Explain any two methods of attaching protective layers.

Marks

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

a) A cast steel cylinder of 350 mm inside diameter is to store certain liquid at a pressure of 13.5 N/mm^2. It is closed at both ends by flat cover plate which are made up of alloy steel and attached by bolts. Determine, the wall thickness of the cylinder and plates if the permissible stresses of their materials are 55 MPa and 65 MPa respectively.

b) Explain the variation in stress concentration factor for circular and elliptical openings in pressure vessels.

c) (i) With neat sketches, illustrate the procedure for nozzle reinforcement?

(ii) Classify the nozzles?

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

a) Give the terminology for pressure vessels?

b) Draw a neat labelled sketch of any one boiler accessory.

c) Define thermal stress. Write the formula of thermal stress giving proper notations.

d) Explain with neat sketch, stresses induced in bi-metallic joints.

e) (i) What are the different types of gaskets and their materials in case of pressure vessels?

(ii) Write the allowable stress range in pressure vessels?

f) (i) Define fatigue concentration.

(ii) Explain notch sensitivity factor.

Marks

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

a) Explain membrane stress analysis for a semi-ellipsoidal head.

b) Explain preference of cylinder over sphere in pressure vessel shell fabrication?

c) Explain shell stiffening with neat sketch.

d) Explain design of pressure vessel for bolt size and numbers.

e) Classify the pressure vessels giving examples.

f) State four factors in determining ligament efficiency.