17457

11920

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

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

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

(3) Figures to the right indicate full marks.

(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.

Marks

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

a) Define pressure vessels and list various types.

b) Explain dilation of pressure vessels and its effects.

c) Explain the stresses in bi-metallic joints.

d) An air receiver consisting of a cylinder closed by hemispherical ends. It has a storage capacity of 0.25 m^3 and an operating internal pressure of 5 MPa. It is made of plain carbon steel with ultimate strength of 340 N/mm^2. Taking factor of safety 4 and neglecting the effect of welded joints, determine the dimensions of the receiver.

e) Define ligament efficiency and explain how it is calculated.

f) Define stress concentration and list various areas in boiler having stress concentration.

g) Classify various techniques used for NDT of welds.

h) List four requirements of materials for pressure vessels.

Marks

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

a) Define terms related to pressure - working pressure, design pressure and hydrostatic test pressure.

b) Classify various types of end closures for cylindrical pressure vessels.

c) Define -

(i) Dead load

(ii) Wind load

(iii) Piping load

(iv) Combination loads w.r.t. pressure vessels.

d) Explain the effect of design pressure and temperature on design of pressure vessel.

e) List the stresses induced in flanges and flanged joints.

f) Explain the ways of reinforcement in pressure vessels.

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

a) Explain design procedure for support skirts and support lugs.

b) Discuss the calculation of membrane stress in semi ellipsoidal and conical heads.

c) Explain the need and design of stiffeners with one example.

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

a) Explain the design of nozzle and its reinforcement, placement and shape.

b) Explain the stress concentration in circular and elliptical opening

c) (i) Define fatigue concentration and it's effects.

(ii) Explain design of multishell construction.

Marks

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

a) Explain any four procedural welding defects and give remedy for it and diagnostic method.

b) Differentiate welded joints with bolted joints using following points -

(i) Strength

(ii) Process difficulty

(iii) Power required

(iv) Defects

(v) Design

(vi) Applications

(vii) Limitations

(viii) Cost

c) Enlist four accessories and four mounting used in boiler. Explain their working and uses in brief.

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

a) Explain the selection process of material for hydrogen service.

b) Explain various methods of attaching protective layers.

c) With neat sketch explain the terminology of pressure vessel.
