S.E. Chemical IV sem

(33)

8/5/15

Sub: mechanical Equip. Design. CHEM/IV/CBGS/MED

QP Code : 3639

Maximum marks: 80

(4 hours)

N.B.
1. Question no. 1 is compulsory.
2. Attempt any three questions out of remaining five questions.
3. Assumptions made should be clearly stated.
4. Assume any suitable data wherever required and justify the same.
5. Figures to the right indicate marks.
6. Illustrate answers with sketches wherever required.

1. Write short notes on any four. 20
   a) Material of construction for reaction vessels.
   b) Types of heads for pressure vessels.
   c) Standards, codes & their significance.
   d) Various types of roofs for storage vessels.
   e) Various theories of failure.

2. a) Write a design procedure for agitator vessel which includes: 14
      i) Agitator shaft, ii) Blade assembly, iii) Stuffing box.
   b) Draw a proportionate drawing of stuffing box. 06

3. a) Explain the design procedure with relevant formulae for designing a rectangular tank, without stiffeners & with stiffeners. 08
   b) Write short note on any three. 12
      i) Types of agitators and their applications.
      ii) Corrosion.
      iii) Selection, types & design of gasket.
      iv) Design stress and factor of safety.

4. a) Describe the design procedure for reaction vessel with 14
      i) Plain jacket, ii) Channel jacket, iii) Limpet coil jacket
   b) Draw neat sketches of above mentioned jackets. 06

5. a) Design a pressure vessel subjected to an internal pressure using following data. Design should include: 14
      i)Shell thickness
      ii)Head thickness.
      iii) Flanged joint between shell and head

      Data:
      (i) Shell and standard torispherical head:
      Design pressure = 2 N/mm^2

[TURN OVER

JP-Con. 12405-15.

08/06/15 3 copies (2) CHEM./IV/CBGS/JUNE

Outer diameter of shell = 1500 mm
Permissible stress for shell and head material = 140 N/mm^2
Crown Radius for head = 1450 mm
Corrosion allowance = 1.5 mm
(ii) Flanged joint:
Gasket factor = 3.75
Minimum design gasket seating stress = 52.5 N/mm^2
Flange material same as shell material
Permissible stress for bolt material = 140 N/mm^2
Desired bolt spacing = 3 times diameter of bolt.
Take W = 1.77 for standard torispherical head.
Use M27 size bolts.

b) Draw to recommended scale, the above designed cylindrical pressure vessel. 06

5 a) Explain various metal forming techniques. 06

b) Non destructive tests. 06

c) Write a note on supports for horizontal vessels. 08

muquestionpapers.com
SHAH & ANCHOR KUTCHHI ENGINEERING COLLEGE