S.E - IV Sem = Chem. Library

Mechanical Equipment Design SE/IV/CBGS/CHEM./NOV

QP Code : 5500

(4 hours) Maximum marks: 80

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) Non destructive tests for process vessels.
   b) Equipment classification and selection.
   c) How baffles help during agitation? Draw different types of baffles.
   d) Classification of reaction vessels.
   e) Standards, codes & their significance.
   f) Wind girders.

2. a) Describe the design procedure for agitated vessel with 14
   i) Agitator shaft, ii) Blade assembly, iii) Stuffing box iv) Flanged coupling

   b) Draw neat sketch of flanged coupling. 06

3. a) Write design procedure of skirt support. 14

   b) Draw proportional diagram of above mentioned support. 06

4. a) Explain the design procedure with relevant formulae for designing a vertical storage vessel with flat bottom. 14

   b) Draw proportional diagram of above mentioned shell for storage vessel. 06

5. a) Write a design procedure for plain and half coiled jacketed chemical reaction vessel including 14
   i) Sheil.
   ii) Jacket.
   iii) Head.

   b) Draw a proportionate drawing of plain jacket. 06

6. 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
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, top view of the above designed cylindrical pressure vessel. 06

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