Printed Pages :3

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ECH-603

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID :151603

Roll No. | | | | | | | | | | |

B. Tech. (Semester-VI)

SPL. THEORY EXAMINATION, 2014-15

PROCESS EQUIPMENT DESIGN

Time : 2 Hours] *[Total Marks : 50*

Note: (i) Attempt all questions.

(ii) Assume suitable data if missing.

(iii) Standard Data Books are allowed.

1. Attempt any four parts of the following: 3×4=12

(a) Explain the term 'Erosion-corrosion' and 'Pitting'.

(b) Discuss the use of glass as construction material.

(c) What are the 'Design Codes'? What factors are considered in design pressure?

(d) Discuss the theories of failure of a pressure vessel.

(e) Explain design of Vessel Shell with half coil.

(f) What are the basic considerations of pipe line design?

2. Attempt any four parts of the following: 3×4=12

(a) Enumerate various steps in designing of vessel subject to external pressure.

(b) What are the different types of materials used for design of pressure vessel? How to make a selection among these?

(c) Outline the various steps in design of crystallizers.

(d) What are the different type of Flanges? Write a note on Flange design.

(e) What do you understand by the allowable stress? Does it depend upon temperature and pressure?

(f) What are the different types of support? Discuss briefly with their application.

3. Attempt any two parts of the following: 7×2=14

(a) Discuss various steps in Heat Exchanger Design by Kern's method.

(b) Write and discuss the important mechanical properties of a material commonly used in the construction of process equipments.

(c) Mention along with equations, the design procedure for a self supporting conical roof for a cylindrical storage vessel.

4. Attempt any two parts of the following: 6×2=12

(a) Discuss Mechanical Design of Evaporator.

(b) Discuss the general design consideration in designing a pressure vessel operated under Internal Pressure.

(c) For a fractioning tower of 2 m diameter, bubble cap trays are to be designed. Weight of liquid on each tray during operation will not exceed so that an edge slop of 0.25 degree occurs. Determine the thickness of tray for maximum permissible deflection of 5 mm. Material of construction for trays is alloy steel with allowable stress 140 MN/m^2 and modulus of Elasticity 19000 Mn/m^2.

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