

ECH603

(Following Roll No. to be filled by candidate)

Roll No.

11204351903

**B TECH**  
**SIXTH SEMESTER EXAMINATION 2015-2016**  
**ECH603**  
**PROCESS EQUIPMENT DESIGN**

**Time: 2 Hours**

**Max. Marks: 50**

**NOTE:**

- Attempt all questions
- Assume missing data suitably and wisely. Illustrate the measures with suitable sketches.

1. Attempt **any four parts** of the following: [3x4]

- ✓ a. Discuss various mechanical properties of materials to be considered in the construction of chemical process equipment.
- ✓ b. What is galvanic corrosion? Explain the importance of galvanic series.
- c. Write short notes on 'contamination and poisoning'.
- ✓ d. Name five common materials with their composition and characteristic used for the equipment construction.
- ✓ e. Discuss the utility of various codes and standard in design.
- f. Discuss the use of glass as construction material.

2. Attempt **any two parts** of the following: [2x6]

- ✓ a. A spherical carbon steel storage tank has an inside diameter of 9 m. All joints are butt welded with backing strip. If the tank is to be used at a working pressure of 300kPa and a temperature of 30°C, estimate the necessary wall thickness. No corrosion allowance is necessary, welding joint efficiency can be considered as 85%.
- ✓ b. Discuss the general design consideration in designing a pressure vessel under internal pressure.
- c. Write notes on:
  - i. Compensation for opening and branches
  - ✓ ii. Types of needs used for closure. Give an equation for the minimum thickness of elliptical head.

3. Attempt **any two parts** of the following: [2x6]

- ✓ a. Discuss various steps in heat exchanger design by Kern's method.
- ✓ b. What is principle types of flanges used in the process industry? Discuss the use of gaskets in operation of process. What types of materials are used for gaskets?
- c. Write short notes on:
  - i. Design of triple effect evaporator

ECH603

ii. Design of crystallizer

4. Attempt **any two parts** of the following: [2x7]

- ✓ a. Enumerate various steps in the design of spray drier.
- ✓ b. Write about different stresses in distillation column. Also derive the expression for the height of distillation column in terms of stresses.
- c. Give a broad classification of stainless steel and write down the composition of hastelloy B.