

Seat  
No.

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सठ - 052

**ELECTIVE - II**  
**Process Equipment Design**  
**(New) (1312)**

P. Pages : 2

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Solve **any two** sub questions for each question.
5. Assume suitable data, if necessary.
6. Use of non programmable calculator is allowed.
7. Draw neat diagrams whenever necessary.

**UNIT - I**

1. a) Explain thermal stresses in cylindrical shell in detail. **10**  
b) Design the shell for pressure vessel having internal diameter 1200mm, permissible stress at 150 °C is 130 N/mm<sup>2</sup> , internal pressure 0.30 N/mm<sup>2</sup> ; The material used for shell is stainless steel (0.5 Cr 18Ni 11 Mo<sub>3</sub>). **10**  
c) Explain the pressure vessel operating at elevated temperature. **10**

**UNIT - II**

2. a) Explain bottom design of tank and column supported roof in case of high pressure vessel. **10**  
b) Explain stresses in shrink fit construction and optimum design of multi - shell construction in case of high pressure vessel. **10**  
c) Write short note on stress in shell for high pressure vessel. **10**

**UNIT - III**

3. a) Explain. 10
- i) Design of reaction vessel shell with walt coil.
- ii) Design of reaction shell with channel jacket.
- b) Classify the shell and tube heat exchanger. 10
- c) Explain in detail the heating systems in case of reaction vessel. 10

**UNIT - IV**

4. a) Derive expressions for deflection and stresses in detail. 10
- b) Derive equations for determination of shell thickness at different heights in case of towers. 10
- c) Write short note on entrainment separators. 10

**UNIT - V**

5. a) Explain vapour / gas liquid separator in detail. 10
- b) Explain reflux drum and compressor knock out drum in detail. 10
- c) Explain hazards in process industries and write safety measures in process industry. 10

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