

(3 Hours)

[Total Marks: 80]

N.B: (1) Question No.1 is **compulsory**.

(2) Answer any **three** questions from Question Nos. 2 to 6.

(3) Assume suitable data if necessary.

- 1 Answer any FOUR of the following questions:-
- (a) Explain crystallization curve. 5
  - (b) Explain the need of multi effect evaporators. 5
  - (c) Discuss control parameters in gas turbine. 5
  - (d) What do you mean by runaway reaction? 5
  - (e) Explain hazard triangle. 5
- 2 (a) Draw surge characteristics. Explain any one method of surge control for centrifugal compressor. 10
- (b) Explain the construction and working of 1:1 shell and tube heat exchanger. 10
- 3 (a) Draw and explain process flow diagram of refinery industry. 10
- (b) Discuss feedback and cascade control scheme of evaporator. 10
- 4 (a) What is start up heater? Discuss its process and safety control. 10
- (b) Explain atmospheric tray control scheme with safety interlocks. 10
- 5 (a) Explain the process of Penicillin-G production along with its control parameters. 10
- (b) Discuss pressure control scheme and overhead product composition of distillation column. 10
- 6 Write short note- 20
- (a) Shrinking and swelling effect in boiler
  - (b) Hazard reduction techniques.