

Reg. No.



Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)



SEVENTH SEMESTER B.TECH (INSTRUMENTATION AND CONTROL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: INSTRUMENTATION AND CONTROL IN PETROCHEMICAL INDUSTRIES

[ICE 441]

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ❖ Answer **ANY FIVE FULL** questions.
- ❖ Missing data may be suitably assumed.

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|------------|---|----------|
| 1A. | Describe the function of condensers and reboilers in a distillation column. Also draw the different types of boiler designs. | 4 |
| 1B. | What are the different types of packing's and trays used in a distillation column. Explain with diagrams. | 4 |
| 1C. | List the various refining processes. | 2 |
| 2A. | Explain cascade control of an evaporator with neat diagram. | 5 |
| 2B. | Describe the feedforward control system with the help of a diagram. | 3 |
| 2C. | Define the following:
(i) Boiling point rise (ii) Capacity | 2 |
| 3A. | Define the various process characteristics in a heat exchanger. Explain the relationship between process gain and load with necessary illustration. | 4 |
| 3B. | How can a feedback type temperature control of a process cooler and process heater can be configured. Explain with illustration. | 4 |
| 3C. | Draw the diagram of a diverter and mixing valve and explain the working. | 2 |
| 4A. | Explain the inferential control of a batch dryer with recirculated air. | 4 |
| 4B. | Describe spray dryer with single-loop control. | 4 |
| 4C. | Draw the diagram for a double drum dryer. | 2 |
| 5A. | Explain with necessary plots the reaction rates and kinematics of a reactor. | 4 |
| 5B. | Explain temperature control in a reactor with neat diagram. | 6 |
| 6A. | Write a note on the boiler equipment and its efficiency. | 5 |
| 6B. | Describe the various safety interlocks in boiler. | 5 |