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MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

SEVENTH SEMESTER B.TECH (INSTRUMENTATION AND CONTROL ENGG.)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

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.
- ❖ Draw the sketches wherever necessary.

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| 1A. | What are the conditions must exist to select distillation for a separation process. | 2 |
| 1B. | With a neat sketch explain the distillation equipment and the column operation. | 3 |
| 1C. | Briefly discuss about the condensers and re-boilers with necessary sketches. | 5 |
| 2A. | Define Single effect evaporation and Multiple effect evaporation. | 2 |
| 2B. | Write short note on Horizontal tube evaporator with its sketch. | 3 |
| 2C. | Derive the steady state model of a two stage evaporator. | 5 |
| 3A. | What are the needs for intercoolers and Interheaters. | 2 |
| 3B. | Give reasons for the sidestream flow rate. Specify the possible combinations of manipulated variables for bottom and distillate composition control. | 3 |
| 3C. | Explain the horizontal and vertical tube evaporator. | 5 |
| 4A. | Give an over view on pump types. | 2 |
| 4B. | Discuss on System curves of pumps. | 3 |
| 4C. | Write short notes on (i) Throttling Control (ii) Rotary Pumps | 5 |
| 5A. | Define reactor time constant. Write the expressions for different time constants in reactor. | 2 |
| 5B. | What are the effects of equilibrium constant “k” in reactor. | 3 |
| 5C. | Explain briefly about the cascade control of reactor with its limitation. How reset windup helps in cascade control loop. | 5 |
| 6A. | Draw the diagram for a double drum dryer. | 2 |
| 6B. | Explain the spray dryer with single loop control. | 3 |
| 6C. | Describe the safety interlocks in boiler operations. | 5 |