Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**ME – SEMESTER I (NEW) – • EXAMINATION – SUMMER 2016**

**Subject Code: 2711603** **Date:18/05/2016**

**Subject Name: Computerised Process Control**

**Time:02:30 pm to 05:00 pm** **Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

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|---|---|---|---|
| **Q.1** | **(a)** | Explain with the help of block diagram the computer control of distillation column. | **07** |
| | **(b)** | Discuss in detail about the principle of Proportional-Integral controller. | **07** |
| **Q.2** | **(a)** | Explain with the help of block diagram the computer control of Shell & Tube heat exchanger. | **07** |
| | **(b)** | Discuss in detail about plant automation. | **07** |
| | | **OR** | |
| | **(b)** | Discuss distributed control system with its advantages and disadvantages. | **07** |
| **Q.3** | **(a)** | With a typical example explain the control aspect of a chemical unit and development and reduction of block diagram. | **07** |
| | **(b)** | Explain with diagram basic DDC (direct digital control) configuration & Dual-computer system for DDC along with their real benefits and drawbacks. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | List out various types of network topology and discuss any two in detail. | **07** |
| | **(b)** | Discuss advantages and disadvantages of an electric transducer. | **07** |
| **Q.4** | | Explain the Root-locus method in brief. Sketch the Root locus diagram for the system having open – loop transfer function $$G(s) = \frac{Kc}{(s+1)(0.5s+1)}$$ Determine the value of Kc for which system remains stable. | **14** |
| | | **OR** | |
| **Q.4** | | Discuss in detail the Bode diagram for Proportional, Proportional – Integral and Proportional-Derivative Controller. | **14** |
| **Q.5** | **(a)** | Discuss about Ziegler-Nichols optimum controller setting and its limitations. | **07** |
| | **(b)** | Explain with the block diagram the computer control of fed-batch fermentor. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Explain the procedure for stability by Routh test and explain its limitations. | **07** |
| | **(b)** | Discuss about the working principle of the Pirani Vacuum gauge. | **07** |

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