

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2018

**Subject Code: 2171709**

**Date: 26/11/2018**

**Subject Name: Distributed Control Systems and SCADA**

**Time: 10:30 AM TO 01:00 PM**

**Total Marks: 70**

**Instructions:**

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

|            |   | MARKS     |
|------------|---|-----------|
| <b>Q.1</b> | (a) Draw block diagram of Direct Digital Control System   | <b>03</b> |
|            | (b) State full form DCS, MAP, MTBF and SCADA.   | <b>04</b> |
|            | (c) Explain with a neat figure hierarchical computer system for a large manufacturing process.  | <b>07</b> |
| <b>Q.2</b> | (a) Define software configuring and state two phases of software configuration  | <b>03</b> |
|            | (b) List out 4 peripheral devices which can be connected to DCS.  | <b>04</b> |
|            | (c) For the following protocols state their network type, advantages and disadvantages in a tabular form:<br>Polling, Token Passing, CSMA/CD and ring expansion | <b>07</b> |
|            | <b>OR</b>   |           |
|            | (c) Classify various types of displays available in DCS, with a neat figure   | <b>07</b> |
| <b>Q.3</b> | (a) Define and explain the concept of availability  | <b>03</b> |
|            | (b) State any 2 point of difference between position and velocity algorithm   | <b>04</b> |
|            | (c) Define algorithm and explain dead band control, emergency response and error squared algorithms in detail   | <b>07</b> |
|            | <b>OR</b>   |           |
| <b>Q.3</b> | (a) What does executive program consist of? List out 2 of its functions.  | <b>03</b> |
|            | (b) List out any 4 production monitoring and control functions.   | <b>04</b> |
|            | (c) With a neat figure explain in detail the principal programs contained in the executive software.  | <b>07</b> |
| <b>Q.4</b> | (a) List 7 layers of OSI model  | <b>03</b> |
|            | (b) Explain in detail alarm access architecture   | <b>04</b> |
|            | (c) With a neat figure explain the communication hierarchy.   | <b>07</b> |
|            | <b>OR</b>   |           |
| <b>Q.4</b> | (a) State the 3 recommended standards (i.e. RS) protocols available in market   | <b>03</b> |
|            | (b) Define with necessary example super-commutation and sub-commutation   | <b>04</b> |
|            | (c) With a neat diagram, explain typical SCADA system and its hierarchy   | <b>07</b> |
| <b>Q.5</b> | (a) List out 3 manufacturers of DCS   | <b>03</b> |
|            | (b) Explain token passing and CSMA/CD bus access methods  | <b>04</b> |
|            | (c) Explain in detail MODBUS bus access methods, transmission modes, application services and acceptance  | <b>07</b> |
|            | <b>OR</b>   |           |
| <b>Q.5</b> | (a) List out 3 transmission media used in communication.  | <b>03</b> |
|            | (b) List out and explain 2 different applications covered by fieldbus.  | <b>04</b> |
|            | (c) Explain in detail FIPBUS bus access methods, features and acceptance.   | <b>07</b> |

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