Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-VII Examination-Nov/Dec.-2011

Subject code: 171702 **Date: 22/11/2011**
Subject Name: Programmable Automation Controller
Time: 10.30 am-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.**

Q.1 **(a)** Discuss industrial automation with its necessities, advantages. With neat sketch, explain PLC basic blocks. **07**
(b) Discuss Various input and output modules of PLC with examples of each. **07**

Q.2 **(a)** Write a PLC ladder program to find the unknown frequency. **04**
(b) Write a PLC ladder program to measure scan time of PLC. **03**
(c) Discuss with suitable example, scan cycle of PLC. **07**

OR

(c) Write a PLC ladder logic equivalent for NAND and NOR as universal gates. **07**

Q.3 **(a)** Explain with timing diagram Retentive timer on/off instruction each. **07**
(b) Write a ladder logic program to fill the tank with following conditions. **07**
1) The lower level limit switch (IN00) is installed upto which tank should be emptied. Outlet valve (OP00) will empty tank.
2) The upper level limit switch (IN01) is placed to which tank shold be filled. Inlet valve (OP01) will fill water in the tank.
3) Keep a provision to fill tank initially, when the level will be less than lower limit set.

OR

Q.3 **(a)** Explain Counter instruction with timing diagram of each. **07**
(b) Explain SKIP and MCR functions of PLC. **03**
(c) Explain PLC latch and Unlatch instruction with an example of conventional START and STOP switch. **04**

Q.4 **(a)** Develop a PLC program to convert temperature in Celsius to temperature. In Fahrenheit. **07**
(b) Explain the following functions in PLC with examples of each. **07**
(i) BIT CLEAR
(ii) BIT SET
(iii)BIT FOLLOW

OR

Q.4 **(a)** Explain the arithmetic functions in PLC. **07**
(b) Explain jump with return instruction and jump with non return instruction. **07**

Q.5 **(a)** Explain **REGISTER TO TABLE** MOVE and **TABLE TO REGISTER** Functions in PLC. **07**

(b) Draw ladder logic programs for following. **07**

1) 4 to 1 line multiplexer
2) F (a,b,c) = ∏ (0,1,3,4,6,7)

OR

Q.5 **(a)** Discuss the factors to be considered in selecting a PLC. **07**

(b) List and describe the major safety rules for PLC troubleshooting. **07**

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