Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – WINTER • 2014

Subject Code: 170802 **Date: 02-12-2014**

Subject Name: Industrial Automation

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)**	Draw a block diagram of a PLC showing the main functional items. Explaining the functions of each block, also.	**07**
	(b)	Define following terms with respect to Process control: (1) Offset (2) Variable Range (3) Neutral Zone (4) Control Lag (5) Dead Time (6) Cycling (7) Error.	**07**
Q.2	**(a)**	What is a controller mode? Explain characteristics of two position and multi-position discontinuous controller modes.	**07**
	(b)	Discuss the characteristics and applications of Proportional control mode.	**07**
		OR	
	(b)	Discuss the characteristics and applications of PI composite control mode.	**07**
Q.3	**(a)**	Explain ladder diagram elements and its applications.	**07**
	(b)	What kind of automation would you recommend for manufacturing? (Fixed/Flexible/Programmable): (1) Light bulbs (2) Garments (3) Textile (4) Cement (5) Printing (6) Toys (7) Pharmaceuticals.	**07**
		OR	
Q.3	**(a)**	Explain Timer and Counter instructions with timing diagram for PLC.	**07**
	(b)	Explain Various types of Automation Techniques applied in Production Systems with suitable example.	**07**
Q.4	**(a)**	What is DCS? Draw a hierarchical DCS structure and explain function of each level.	**07**
	(b)	Explain different types of displays in DCS.	**07**
		OR	
Q.4	**(a)**	Explain the concept of networking in DCS. Also explain various network topologies.	**07**
	(b)	Explain in detail the input-output module used in PLC.	**07**
Q.5	**(a)**	Define the variables in the system of Figure-1 that constitutes the process load.	**07**
	(b)	Develop a ladder diagram for temperature measurement and control system shown in Figure-2.	**07**
		OR	
Q.5	**(a)**	Explain the three main components of SCADA.	**07**
	(b)	A controlling variable is a motor speed that varies from 800-1750 rpm. If the speed is controlled by a 25 to 50v dc signal, calculate (1) the speed produced by an input of 38v, (2) an input voltage require for speed 1446 rpm and (3) the speed calculated as a percent of span.	**07**

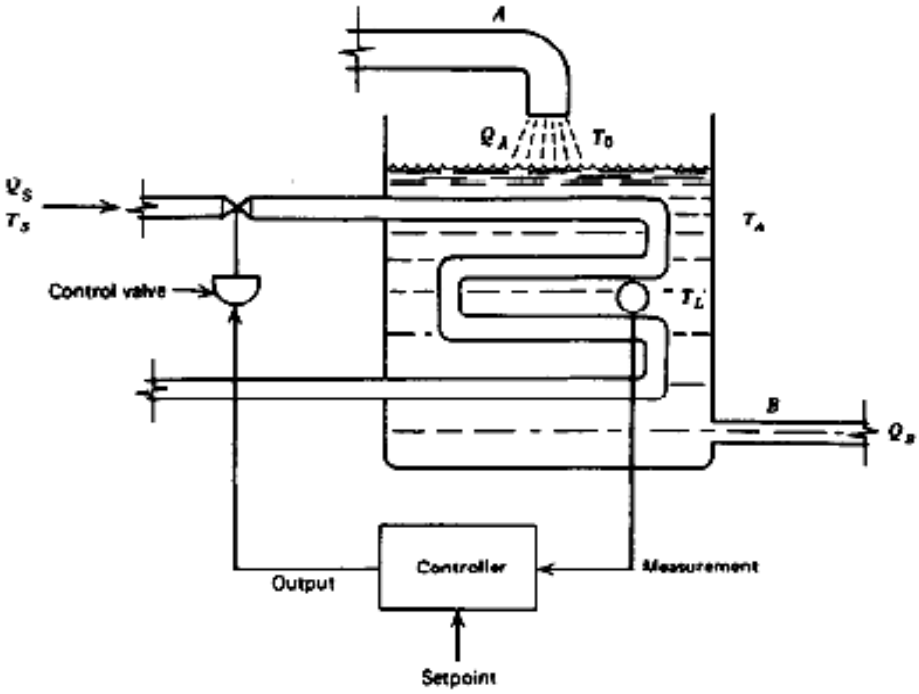

Figure-1

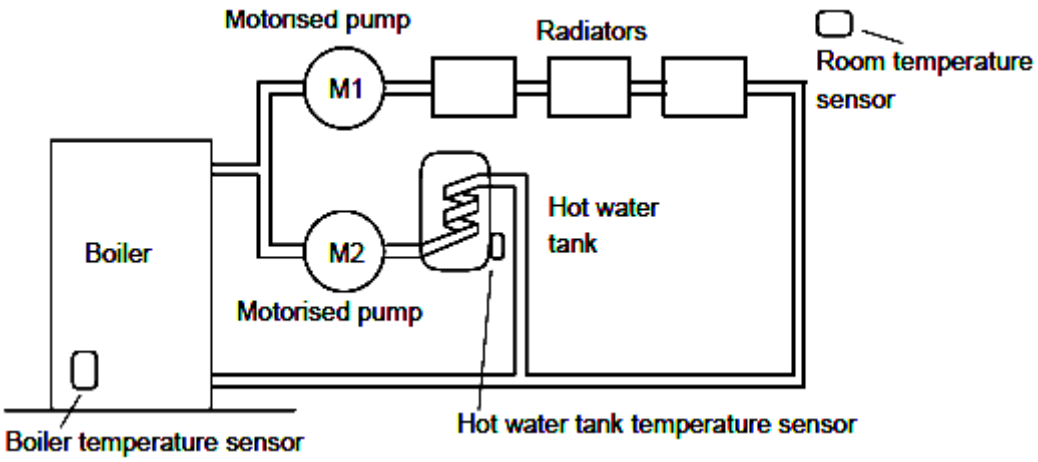

Figure-2

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