Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER • 2013

Subject code: 1720807 **Date: 02-01-2014**

Subject Name: Automation in Production and Hydraulic Control

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)**	Explain Automated Manufacturing Systems.	**07**
	(b)	Write a short note on automated inspection.	**07**
Q.2	**(a)**	A machine tool builder submits a proposal for a 20-station transfer line to machine a certain component currently produced by conventional methods. The proposal states that the line will operate at a production rate of 50 pieces per hour at 100% efficiency. On similar transfer lines the probability of station breakdowns per cycle is equal for all stations and p= 0.005 breakdowns/cycle. It is also estimated that the average downtime per line stop will be 8.0 min. the starting casting that is machined on the line costs $3.00 per part. The line operates at a cost of $75/hr. The 20 cutting tools (one tool per station) last for 50 parts each, and the average cost per tool=$2 per cutting age. Compute (i) production rate, (ii) line efficiency, and (iii) cost per unit price production on the line.	**07**
	(b)	Explain vibratory bowl feeder	**07**
		OR	
	(b)	What are the four functions included within the scope of manufacturing support system? Explain in brief.	**07**
Q.3	**(a)**	What is automation? Explain three basic elements of an automated system.	**07**
	(b)	Discuss the influence of following parameters on mean conveying velocity of vibratory bowl feeder: (i) Track acceleration (ii) Coefficient of friction	**07**
		OR	
Q.3	**(a)**	Explain in brief: different types of automated assembly systems.	**07**
	(b)	Sketch the symbol as per ISO recommendations of following and explain the use of same: (i) Pressure relief valve. (ii) Double acting differential cylinder.	**07**
Q.4	**(a)**	Distinguish between hydraulic and pneumatic system maintenance.	**07**
	(b)	Describe with neat sketch construction and working of Hydraulic gear pump.	**07**
		OR	
Q.4	**(a)**	Explain directional control valves.	**07**
	(b)	Write a short note of pressure reducing valve.	**07**

Q.5	**(a)**	Sketch ISO symbol for following hydraulic control: (i) Variable displacement hydraulic pumps. (ii) Hydraulic accumulator. (iii) Pressure relief valve. (iv) Electric motor. (v) 4/2 directional control valve. (vi) Double acting cylinder with single piston rod. (vii) Lines crossing.	**07**
	(b)	Write a short note on hydraulic actuators.	**07**
		OR	
Q.5	**(a)**	Explain open loop and closed loop hydraulic circuit.	**07**
	(b)	Write a short note on structure of hydraulic system.	**07**

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