B.E. Mechanical Engineering Seven Semester **ME704 - Automation in Production**

P. Pages: 2

Time : Three Hours

* 1	4 3	38	*

GUG/W/18/1839

Max. Marks : 80

	Note	 s: 1. All questions carry marks as indicated. 3. Answer all questions. 3. Due credit will be given to neatness and adequate dimensions. 4. Assume suitable data wherever necessary. 5. Illustrate your answers wherever necessary with the help of neat sketches. 		
1.	a)	Define 'Automation in Production'. Explain its different types.	5	
	b)	What is a flow line ? Explain the different methods of work part transport. Give examples of each.	5	
	c)	A circular indexing machine performs 10 assembly operations at 10 separate station. The total cycle time, including transfer time between stations, is 15 seconds. Stations break down with a probability of 0.006, which can be considered equal for all stations. When these work stoppages occur, it takes an average of 3 min to correct the fault compute the proportion of downtime, the efficiency and the hourly production rate of this circular indexing machine.	6	
2	a)	Describe the various reasons for Automating the production. What is Buffer storage?	6	
2.	<i>a)</i>	Explain the reasons for its use in flow line.	U	
	b)	A transfer line has 12 workstations, each with a probability of break down of 0.03. The cycle time of the line is 1.2 min and each time a breakdown occurs, it takes exactly 6 min to make repairs. The line is to be divided into two stages by a storage buffer so that each stage will consist of six stations. What is the maximum possible efficiency of two stage line? Also compute the efficiency of the two stage line for different buffer capacities of 10, 500, 1000 and ∞ parts.	10	
3.	a)	What is 'Numerical Control' ? Describe its components with the help of a neat sketch.	5	
	b)	Explain various NC Words. Give suitable example of each.		
	c)	What is Direct Numerical control ? Distinguish between CNC and DNC. Draw neat sketches.	6	
		OR		
4.	a)	Explain the following :i)Closed loop NCii)Point to point NCiii)Contouring NC	6	
	b)	What do you mean by Tape Format ? Explain different tape formats with suitable example.	5	
	c)	What is API ? What are the different statements in APT ? Explain each with suitable examples.	5	

5.	a)	What is a Robot ? Explain various joints used in Robot. Draw neat sketches.	5
	b)	What do you mean by shop floor control ? Explain its various phases. Draw neat sketch.	6
	c)	Explain various data files and system reports of flexible manufacturing system.	5
		OR	
6.	a)	Explain Retrieval CAPP. State the benefits of CAPP.	6
	b)	Explain the following Robot configurations :i) Cylindrical configuration Robotii) Jointed arm Robot	5
	c)	What is FMS ? Explain its various layout configuration.	5
7.	a)	Define AGVS. Explain its different application.	5
	b)	Explain the vehicle guidance and routing for AGVS.	5
	c)	The length of an AS/RS is 90 meters and its height is 30 meters. The horizontal travel speed of S/R machine is 80 m/min. The S/R machine requires 36 seconds to perform P & D operation. What is the vertical travel speed of S/R machine to make the system square in time ? Determine the expected single command and dual command transaction times for the storage system.	6
		OR	
8.	a)	Describe the various categories of material handling equipments. Give the examples of each category.	5
	b)	What is AS/RS ? Explain its basic components. What special features are required to operate an AS/RS ? Explain each.	6
	c)	Explain the different types of AGVS. How is the Traffic control and safety achieved in AGVS.	5
9.	a)	What is Machine Vision System ? Explain its operation and working in detail.	8
	b)	What is CMM ? Explain its different configuration. Draw neat sketches.	8
		OR	
10.	a)	What are the applications of machine vision system explain.	4
	b)	Explain the following :	12

- b)
- Explain the following :i) Off-line and On-line inspection.ii) Composite part conceptiii) Benefits of Group Technology.
