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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

Programme: B.E.

Branch: Mechanical Engineering

Course Code: 20ME6DECIM

Course: Computer Integrated Manufacturing

Semester: VI

Duration: 3 hrs.

Max Marks: 100

Date: 19.07.2023

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

		UNIT - I	CO	PO	Marks
1	a)	Define automation. Explain different types of automation.	<i>CO1</i>	<i>PO1</i>	10
	b)	Explain automation migration strategy with a neat sketch.	<i>CO1</i>	<i>PO1</i>	10
		UNIT - II			
2	a)	Explain the following transfer mechanisms with neat sketches. (i) Rack & Pinion Mechanism. (ii) Geneva Wheel Mechanism	<i>CO1</i>	<i>PO1</i>	10
	b)	List and elaborate the methods of work transportation.	<i>CO2</i>	<i>PO1</i>	10
		UNIT - III			
3	a)	A 20 station transfer line has an ideal cycle time of $T_c = 1.2$ mins. The probability of station breakdown per cycle is equal for all stations & $P = 0.005$ breakdowns / cycle. For each of the upper bound & lower bound determine: a) frequency of line stops per cycle b) average actual production rate c) line efficiency.	<i>CO5</i>	<i>PO1,2</i>	10
	b)	Explain the following terms using with storage buffer. (i) Zero buffer storage. (ii) Buffer storage with infinite capacity.	<i>CO2</i>	<i>PO1,2</i>	10
		OR			
4	a)	A 20-station transfer line is divided into two stages of 10 stations each. The ideal cycle time of each stage is $T_c = 1.2$ min. All of the stations in the line have the same probability of stopping, $p = 0.005$. It is assumed that the downtime is constant when a breakdown occurs, $T_d = 8.0$ min. Using the upper-bound approach, compute the line efficiency for the following buffer capacities: (a) $b = 0$, (b) $b = \infty$, (c) $b = 10$, (d) $b = 100$	<i>CO5</i>	<i>PO1,2</i>	10

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

	b)	A 30 station Transfer line is being proposed to machine a certain component currently produced by conventional methods. The proposal received from the machine tool builder states that the line will operate at a production rate of 100 pc / hr at 100% efficiency. From a similar transfer line, it is estimated that breakdowns of all types will occur at a frequency of $F = 0.20$ breakdowns per cycle & that the average downtime per line stop will be 8.0 minutes. The starting blank that is machined on the line costs Rs. 5.00 per part. The line operates at a cost for 100 parts each & the average cost per tool = Rs. 20 per cutting edge. Compute the following: 1. Production rate 2. Line efficiency 3. Cost per unit piece produced on the line.	CO5	POI,2	10
		UNIT - IV			
5	a)	Explain parts feeding and delivery system with neat sketches.	CO3	POI	10
	b)	Explain any three types of AGV's with neat sketches.	CO1	POI	10
		OR			
6	a)	Explain the structure of MRP system with block diagram.	CO3	POI	10
	b)	Explain design for automated assembly.	CO1	POI	10
		UNIT - V			
7	a)	Explain four basic configurations of industrial robot with neat sketches.	CO3	POI	10
	b)	Explain steps in part programming with neat block diagram.	CO4	POI	10
