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

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E. **Semester: VI**
Branch: Mechanical Engineering **Duration: 3 hrs.**
Course Code: 20ME6DECIM **Max Marks: 100**
Course: Computer Integrated Manufacturing **Date: 27.09.2023**

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

1 a) Define automation. Explain different types of automation. **10**

b) Explain automation migration strategy with a neat sketch. **10**

UNIT - II

2 a) Explain the following transfer mechanisms with neat sketches. **10**
(i) Rack & Pinion Mechanism. (ii) Geneva Wheel Mechanism

b) List and elaborate the methods of work transportation. **10**

UNIT - III

3 a) A 2 station transfer line has an ideal cycle time of Tc = 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. **10**

b) Explain the following terms using with storage buffer. **10**
(i) Zero buffer storage. (ii) Buffer storage with infinite capacity.

OR

4 a) Consider 20-station transfer line instead of 2-station transfer line as in 3(a), compare the line efficiencies & production rates for the following cases, where in each case the buffer capacity is infinite: (i) no storage buffers, (ii) one buffer, (iii) three buffers, & 13, 19 buffers. Assume in cases (ii) & (iii) that the buffers are located in the line to equalize the downtime frequencies; i.e. all Fi are equal. As before, the computations to be based on the upper-bound approach **10**

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 **10**

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.

UNIT - IV

5	a)	Explain parts feeding and delivery system with neat sketches.	**10**
	b)	Explain the types of AGV's with neat sketches.	**10**

OR

6	a)	Explain the structure of MRP system with block diagram.	**10**
	b)	Explain design considerations for automated assembly.	**10**

UNIT - V

7	a)	Explain three basic configurations of industrial robot with neat sketch.	**10**
	b)	Explain steps in part programming with neat block diagram.	**10**

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