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**Seventh Semester B.E. Degree Examination, Dec.2013/Jan.2014**  
**Computer Integrated Manufacturing**

Time: 3 hrs.

Max. Marks:100.

**Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.**

**PART – A**

- 1 a. What is automation? Explain the types of automation. (10 Marks)  
 b. A certain part is routed through six machines in a batch production plant. The setup and operation times for each machine are given in the table below.

Machine	Setup time (hrs)	Operation time (mins)
1	4	5.0
2	2	3.5
3	8	10.0
4	3	1.9
5	3	4.1
6	4	2.5

The batch size is 100 and the average non-operation time/machine is 12 hrs. Determine

- (i) Manufacturing load time (ii) Production rate for operation 3. (10 Marks)
- 2 a. What is an automated flow line? State its types. Explain the different methods of work part transport. (10 Marks)  
 b. With neat sketches, explain the following :  
 (i) Rack and pinion mechanism (ii) Geneva mechanism. (10 Marks)
- 3 a. Explain the flow line performance analysis by means of three basic measures - average production rate, line efficiency and cost per item produced. (10 Marks)  
 b. An 8 station rotary indexing machine operates with an ideal cycle time of 20 secs. The frequency of line stop occurrences is 0.06 stops/cycle on the average. When a stop occurs, it takes an average of 3 mins to make repairs.  
 Determine the following:  
 (i) Average production time (ii) Average production rate (iii) Line efficiency  
 (iv) Proportion of downtime. (10 Marks)
- 4 a. Mention the steps involved in the following methods of line balancing and explain them, with a simple example:  
 (i) Largest candidate rule (ii) Ranked positional weight method. (08 Marks)  
 b. A project has the following tasks. Its immediate predecessor and element times are given below.

Tasks	$t_e$ (mins)	Must be preceded by
1	0.2	-
2	0.4	-
3	0.7	1
4	0.1	1, 2
5	0.3	2
6	0.11	3
7	0.32	3
8	0.6	3, 4
9	0.27	6, 7, 8
10	0.38	5, 8
11	0.5	9, 10
12	0.12	11

**Cont.- Q4(b).**

- 4 b. Using Largest candidate rule method,  
 (i) Construct the precedence diagram.  
 (ii) If the ideal cycle time is 1.0 min, find the minimum number of workstations required to complete the project.  
 (iii) Calculate the balance delay. (12 Marks)

**PART – B**

- 5 a. Explain the following with reference to parts feeding devices of automated assembly systems:  
 (i) Hopper (ii) Selector & orientor (iii) Escapement & placement devices. (10 Marks)  
 b. What are automated guided vehicle systems? Explain the types of AGVS. (10 Marks)
- 6 a. Explain with a block diagram, the principal functions in a computerized production planning system. (10 Marks)  
 b. What is material requirement planning? Discuss fundamental concepts in MRP. (10 Marks)
- 7 a. Explain briefly the features of vertical axis machining centre (VMC). Give its applications. (10 Marks)  
 b. Write a manual part program for machining the component shown in Fig.Q7(b). Machining involves 3 holes, 15 mm diameter with depth of holes as 20 mm. make suitable assumptions. Also give the meaning of G and M codes used in the program. (10 Marks)

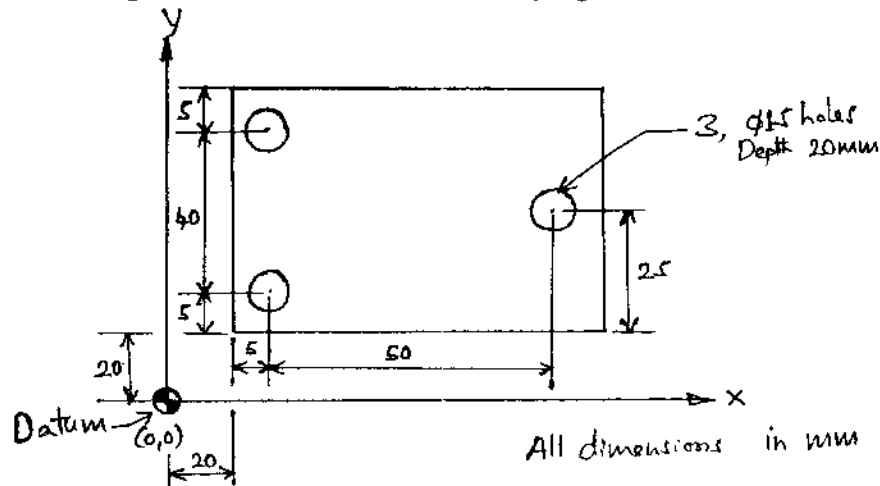


Fig.Q7(b)

- 8 a. Define Robot. Explain any two configurations of industrial robots using schematic diagrams. (10 Marks)  
 b. Explain with sketches any two types of robotic sensors. (10 Marks)

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