USN ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚   **16MCM12**

First Semester M.Tech. Degree Examination, Dec.2016/Jan.2017

Automation & Computer Integrated Manufacturing

Time: 3 hrs.   Max. Marks: 80

Note: *Answer any FIVE full questions, choosing one full question from each module.*

Module-1

1   a. Write short notes on CAD, CAM, CAE and CIM.   **(08 Marks)**
      b. With suitable block diagrams, explain product cycle and product development cycle.
                                               (08 Marks)

OR

2   a. With neat sketches, explain sequential and concurrent engineering.   **(08 Marks)**
      b. Explain in brief Hard and Soft prototyping concepts.   **(08 Marks)**

Module-2

3   a. What are the major manufacturing planning systems? Explain in detail about generative type CAPP?   **(08 Marks)**
      b. Mention the inputs and outputs of MRP? Explain them with a neat diagram.   **(08 Marks)**

OR

4   a. Explain the machine readable media in detail.   **(08 Marks)**
      b. With a suitable sketch, explain the phases of shop floor control.   **(08 Marks)**

Module-3

5   a. Mention the different system configurations of automated assembly? With a neat sketch, explain carousel assembly system?   **(06 Marks)**
      b. A ten station inline assembly machine has an ideal cycle time 6sec. The base part is automatically loaded prior to the first station and components are added at each of the stations. The fraction defect rate at each of the ten stations is q = 0.01 and the probability that a defect will jam is m = 0.5. When a jam occurs, the average downtime is 2 min cost to operate the assembly machine is Rs 2,862.72/hr other costs are ignored. Determine the following :
         i) Average production rate of all assemblies
         ii) Yield of good assemblies
         iii) Average production rate of good product
         iv) Uptime efficiency of the assembly machine
         v) Cost per unit.   **(10 Marks)**

OR

6   a. Derive an equation for analysis of two stage transfer line based on assumption that both stages are never down at the same time.   **(08 Marks)**

b. A single station assembly machine performs 5-work elements to assemble 4-components to a base part. The elements are listed in the table.

Element	Operation	Time	q	m	p
1	Add gear	4	0.02	1.0	-
2	Add spacer	3	0.01	0.6	-
3	Add gear	4	0.015	0.8	-
4	Add gear and mesh	7	0.02	1.0	-
5	Fasten	5	0	NA	0.012

Time to load the base part is 3-sec and time to unload the completed assembly is 4-sec, giving load/unload time of $T_n = 7sec$. When a jam occurs it takes an average of 1.5minutes to clear the jam and restart the machine. Determine the following :

    i)   Production rate of all product
    ii) Yield of good product
    iii) Production rate of good product
    iv) Uptime efficiency of the assembly machine. **(08 Marks)**

Module-4

7 a. Explain the different automated material handling equipments which are commercially available? **(08 Marks)**

  b. Explain in detail, how AGVs can be controlled to follow their pathways? Mention the applications of it? **(08 Marks)**

OR

8 a. Discuss the important types of automated storage/retrieval systems. Also mention ASRS applications? **(10 Marks)**

  b. Write a short note on horizontal and vertical carousel storage system. **(06 Marks)**

Module-5

9 a. With a suitable sketch, explain the basic function of machine vision system. **(10 Marks)**

  b. Write a short note on Computer Aided Testing. **(06 Marks)**

OR

10 a. Explain the construction of coordinate measuring machine. **(08 Marks)**

   b. With a neat sketch, explain scanning laser technique. **(08 Marks)**

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