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**BACHELOR OF TECHNOLOGY IN
MECHANICAL ENGINEERING
(COMPUTER INTEGRATED
MANUFACTURING)**

Term-End Examination

June, 2010

**BME-005 : COMPUTER INTEGRATED
MANUFACTURING**

Time : 3 hours

Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks. Use of calculator is permitted.

1. (a) Discuss the concept of CIM. "In order to achieve corporate goal and objectives, integration approach is required for customers as well as suppliers". Do you agree with this statement ? Answer with proper justification. Also write the potential benefits of CIM. **10+4**
- (b) Describe the five major components of Computer Integrated Manufacturing.

2. (a) Describe the various steps in Inspection. **8+6**
What do you understand by inspection accuracy ? What are Type I and Type II errors ?

(b) Define Coordinate Metrology. Write the various components of Coordinate Metrology.

3. (a) Describe briefly the four major components of AGVS. Why AGVS are considered as flexible material handling system ? 6+8

(b) Calculate the production rate for a single-machine robotic cell for an 8-hr shift if the system availability is 80%. Also determine the percent utilization of machine and robot. On average, the machine takes 35 sec to process a part. The other robot operation times are as follows :

Robot picks up a shaft from the conveyor = 4.0 sec

Robot moves the shaft to the lathe = 1.5 sec

Robot loads the shaft on to lathe = 1.0 sec

Robot unloads the shaft from the lathe = 0.5 sec

Robot moves the conveyor = 1.5 sec

Robot puts the shaft on the outgoing conveyor = 0.5 sec

Robot moves the shaft from the outgoing conveyor to the input conveyor = 5.0 sec

4. (a) What are the objectives of installing an Automated Storage System in a Factory ? Describe the various components of AS/RS. 6+8
- (b) In each aisle of an AS/RS, there are 70 storage compartments in the length direction and 10 storage compartments vertically. The dimensions of the unit load in centimeters (cm) are 57 (length), 45 (width) and 57 (height) respectively. The allowances designed for each storage compartment are : $x=03$ cm, $y=05$ cm and $z=03$ cm. Storage depth u in the number of unit load is 3. Determine the capacity per aisle and the dimensions of single storage system.
5. (a) Why manufacturing companies are switching over to flexible manufacturing systems ? Justify your answer with suitable examples. 6+8
- (b) Describe machine flexibility, production flexibility, and mix flexibility. Discuss the factors on which these flexibilities depend.
6. (a) Why the parts are coded in Group Technology ? Describe any one method of coding with suitable example. 7+7
- (b) Discuss primary reasons for the wide spread use of simulation techniques. Write the steps in developing a simulation model.

7. (a) When a system can be called agile ? List atleast five characteristics of agile manufacturing. **5+5+4**
- (b) What is extended enterprise ? Discuss the role of internet in extended enterprise.
- (c) What do you understand by 'point-of-use manufacture' ? Discuss the benefits and risks from 'point-of-use manufacture'.
8. Write short notes on *any four* of the following :
- (a) Information system of automated factory.
- (b) Latest trends in manufacturing.
- (c) Main functions of a vision system.
- (d) Static and dynamic simulation models.
- (e) Need for CAPP in CIM.
- (f) Activity Cycle Diagram. **3½x4=14**
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