

Total No. of Questions : 4]

SEAT No. :

PE117

[Total No. of Pages : 2

[6579]-424

T.E. (Robotics and Automation) (Insem)

INDUSTRIAL ROBOTICS AND MATERIAL HANDLING SYSTEMS

(2019 Pattern) (Semester - I) (Elective - I) (311505(A)-III)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Solve Q.1 or Q.2, Q.3 or Q.4.
- 2) Figure to the right indicate full marks.
- 3) Neat diagram must be drawn wherever necessary.
- 4) Assume suitable data if necessary.
- 5) Use of logarithmic table, slide rule or electronic pocket calculator is allowed.

Q1) a) Define Material Handling System. List Principles of Material Handling System. [7]

b) Explain from to chart with example used in manufacturing Industry. [8]

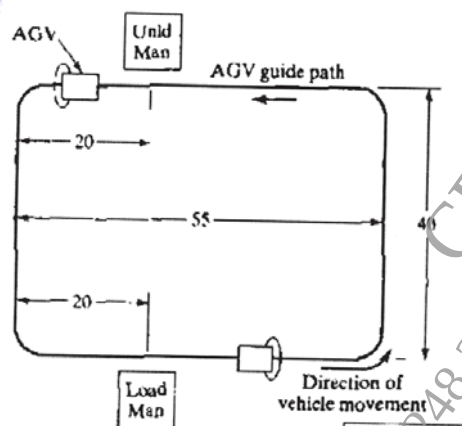
OR

Q2) a) List and explain various types of conveyors used in manufacturing industries. [7]

b) Given the AGVS layout shown in Figure below, Vehicles travel counterclockwise around the loop to deliver loads from the load station to the unload station. Loading time at the load station = 0.75 min, and unloading time at the unload station = 0.50 min. It is desired to determine how many vehicles are required to satisfy demand for this layout if a total of 40 del/hr must be completed by the AGVS. The following performance parameters are given: vehicle velocity = 50 m/min, availability = 0.95, traffic factor = 0.90, and operator efficiency does not apply so $E = 1.0$. [8]

Determine:

- i) travel distances loaded and empty,
- ii) ideal delivery cycle time, and
- ii) number of vehicles required to satisfy the delivery demand



P.T.O.

Q3) a) What is automatic identification and data transfer? [7]

b) The single command cycle system of a XYZ Inc. has cycle time per operation as 2 minutes. Expected system throughput for the corporation is 360 operations per hour. Number of storage space per system height is 15 and total number of storage spaces using a randomized policy is 9000. Assuming storage and retrieval operation take same time, determine: [8]

- i) Number of S/R machines;
- ii) Number of rows; and
- iii) Number of bays in each rows

OR

Q4) a) What are the objectives of using Automated Storage and Retrieval System in a manufacturing company? [8]

b) What are the factors that influence system throughput for Automated Storage and Retrieval System?

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 inches (in) are 50 (length), 50 (width) and 50 (height) respectively. The allowances designed for each storage compartment are: $x = 8$ inch, $y = 7$ inch and $z = 10$ inch. Storage depth u in the number of unit load is 3. Determine the capacity per aisle and the dimensions of the single storage system. [7]

