

GANPAT UNIVERSITY
M.TECH SEM. I – MANUFACTURING AUTOMATION
REGULAR EXAMINATION JANUARY - 2012
3ME-105 MANUFACTURING AUTOMATION

Time: 3 Hours

Total Marks: 70

Instructions:

- 1). All questions are **compulsory**.
- 2). Figures to the **right** indicate full marks.
- 3). Answers to the two sections must be written in **separate** answer books.
- 4). Assume all necessary data.

Section – I**Que:-1 Attempt All.****[12]**

- (A) Explain the types of instructions of the 8085 microprocessor.
- (B) There are green, red and blue pushbuttons are used to operate conveyor and LED. You have to press green and blue pushbuttons both to switch on the conveyor and the LED and press red pushbutton to switch off the conveyor and LED. Make a ladder diagram for the given task.
- (C) There are 12H, 30H and 55H available in memory location D000H, D001H and D002H respectively. Write an ALP for the following tasks.
 - i). Add 12H and 30H
 - ii). Store answer at register L.
 - iii). AND operation between the previous answer and 55H.
 - iv). Store answer at memory location D003H.

OR**Que:-1 Attempt All.****[12]**

- (A) Explain different components of 8085 microprocessor based system.
- (B) Discuss the basic components of the PLC.
- (C) Write an ALP for the following tasks.
 - i). Load 43H and 75H in register D and E respectively
 - ii). Perform EX-OR operation two data
 - iii). Load 25H in the register B and perform addition operation with the accumulator data.
 - iv). Store answer at memory location C000H.

- Que:-2** (A) There are two cylinders 'A' and 'B' are used to clamp an object. First cylinder 'A' clamp the object and then cylinder 'B'. Both the cylinders release the object at the same time. Design and explain hydraulic circuit for the given application. **[06]**

- (B) A DA hydraulic cylinder is used for drilling operation. The diameter of the piston is 18 cm and the diameter of the rod is 6 cm. A pump supplies hydraulic oil at a rate of $50 \text{ cm}^3/\text{sec}$ with a pressure of 50 N/cm^2 . Determine [05]
- The force that can be supplied by the piston in the forward and the reverse strokes
 - The maximum velocity with which rod can operate in forward and reverse directions

OR

Que:-2 (A) Draw the pneumatic circuit to control a DA cylinder by using 4/2 both side solenoid operated valve. Also draw the PLC ladder diagram to control a solenoid operated valve by using two pushbuttons. [06]

(B) Explain role of the filter in the pneumatic system. [05]

Que:-3 Attempt Any three. [12]

(A) Explain difference between machine language and assembly language of the 8085 microprocessor.

(B) Explain the on-delay timer with example.

(C) Explain oil properties.

(D) Explain the different types of the sensors.

Section – II

Que:-4 Attempt All. [12]

(A) Explain the magnetic-disk feeder with neat sketch.

(B) Explain the various devices are used to transfer the parts at workstations for automated assembly.

(C) Discuss the USA principles for Automation in the manufacturing.

OR

Que:-4 Attempt All. [12]

(A) Explain the effect of track acceleration and frequency on conveying velocity with respect to vibratory feeders using suitable graph.

(B) Distinguish between the jig and fixture. Enlist the principles of the jigs and fixture design

(C) What is manufacturing automation? Explain the disadvantages of automation in the manufacturing.

Que:-5 (A) Explain the various types of storage devices are used in a industry. [06]

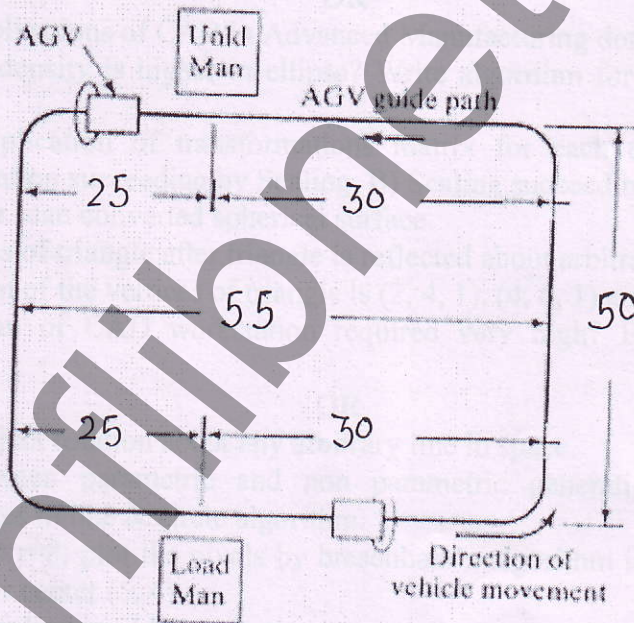
(B) Each aisle of a six-aisle AS/RS is to contain 40 storage compartments in the length direction and 10 compartments vertically. All storage compartments will be the same size to accommodate standard size pallets of dimensions: $x = 10\text{cm}$ and $y = 12\text{cm}$. The [05]

height of the unit load $z = 8\text{cm}$. Using the allowances, $a = 1.2\text{cm}$, $b = 1.5\text{cm}$, and $c = 1.8\text{cm}$. determine: (i) how many unit loads can be stored in the AS/RS, and (ii) the width, length and height of the AS/RS.

OR

Que:-5 (A) Which principles are considered in the product design for automated assembly? [06]

(B) Given the AGVS layout shown in figure. Vehicles travel counterclockwise around the loop to deliver loads from the load station to the unload station. Loading time at the load station = 0.6 min, and unloading time at the unload station = 0.5 min. It is desired to determine how many vehicles are required to satisfy demand if a total of 50 del/hr must be completed by the AGVS. Vehicle velocity = 60 m/min, availability = 0.95, traffic factor = 0.9 and operator efficiency $E = 1.0$. Determine: (a) travel distances loaded and empty (b) ideal delivery cycle time and (c) number of vehicles required to satisfy the delivery demand. [05]



Que:-6 Attempt Any three.

[12]

- (A) Explain routing and scheduling for the material handling system.
- (B) (i) Define throughput and storage capacity
(ii) What is the difference between the randomized storage and dedicated storage?
- (C) Explain the different configurations for the automatic assembly systems.
- (D) Explain the migration strategy for the automation with neat sketches.

END OF PAPER