Exam No: _____

GANPAT UNIVERSITY
M.TECH SEM I (MECHANICAL-AMT)
REGULAR EXAMINATION JAN-2013
3ME105 MANUFACTURING AUTOMATION

TIME – 3 HOURS **TOTAL MARKS- 70**

INSTRUCTION:- 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Make suitable assumptions wherever necessary.

SECTION-I

Que-1 **[12]**

(a) Write down steps of Migration strategy for automation. Identify them.

(b) Explain "Human workers will be needed in factory operations, even in the most highly automated operation."

(c) Write down construction and working of vibratory bowl feeder.

OR

Que-1 **[12]**

(a) Explain different types of AS/RS system.

(b) Write down USA principle of Automation and process improvement.

(c) Give the difference between single station and multi station assembly system.

Que-2 **[11]**

(a) A roller conveyor follows a pathway 35 m long between a parts production department and an assembly department. Velocity of the conveyor is 40 m/min. Parts are loaded into large tote pans, which are placed onto the conveyor at the load station in the production department. Two operators work the loading station. The first worker loads parts into tote pans, which takes 25 sec. Each tote pan holds 20 parts. Parts enter the loading station from production at a rate that is in balance with this 25-sec cycle. The second worker loads tote pans onto the conveyor, which takes only 10 sec. Determine: (a) spacing between tote pans along the conveyor, (b) maximum possible flow rate in parts/min, and (c) the minimum time required to unload the tote pan in the assembly department.

(b) What is the different between a hoist and a crane? With sketch.

OR

Que-2 **[11]**

(a) Given the AGVS layout shown in Fig. 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. Determine: (a) travel distances loaded and empty, (b) ideal delivery cycle time, and (c) number of vehicles required to satisfy the delivery demand.

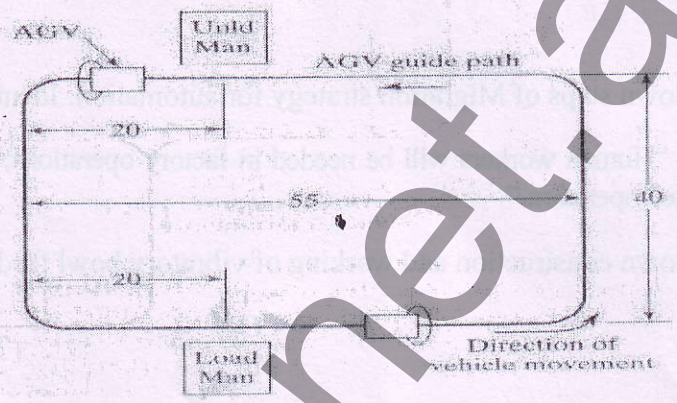

Figure:

(b) What is a conveyor? Give the name of different types of conveyor and explain.

Que-3 **Attempt Any Three.** **[12]**

(a) Explain the 3-2-1 principle in workholding.

(b) Compare the principal requirements for machining fixtures versus those for assembly fixtures.

(c) Explain Carousel storage systems.

(d) Discuss the need for flexible fixtures in small-batch and/or one-of-akind manufacturing environments.

SECTION-II

Que-4 **[12]**

(a) Explain working principle of Inductive and Capacitive proximity sensor with neat sketch.

(b) What are the reason behind the increasing trend of Hydraulics and pneumatics in industries and mobile equipments? What are the differences in application of hydraulics and pneumatics?

OR

Que-4 **[12]**

(a) What is the difference between Hard Automation and Soft automation? Explain with Example. What are the advantages of Soft automation over Hardwire automation?

(b) What is the application of rotary encoders in close loop systems? How will you select the type of encoder for particular application?

Que-5 **[11]**

(a) How many type of miscellaneous sensor? Describe it.

(b) Enlist basic components of Hydraulic system. And Explain all components.

OR

Que-5 **[11]**

(a) Briefly Explain Pressure relief valve. Draw the symbols for Pressure relief valves used in Hydraulics.

(b) Draw block diagram of PLC. Explain function of various blocks.

Que-6 **Attempt Any Three** **[12]**

(a) What are the strategies for automation?

(b) Where PID control is used? How three constants affect the control performance?

(c) Define registers and explain different registers used in 8085 microprocessor.

(d) Explain the role of Mechatronics in manufacturing.

**********END OF PAPER**********