

Date: 11/01/2016

Student Exam No: _____

GANPAT UNIVERSITY

M.TECH SEM. II - ADVANCED MANUFACTURING TECHNIQUES

REGULAR EXAMINATION NOV-DEC 2015

3ME-105 MANUFACTURING AUTOMATION

Time: 3 Hours

Total Marks: 60

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). Be precise and to the point in answering the descriptive questions.

Section - I

Que:-1 Attempt all.

- (A) Explain the block diagram of PLC with its components. [04]
- (B) Make a PLC ladder diagram for the following application. [03]
- “A START pushbutton should be pressed to run the motor. The motor will automatically stop after 20 seconds. The STOP pushbutton should be used to stop the motor in case of any emergency.”
- (C) Specify the contents of the registers when the following instructions are executed. [03]

A B D E

MVI B, 54H
MVI D, 28H
MOV A, D
ADD B
MOV D, A
ORA D
MOV E, A

OR

Que:-1 Attempt all.

- (A) Discuss the various features for selection the sensors. Also write any four sensor names with the function. [04]
- (B) Discuss the different operations performed by the microprocessor. [03]
- (C) Explain the up-counter instruction with an example. [03]

Que:-2 Attempt all.

- (A) a). List the different types of valves in the hydraulic systems. [05]
- b). Also list the different types of Pump which are used in the hydraulic systems.
- c). Explain difference between SA & DA cylinder.
- (B) Draw mete-in and meter-out circuit to control the forward speed of a DA hydraulic cylinder. [05]

OR

Que:-2 Attempt all.

- (A) a). What is FRL unit? [02]
b). Explain the single stage reciprocating air compressor. [03]
(B) Convert a). 398 decimal number to binary number [05]
b). 1110011.110 binary number to decimal number
c). 6B9D hex number to binary number
d). 777 decimal number to octal number
e). E5 hex number to decimal number

Que:-3 Attempt All.

[10]

- (A) Explain cushioning assembly in the cylinder.
(C) Discuss OR, AND, EX-OR and NOT gate with examples.

Section – II

Que:-4 Attempt all.

- (A) Define the term jigs. Enlist the types of Jigs and explain any one with neat sketch. [04]
(B) Explain different strategies which are used in automation to increase productivity. [03]
(C) List the different methods which are used to define the pathways of AGV. Explain any one in briefly. [03]

OR

Que:-4 Attempt all.

- (A) Explain different ways to classify conveyors. [04]
(B) Discuss the advantages and disadvantages of Automation in industry. [03]
(C) Explain different types of the automation. [03]

Que:-5 Attempt all.

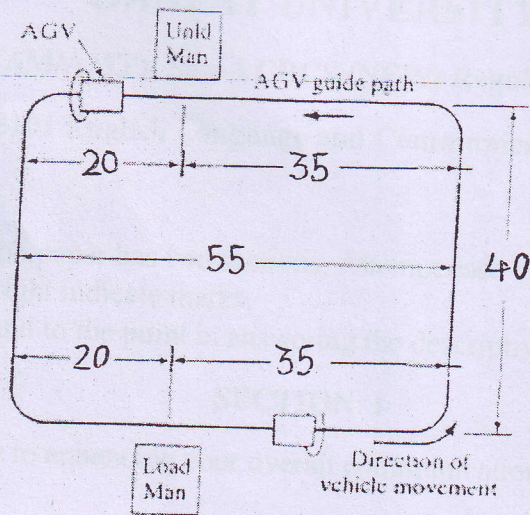
- (A) Discuss the following factors for the material handling systems. [06]
(i) Flow rate (ii) Scheduling (iii) Routing
(B) Explain the function of the hopper, parts feeder, feed track and escapement device. [04]

OR

Que:-5 Attempt all.

- (A) Explain the different types of AGVs. [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 [04]

loaded and empty (b) ideal delivery cycle time and (c) number of vehicles required to satisfy the delivery demand.



Que:-6 Attempt All.

- (A) Discuss the different configurations of the automated assemble systems (AAS).
- (B) Discuss the USA principles for any one manufacturing process.

[10]

END OF PAPER