



VII Semester B.E. (Mechanical Engineering) Degree Examination,
December 2017/January 2018
(2K11 Scheme)

ME 701 : AUTOMATION IN MANUFACTURING

Time : 3 Hours

Max. Marks : 100

Instruction : Answer **any five full** questions, choosing **atleast one full** question from **each** Part.

PART – A

1. a) With a block diagram explain organization and information processing in manufacturing. 6
b) The average part produced in a certain batch manufacturing plant must be processed through an average of 8 machines. There are 15 new batches of parts launched every week. Other pertinent data are as follows :
 $T_0 = 6$ min, $T_{su} = 5$ hrs, $Q = 25$ parts, Average $T_{no} = 10$ hrs.
There are 15 machines in plant. The plant operation on an average of 60 production hours per week. Determine : MLT, PC and U. 8
c) Compare different types of production. 6
2. a) Briefly discuss the advanced automation functions. 8
b) Explain desirable features for selecting sensors used in automated systems. 6
c) List out commonly detected errors in automated machining cell. 6
3. a) What are the functions of material handling ? Explain the different types of material handling equipments. 8
b) Determine the number of vehicles required to satisfy demand for a particular AGVS. The system must be capable of making 50 deliveries/hour. The performance characteristics of the system are : Vehicle velocity = 100 m/min., average distance travelled per delivery = 300 m, pick-up time = 50 s, Drop off time = 50 s, average distance travelling empty = 200 m and traffic factor = 0.8. Determine the number of vehicles required to satisfy the delivery demand. Also determine the handling system efficiency. 6
c) Define AS/RS and draw the layout of a typical unit load AS/RS and labeled. 6

P.T.O.



PART – B

4. a) With a block diagram, explain the structure of a typical PLC. **6**
- b) With the help of a pneumatic circuit, write PLC wiring diagram and ladder program for activation of double acting cylinder. **8**
- c) List out the areas of PLC applications and PLC standards. **6**
5. a) Define Pneumatics. Briefly discuss the generation of compressed air. **8**
- b) Explain with the help of a block diagram, the symbol structure of a DC valve. **6**
- c) Explain the construction and working of NC type time delay valve. **6**
6. a) A pneumatically controlled press with a stamping die is used for producing badges. A double acting cylinders used for driving the press is to extend when the two push buttons PB_1 and PB_2 are pressed simultaneously. The cylinder is to retract automatically after reaching the forward end position. The cylinder should retract immediately if the emergency push button PB_3 is pressed. Develop a pneumatic control circuit to implement the control task. **10**
- b) What are the limitations of cascade method ? Draw the power supply for two group, three group and four group circuit using cascade method. **10**
7. a) What are the advantages of electrical activation of pneumatic valve over pure pneumatic control ? **6**
- b) With a schematic diagram, explain the working of 5/2 way double solenoid valve. **6**
- c) Design an electro pneumatic circuit for automatic returning of double acting cylinder. **8**
8. a) Design two group multiactivator electro pneumatic circuit for controlling stamping device. **12**
- b) Explain the construction and working of a relay. **8**
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