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14MAR14

**First Semester M.Tech. Degree Examination, Dec.2015/Jan.2016**

**Automation in Manufacturing Systems**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1 a. What are the strategies used for automation and production systems? (10 Marks)  
b. With the help of a diagram, explain the relationship between the physical activities and information processing activities in manufacturing. (10 Marks)
- 2 a. Define the following terms:  
i) Production capacity  
ii) Utilization and availability  
iii) Manufacturing lead time  
iv) Work-in-process (10 Marks)  
b. The hourly rate for a certain work center is to be determined based on the following data:  
Direct labour rate = Rs.100/hr  
Applicable factory overhead rate on labour = 60%  
Capital investment in machine = 100000  
Service life of the machine = 8 yr  
Rate of return = 20%  
Salvage value in 8 yr = 0  
Applicable factory overhead rate on machine = 50%.  
The work center will be operated one 8 hr shift, 250 day/hr.  
Determine the appropriate hourly rate for the work center. (10 Marks)
- 3 a. What are the advanced automated functions? Explain maintenance and repair diagnostics and safety monitoring functions. (10 Marks)  
b. What do you mean by petrinet model? Differentiate between simple petrinets and high level petrinets. (10 Marks)
- 4 a. Name few commonly used sensor and actuators used in automated systems. (06 Marks)  
b. What are the components used in a PLC? Explain. (06 Marks)  
c. With the help of a flow diagram explain advanced manufacturing planning cycle. (08 Marks)
- 5 a. What are the basic components required in a hydraulic system? (06 Marks)  
b. With the help of a hydraulic circuit, explain the operation of a control of double acting hydraulic cylinder. (10 Marks)  
c. What are the considerations to be followed while designing a pneumatic circuit? (04 Marks)
- 6 a. Write the MPL components, truth table and symbol of AND function of moving part logic circuits. (10 Marks)  
b. With the help of a circuit diagram, explain electrohydraulic servo system. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

- 7 a. Construct ladder diagram and equivalent functional block diagram for a signal lamp required to be switched on if the pump is running and the pressure is satisfactory. (12 Marks)  
 b. Discuss the importance of documenting a PLC system. (08 Marks)
- 8 a. Devise a ladder program that could be used to a more complex temperature control task involving a domestic central heating system as shown in Fig.Q8(a).

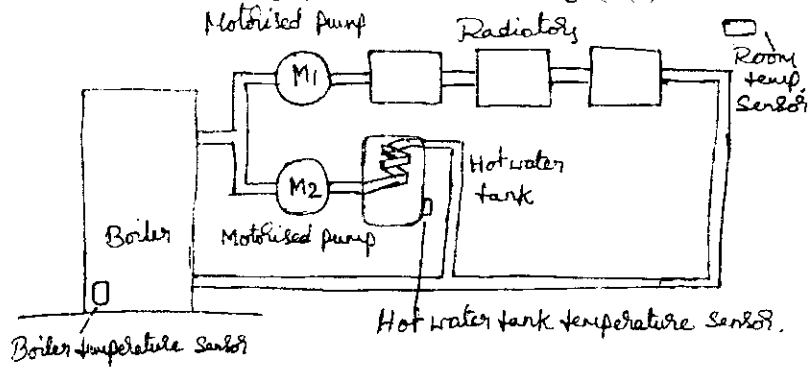


Fig.Q8(a)

- b. Write a note on PLC processors.

(15 Marks)  
 (05 Marks)

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