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10MAR31

Third Semester M.Tech. Degree Examination, December 2012
Automation in Manufacturing

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1
 - a. With a neat sketch, explain the information processing activities of a manufacturing support systems. (12 Marks)
 - b. What are the phases of Automation Migration Strategy? Explain them. (08 Marks)

- 2
 - a. Develop the mathematical models for the following production concepts :
 i) Production rate ii) Manufacturing lead time iii) Utilization and availability
 iv) Production capacity. (10 Marks)
 - b. The hourly rate for a certain work center is to be determined based on the following data, direct labor rate = \$ 15/hr , applicable factory overhead rate on labor = 35% , capital investment in machine = \$ 200,000 , service life of the machine = 5 years, rate of return = 15% , salvage value is five years = zero and applicable factory overhead rate on machine = 40%. The work center will be operated two 8 hours shifts, 250 day/year. Determine the appropriate hourly rate for the work center. (10 Marks)

- 3
 - a. Discuss the following advanced automation functions :
 i) Safety monitoring ii) Maintenance and repair diagnostics iii) Error detection and recovery. (15 Marks)
 - b. Explain various levels of automation in manufacturing. (05 Marks)

- 4
 - a. Explain the following contact interface devices :
 i) Contact input interface devices ii) Contact output interface device. (10 Marks)
 - b. With a neat sketch, explain the working principle of direct digital control. (10 Marks)

- 5
 - a. Name the activities of advanced manufacturing planning and explain them with a block diagram. (12 Marks)
 - b. Explain the methodology of automated process planning using generative CAPP system. (08 Marks)

- 6
 - a. Explain hydraulic motor braking system, with a circuit diagram. (10 Marks)
 - b. Explain the operation of a pneumatic circuit for the control of an air – motor, with a circuit diagram. (10 Marks)

- 7
 - a. Explain the working principle of a electro – hydraulic servo system, with a neat sketch. (10 Marks)
 - b. With a neat circuit diagram, explain the M.P.L circuit that controls the extension of a double acting cylinder. (10 Marks)

- 8
 - a. Describe some of the major PLC counter functions and timer functions used in circuits and process. (12 Marks)
 - b. Describe the operation of PLC skip function, with an illustration. (08 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.