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06ME757

Seventh Semester B.E. Degree Examination, Dec.09-Jan.10
Automation In Manufacturing

Time: 3 hrs.

Max. Marks:100

Note: *Answer any FIVE full questions, selecting at least TWO from each part.*

PART - A

1 a. Define automation. Discuss different types of automation in production system. **(08 Marks)**
   b. Explain the good reasons for automation of production systems. **(06 Marks)**
   c. Discuss the fundamental strategies of automation. **(06 Marks)**

2 a. Explain the basic functions in manufacturing operations. **(08 Marks)**
   b. The average part production in a certain batch manufacturing plant must be processed through an average of six machines. There are 20 new batches of parts launched each week. Other pertinent data are as follows : Average operation time = 6 min ; Average setup time = 5 Hours ; Average batch size = 25 parts. Average non operative time per batch = 10 hours. There are 18 machines in the plant. The plant operates on average of 70 production hours per week. Scrap rate is negligible.
   i) Determine the manufacturing lead time for an average part   ii) Determine the plant capacity   iii) Determine the plant utilization   iv) How would you expect the non operation time to be affected by the plant utilization? **(08 Marks)**
   c. In a work center, direct labor rate = Rs 70/h ; applicable labour factory overhead rate = 60% ; capital investment in machine = Rs 10 lakhs ; service life = 8 years ; salvage value = zero ; applicable machine factory overhead rate = 50% ; rate of return used 10%. The machine is operated on 8-hour shift per day, 250 days per year. Determine the appropriate hourly cost for this worker – machine system. **(04 Marks)**

3 a. Differentiate between continuous and intermittent control strategies in automated system. **(06 Marks)**
   b. Define computer process control. Explain different types of data collected by computer process control. **(05 Marks)**
   c. Discuss different forms of computer process control. **(09 Marks)**

4 a. Discuss the following measures of performance for an automated work station :
   i) production time   ii) production rate   iii) line efficiency   iv) cost per unit produced. **(10 Marks)**
   b. The manufacturing engineering department has estimated that the ideal cycle time T_c = 10 min. The break down occurs with a frequency F = 0.1 break down/cycle and the average down time per stop will be 6.0 minutes. The scrap rate for the current conventional method is 5%. The starting casting for the component costs Rs 15 each and it will cost Rs 60/hour to operate the system. Cutting tools are estimated to cost Rs 1.5 per part. Determine the following measures of performance : i) production rate   ii) number of hours required to meet a demand of 1500 units/week   iii) line efficiency   iv) cost per unit produced. **(10 Marks)**

PART – B

5 a. Explain Opitz's classification and coding systems with illustration. **(08 Marks)**
   b. What is FMS? Explain the components of FMS. **(07 Marks)**
   c. Explain the benefits of FMS. **(05 Marks)**

6 a. Explain Taguchi's signal to noise ratio concept with illustrations. **(05 Marks)**
   b. Explain three methods of automated inspection. **(09 Marks)**
   c. Give the classification of optical inspection methods. **(06 Marks)**

7 a. Explain with neat sketches, construction, operation and programming of coordinate measuring machine (CMM). **(10 Marks)**
   b. What is machine vision? Explain with a block diagram, basic functions of machine vision systems. **(10 Marks)**

8 a. What is computer aided process planning? Differentiate between Retrieval CAPP and Generative CAPP. **(12 Marks)**
   b. Explain with illustration the Just – in – time production system and compare with traditional inventory management. **(08 Marks)**

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