PRESIDENCY UNIVERSITY
BENGALURU

SET B

SCHOOL OF ENGINEERING
END TERM EXAMINATION – MAY / JUNE 2024

Semester : Semester VIII - 2020
Course Code : MEC3064
Course Name : Manufacturing Control and Automation
Program : B.Tech.

Date : May 31, 2024
Time : 01.00pm to 04.00pm
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ANY FIVE QUESTIONS   5QX2M=10M

1. Give examples for manufacturing system

(CO1) [Knowledge]

2. Differentiate between manually operated machines and fully automated machines

(CO1) [Knowledge]

3. What is automatic tool changer?

(CO1) [Knowledge]

4. What is fuzzy logic?

(CO3) [Knowledge]

5. List out the application of fuzzy logic control system.

(CO3) [Knowledge]

6. What is industrial control in Automation?

(CO4) [Knowledge]

7. What are process industries in automation?

(CO4) [Knowledge]

PART B

ANSWER ANY SIX QUESTIONS   6QX10M=60M

8. In CNC machine, a device used to pick the tool from the tool magazine and replace the tool with newtool. Explain 180-degree Automatic tool changer with advantages and limitations.

(CO1) [Comprehension]

9. In modern manufacturing process, processing or assembly work is accomplished with the aid of machines or tools. Explain the classification of production machines used in the automation process.

(CO1) [Comprehension]

10. AI technologies utilized in manufacturing include machine learning, computer vision, natural language processing, robotics, and data analytics. Explain what are the AI technologies and techniques used in manufacturing

(CO3) [Comprehension]

11. Machine learning (ML) is a branch of artificial intelligence (AI) and computer science that focuses on using data and algorithms to enable AI to imitate the way that humans learn, gradually improving its accuracy. Explain how 'Machine Learning' will help increase production of components.

(CO3) [Comprehension]

12. Artificial intelligence (AI) is an evolving technology that tries to simulate human intelligence using machines. With a flow chart, explain how artificial neural networks can be used in the manufacturing sector.

(CO3) [Comprehension]

13. In an adaptive control system, parameters are automatically adjusted to keep the system at its optimum level. Explain the adoptive control system working process with block diagram

(CO4) [Comprehension]

14. Explain the different level of automation in process and discrete manufacturing industries

(CO4) [Comprehension]

15. The 8085 microprocessor is an 8-bit microprocessor. The microprocessor 8085 can read, write, or perform arithmetic and logic operations. Draw the architecture of microprocessor 8085 and label all parts

(CO4) [Comprehension]

PART C

ANSWER ANY TWO QUESTIONS   **2QX15M=30M**

16. A 28 station transfer line is being proposed to machine certain parts currently produced by traditional methods. The proposal received from the machine tool builder's states that the line will operate at a production rate of 90 pc/hr at 100% efficiency. From a similar transfer line, it is estimated that breakdowns of all types will occur at the frequency of F=0.20 breakdowns per cycle and that the average downtime per line stops will be 8.0 minutes. The starting blank that is machined on the line costs Rs. 4.00 per part. The line operates at a cost of 95 parts each and average cost per tool=Rs.18 per cutting edge.
    Compute the following
    1. Production rate
    2. Line efficiency
    3. Cost per unit piece produced on the line.

(CO2) [Application]

17. A machine manufacturer makes a proposal for a 20 station transfer line to machine a parts currently produced by traditional methods. The proposal states that, the production line will operate at a production rate of 50 pieces per hour at 100% efficiency. On similar transfer line, the probability of station breakdown per cycle is equal for all stations and p=0.005 breakdown /cycle. It is also estimated that the average downtime per line stop will be 8.0 min. The starting casting that is machined on the line costs 3.00 per parts. The line operates at a cost of Rs.75.00/hr. The 20 cutting tools (one tool per station) last for 50 parts each, and the average cost per tool=2.00 per cutting edge. Based on this data, compute
    (a) production rate
    (b) line efficiency and
    (c) cost per unit piece produced on the line

(CO2) [Application]

18. A 30-working station transfer line is divided into two stages of 15 working stations each. The ideal cycle time of each stage is Tc = 1.4 minutes. All of the stations in the line have the same probability of stopping, p = 0.006. We assume that the downtime is constant when a breakdown occurs, Td = 7.0 min. Using the upper-bound approach, compute the line efficiency for the following buffer capacities:
    (a) b = 0,
    (b) b = Infinity and
    (c) b = 20

(CO2) [Application]