Graphic Era
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University under section 2(f) of UGC Act, 1956

Term Evaluation (Even) Semester Examination March 2025

Roll no...............................

Name of the Course: B.Tech **CME)**
Semester: 4th
Name of the Paper: *Automation in Production*
Paper Code: TME-410
Time: 1.5 hour

Maximum Marks: 50

Note:
(i) Answer all the questions by choosing any one of the sub-questions
(ii)Each question carries 10 marks.

Q1. (10 Marks)
a. The cost of the raw material for a certain part is $100. The part is processed through 20 processing steps in the plant and the manufacturing lead time is 15weeks. The production time per processing step is 9.8 h and the machine and labor rate is $25.00/h. Inspection, material handling, and related costs average $10per processing step by the time the pan is finished. The interest rate i used by the company is 20% and the storage rate 5 = 13%. Determine the cost per part and the holding cost. **CO2**
OR
b. Derive and explain the break-even analysis formula. How does break-even analysis help in decision-making for automation investments? Also, discuss factors affecting the unit cost of production in automated systems. **CO1**

Q2. (10 Marks)
a. Explain the key principles of automation in a production system. Discuss different automation strategies and their impact on productivity, quality, and cost-effectiveness. **CO3**
OR
b. Derive and explain the break-even analysis formula. How does break-even analysis help in decision-making for automation investments? Also, discuss factors affecting the unit cost of production in automated systems. **CO3**

Q3. (10 Marks)
a. Explain the concept of automated flow lines and discuss different types of transfer mechanisms used in automated manufacturing systems. Provide examples of how these mechanisms enhance production efficiency. **CO1**
OR
b. Derive and explain the mathematical model for analyzing transfer lines without storage. Discuss the impact of machine breakdown and repair time on system efficiency. **CO2**

Q4. (10 Marks)
a. Discuss the key design and fabrication considerations that engineers must account for when developing automated flow lines. How do these considerations impact the cost, reliability, and performance of the system? **CO3**
OR
b. What is partial automation? Compare its advantages and disadvantages with full automation. Additionally, explain how computer simulation is used to analyze and optimize automated flow lines. **CO1**

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Q5.   (10 Marks)
a. What is buffer storage in automated flow lines? Discuss its role in improving the efficiency of transfer lines. Also, describe different methods of work part transport used in automated manufacturing systems.   **CO2**

OR

b. Discuss the different levels of automation in a production system, ranging from manual to fully automated operations. Provide examples of industries where each level is implemented.   **CO1**