Code: ME8T2B

## IV B.Tech - II Semester – Regular / Supplementary Examinations MAY-2022

## AUTOMATION IN MANUFACTURING
### (MECHANICAL ENGINEERING)

Duration: 3 hours                                    Max. Marks: 70

## PART – A
Answer *all* the questions.   All questions carry equal marks
11x 2 = 22 M

1.
   a) Define automation. List out the types of automation.
   b) What is meant by Single-station manufacturing cell?
   c) What are the four automated assembly system configurations?
   d) Name some line balancing methods.
   e) What is AGV?
   f) Name various types material handling equipment.
   g) List out the types of adaptive control systems.
   h) Draw neat sketch of adaptive control system for CNC turning center.
   i) What are various types of inspection methods?
   j) Classify CMM.
   k) Define Monorail and conveyer.

## PART – B

Answer any **THREE** questions.   All questions carry equal marks.                                                  3 x 16 = 48 M

2. a) Discuss various types of automation strategies mentioning their importance.                                 8 M

   b) List various mechanical feeding devices. Explain any one with neat sketch.                                   8 M

3.  The following table defines the precedence relationships and element terms for new model toy.                 16 M
    i) Construct the precedence diagram for this job.
    ii) If the ideal cycle time = 1.1min. repositioning time 0.1min and up time proportion is assumed to be 1.0, what is the theoretical minimum number of work station required to minimize the balance delay under the assumption that there will be one worker per station?
    iii) Using Ranked Positional Weights method, assign work elements to stations and compute balance delay.

| Work element no. | $T_e$ (Min) | Immediate Predecessor |
|---|---|---|
| 1 | 0.5 | -- |
| 2 | 0.3 | 1 |
| 3 | 0.8 | 1 |
| 4 | 0.2 | 2 |
| 5 | 0.2 | 2 |
| 6 | 0.6 | 3 |
| 7 | 0.4 | 4,5 |
| 8 | 0.5 | 3,5 |
| 9 | 0.3 | 7,8 |
| 10 | 0.6 | 6,9 |

4. a) Illustrate any two material handling equipment with neat sketches.                                                                8 M

   b) Briefly describe the basic components of AS/RS.       8 M

5. a) What do you mean by adaptive control? Explain the types of adaptive control.                                                8 M

   b) List out the various operation parameters that can be measured in turning operation to use in adaptive control systems.                                                                           8 M

6. a) Explain the working of machine vision with neat sketch.                                                                          8 M

   b) Discuss briefly about different types of co-ordinate measuring machines (CMM).                               8 M