

Time: 3 Hours

Max. Marks: 60

- Note:*
1. It is compulsory to answer the questions of Part -1. Limit your answers within 20-40 word in this part.
  2. Answer any four questions from Part -2 in detail.
  3. Different parts of the same question are to be attempted adjacent to each other.
  4. Assume suitable standard data wherever required, if not given.

**PART -1**

- Q1
- (a) Name the different automation strategies. (2)
  - (b) What is the use of buffer storage in an automated storage system? (2)
  - (c) Name any two conditions under which automated assembly technology should be considered. (2)
  - (d) Name any four part feeding devices. (2)
  - (e) Explain the Optiz parts classification and coding system. (2)
  - (f) What is the difference between a dedicated FMS and a random order FMS? (2)
  - (g) Name the four tests of flexibility that a manufacturing system must satisfy in order to be classified as flexible. (2)
  - (h) Define the work volume of a robot manipulator. (2)
  - (i) Name any four types of sensors used in robots. (2)
  - (j) What is the difference between repeatability and accuracy in robotic application? (2)

**PART -2**

- Q2
- (a) Explain in detail with suitable diagram the different physical configuration of the automated assembly system. (5)
  - (b) A feeder-selector device at one of the station of an automated assembly machine has a feed rate of 25 parts per minute and provides a throughput of one part in four. The ideal cycle time of the assembly machine is 10 sec. The low level sensor on the feed track is set at 10 parts, and the high level sensor is set at 20 parts. (a) How long will it take for the supply of parts to be depleted from the high level sensor to the low level sensor once the feeder selector device is turned off? (b) How long will it take for the parts to be resupplied from the low level sensor to the high level sensor, on average, after the feeder-selector device is turned on? (5)
- Q3
- (a) What is group technology? Explain the features of parts classification and coding systems. (5)
  - (b) Apply the rank order clustering technique for grouping the parts to the part-machine incidence matrix given in following table. (5)

Part-machine incidence matrix

Machines (j)	Parts (i)								
	A	B	C	D	E	F	G	H	I
1	1			1				1	
2					1				1
3			1		1				1
4		1				1			
5	1							1	
6			1						1
7		1				1	1		

- Q4 What are the different types of FMS layout configurations? Explain any one.