Q. Code: 269940

Reg. No. | | | | | | | | | | | | | | |

B.E / B.TECH. DEGREE EXAMINATION, MAY 2024

Seventh Semester

ME18702 – COMPUTER INTEGRATED MANUFACTURING

(Mechanical Engineering)

(Regulation 2018)

TIME: 3 HOURS **MAX. MARKS: 100**

CO 1 Students will be able to understand the concepts of CIM, automation and CAPP and select appropriate automation technology for a given manufacturing scenario.

CO 2 Students will be able to derive GT code for the given drawing using Opitz coding system and do quantitative analysis for the performance of cellular manufacturing.

CO 3 Students will be able to apply the concept of FMS and its applications and be able to solve simple quantitative analysis problems in FMS. Also understand AGVS, its applications and vehicle guidance management and safety.

CO 4 Students will be able to select an appropriate type of robot, end effector, and sensor for a given application.

CO 5 Students will be able to understand OSI, MAP, and TOP. Also, will be able to understand various data modelling and architecture of databases.

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	What are the three steps to be followed in implementing automation?	**1**	**1**
2.	Why is an "Expert System" needed for Generative CAPP system.	**1**	**2**
3.	How is the digit sequence defined in Opitz coding system?	**2**	**2**
4.	What are the various types of part movements that can be identified in a mixed-model part production system?	**2**	**2**
5.	When does one need dedicated FMS and when does one need random FMS?	**3**	**3**
6.	Select a suitable light source for a paint strip AGV.	**3**	**3**
7.	Large flat glass sheets are to be picked from a stack and must be restacked. Which type of end effector will you use? Justify your answer.	**4**	**3**
8.	Explain accuracy and repeatability.	**4**	**2**
9.	What are the three types of schemas?	**5**	**1**
10.	Define database.	**5**	**1**

PART- B (5 x 14 = 70 Marks)

			Marks	CO	RBT LEVEL
11.(a)	**(i)**	Briefly explain the advanced automation functions.	**(7)**	**1**	**2**
	(ii)	Explain fixed automation, programmable automation, and flexible automation.	**(7)**	**1**	**2**
		(OR)			
(b)	**(i)**	Explain the USA principle of automation.	**(7)**	**1**	**2**
	(ii)	Write notes on retrieval type CAPP system.	**(7)**	**1**	**2**
12.(a)	**(i)**	Elaborate the production flow analysis with an example.	**(7)**	**2**	**2**
	(ii)	Explain the composite part concept with an example.	**(7)**	**2**	**2**
		(OR)			
(b)	**(i)**	Arrive at different machine cell layouts to meet the various part movement requirements.	**(7)**	**2**	**3**
	(ii)	Five machines constitute a GT cell. The From/To data for the machines are shown in the table. (i) Determine the most logical sequence of machines for this cell (ii) Construct the network diagram for the data, showing where and how many parts enter and exit the system.	**(7)**	**2**	**3**

From	To				
	1	2	3	4	5
1	0	10	70	0	0
2	0	0	0	80	0
3	0	0	0	0	0
4	70	0	20	0	0
5	0	70	0	15	0

13 (a)	**(i)**	Briefly explain the various components of an FMS.	**(7)**	**3**	**2**
	(ii)	Explain the computer control system and its functions.	**(7)**	**3**	**2**
		(OR)			
(b)	**(i)**	What is an Automated Guided Vehicle? Justify the need for an AGV in a manufacturing industry. Discuss automated guided vehicle system in detail.	**(7)**	**3**	**3**
	(ii)	Explain various vehicle guidance technologies used for AGVs.	**(7)**	**3**	**2**
14.(a)	**(i)**	Explain the cylindrical coordinate robot with a neat diagram. Give its advantages and disadvantages.	**(7)**	**4**	**2**
	(ii)	Explain the various applications of an industrial robot.	**(7)**	**4**	**2**
		(OR)			

			Marks	CO	RBT LEVEL
(b)	**(i)**	Write notes on the various sensors used in robots.	**(7)**	**4**	**2**
	(ii)	Write notes on intelligent robots.	**(7)**	**4**	**2**
15.(a)	**(i)**	Explain Manufacturing Automation Protocol (MAP).	**(7)**	**5**	**2**
	(ii)	Explain Technical Office Protocol (TOP).	**(7)**	**5**	**2**
		(OR)			
(b)	**(i)**	Explain the entity-relationship with a suitable diagram.	**(7)**	**5**	**2**
	(ii)	Explain the concept of relational database and give its advantages.	**(7)**	**5**	**2**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Apply the rank order clustering technique to the part-machine incidence matrix given in the table to arrange parts and machines into groups.	**(10)**	**2**	**3**

	Part Number					
Machine ID		P1	P2	P3	P4	P5
	M1			1		1
	M2		1	1		
	M3	1			1	
	M4		1	1		1
	M5	1			1	