Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

IV SEM B.Tech. MECHATRONICS ENGINEERING
END SEMESTER EXAM – 18th June 2022
SUBJECT: AUTOMATED MANUFACTURING SYSTEMS (MTE2251)

Time: 180 min. Max. Marks: 50

Instructions to Candidates

- Answer A**LL** questions.
- Any missing data may be suitably assumed.

Q. No.	QUESTIONS	M	CO	PO	LO	BL
1A	List out the levels of automation with suitable example.	**2**	**1**	**1, 2**	**1, 4**	**3**
1B	Discuss the process chain for Additive Manufacturing (AM) process. Mention the drawbacks associated with AM process.	**3**	**3**	**1, 5**	**12, 13**	**3**
1C	With the help of product life cycle, listout the sources of data generation activities in the computer integrated manufacturing systems. Classify generated data into different types of CIM database.	**5**	**5**	**1, 3**	**5, 9**	**6**
2A	Identify the hardware, software and technologies required to establish computer integrated manufacturing system.	**2**	**5**	**1, 3**	**5, 9**	**6**
2B	Derive an expression for material removal rate in electric discharge machining process. Also identify important EDM process parameters.	**3**	**3**	**1, 5**	**12, 13**	**3**
2C	In the process of identifying part families, what are the steps needs to be followed if process flow analysis data is used. Discuss with suitable example.	**5**	**4**	**1, 3, 4**	**1, 3**	**4**

3A

The SQL problem is based on the tables presented below where salespeople have orders with certain customers that are in the Customers table no.2.

Table 1. Salesperson

ID	Name	Age	Salary
1	Rachel	61	140000
2	Ross	34	44000
5	Monica	34	40000
7	Joe	41	52000
8	Phoebe	57	115000
11	Chandler	38	38000

Table 2. Customer

ID	Name	City	Store Name
4	Sheldon	Tokyo	Gada electronics
6	Penny	Berlin	Laxmi chit fund
7	Bernie	Lisbon	The cheesecake factory
9	Leonard	Rio	Wayne enterprises

Table 3. Orders

Order Number	Order_date	Cust_id	Salesperson_id	Amount
10	8/2/96	4	2	2400
20	1/30/99	4	8	1800
30	7/14/95	9	1	460
40	1/29/98	7	2	540
50	2/3/98	6	7	600
60	3/2/98	6	7	720
70	5/6/98	9	7	150

Write the query to find the

a) Largest order amount for each salesperson and the associated order number,
b) Customer name and his city name who brought cheapest product.
c) The year which recorded highest orders in the given dataset.
d) Which city placed more orders display salespersons name too.

5	**5**	**1, 3**	**5, 9**	**6**

3B

What are different types of manufacturing processes? Mention suitable type of manufacturing process for 3D printing, sheet metal bending, welding, and step turning.

2	**1**	**1, 2**	**1, 4**	**3**

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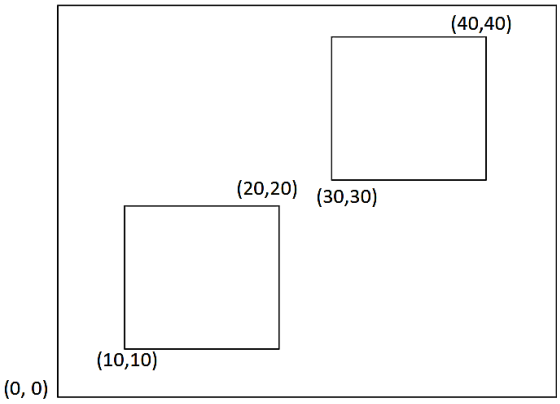
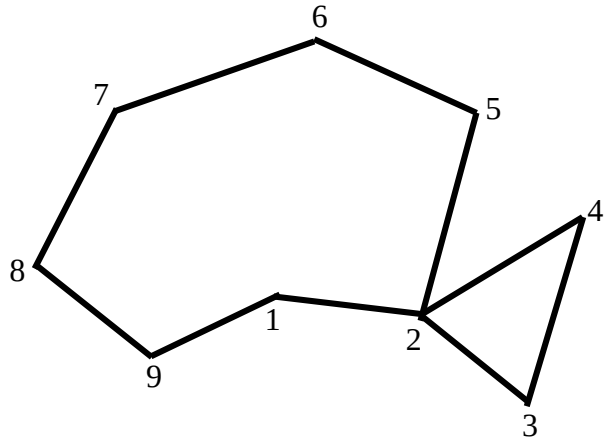
3C	Write a part program to obtain the model shown below from the profile of given size. Consider billet size as (50 × 50 × 20) mm and depth of cut as 10 mm. Consider all units in mm. Mention the type and dimension of the tool selected.  	**3**	**3**	**1, 5**	**12, 13**	**3**
4A	Discuss different types of database architecture with suitable example.	**2**	**5**	**1, 3**	**5, 9**	**6**
4B	Differentiate between absolute and incremental positioning system in CNC machine by considering principle, advantages, and disadvantages.	**3**	**2**	**1, 3**	**2, 3**	**4**
4C	Generate the facets to repair of the gap in the below image. a) Listout approved edges b) Detect the gaps in the model (File B1) c) Listout erroneous edges (File C) d) Generate the facets to repair the gaps (File D)  	**5**	**2**	**1, 3**	**2, 3**	**4**

5A	What is the importance of database management system in automated manufacturing systems?	**2**	**5**	**1, 3**	**5, 9**	**6**
5B	Discuss the working principle using suitable schematic diagram, operating parameters, advantages and disadvantages of abrasive jet machining process.	**3**	**3**	**1, 5**	**12, 13**	**3**
5C	Design the ASRS system with following requirements. In each aisle of an AS/RS, there are 60 storage compartments in the length direction and 40 storage compartments vertically. The unit load sizes are 0.5m width, 0.5m length, 0.5m height. The height clearance and length clearance is 0.2m and width clearance is 0.2m. The average cycle time of operation of the machine is 2min. The system has total number of storage space is 16000. The system throughput expected is 600 operations/hr. Desired system height to be less than 20m. Take Center-Center support height as 0.10m, Bay side support allowance as 0.10m, clearance for crane runout has 3m. Clearance for pickup/drop off area is 5m., aisle width as 2m and the number of unit load/storage is 2.	**5**	**4**	**1, 3, 4**	**1, 3**	**4**