



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL
(A constituent unit of MAHE, Manipal)

Department of Mechanical and Manufacturing Engineering

I Sem- M. Tech (Industrial Automation and Robotics)

Digital Manufacturing (MTE 5004)

End-semester Examination

Date:

Max Marks: 50

Time: 10.30 AM -11.30 PM

		M	CO	PO	BL
1 a	Explain various vehicle guidance technologies used in automated material handling systems of the smart factories	4	1	7	2
1b	Describe the Building blocks of automation	4	1	7	2
1c	Explain four different error recovery strategies	2	1	7	2
2 a	Discuss the steps involved in cusomisation of product based on <i>Leonard and Rayport</i> guidelines	4	2	2	2
2 b	Describe the working of stereolithography and highlight the features of this process	4	2	2	4
2 c	What are the stumbling blocks for Rapid manufacturing methods	2	2	2	4
3 a	Explain the architecture for a database system	4	3	3	
3 b	For the E-R diagram shown below, write the SQL code to create the dabase and apply suitable constraints. <pre> graph TD DEPARTMENT[DEPARTMENT] --- Name1(Name) DEPARTMENT --- Number1(Number) DEPARTMENT --- Locations1(Locations) DEPARTMENT --- Manager1(Manager) DEPARTMENT --- Manager_start_date1(Manager_start_date) PROJECT[PROJECT] --- Name2(Name) PROJECT --- Number2(Number) PROJECT --- Location1(Location) PROJECT --- Controlling_department1(Controlling_department) EMPLOYEE[EMPLOYEE] --- Fname(Fname) EMPLOYEE --- Minit(Minit) EMPLOYEE --- Lname(Lname) EMPLOYEE --- Sex1(Sex) EMPLOYEE --- Name2(Name) EMPLOYEE --- Ssn(Ssn) EMPLOYEE --- Salary(Salary) EMPLOYEE --- Department1(Department) EMPLOYEE --- Birth_date1(Birth_date) EMPLOYEE --- Address(Address) EMPLOYEE --- Supervisor(Supervisor) EMPLOYEE --- Project1(Project) EMPLOYEE --- Hours(Hours) EMPLOYEE --- Works_on(Works_on) DEPENDENT[DEPENDENT] --- Birth_date2(Birth_date) DEPENDENT --- Sex2(Sex) DEPENDENT --- Employee1(Employee) DEPENDENT --- Relationship(Relationship) DEPENDENT --- Dependent_name(Dependent_name) </pre>	4	3	3	3

3 c	Define and Differntiate the primary key and foreign key with suitable example	2	3	3	4																																										
4 a	Discuss the three dimensions of Digital Manufacturing	4	4	8	2																																										
4 b	Explain the technology/tools of Digital manufacturing	4	4	8	2																																										
4 c	Benefits of Digital Manufacturing	2	4	8	2																																										
5 a	Explain the generalised process chain of rapid manufacturing process	4	2	2	2																																										
5 b	<p>For the data shown in the following table, write the SQL query for the following</p> <p>a) Identify the names of students with age greater than 21</p> <p>b) Determine the average GPA of all students</p> <p>c) Find the name of student whos name starts with ‘Be’</p> <p>d) Find the name and address of students whose phone number is not entered in entered in the database</p> <p>STUDENT</p> <table><tr><th>Name</th><th>Ssn</th><th>Home_phone</th><th>Address</th><th>Office_phone</th><th>Age</th><th>Gpa</th></tr><tr><td>Dick Davidson</td><td>422-11-2320</td><td>NULL</td><td>3452 Elgin Road</td><td>749-1253</td><td>25</td><td>3.53</td></tr><tr><td>Barbara Benson</td><td>533-69-1238</td><td>839-8461</td><td>7384 Fontana Lane</td><td>NULL</td><td>19</td><td>3.25</td></tr><tr><td>Rohan Panchal</td><td>489-22-1100</td><td>376-9821</td><td>265 Lark Lane</td><td>749-6492</td><td>28</td><td>3.93</td></tr><tr><td>Chung-cha Kim</td><td>381-62-1245</td><td>375-4409</td><td>125 Kirby Road</td><td>NULL</td><td>18</td><td>2.89</td></tr><tr><td>Benjamin Bayer</td><td>305-61-2435</td><td>373-1616</td><td>2918 Bluebonnet Lane</td><td>NULL</td><td>19</td><td>3.21</td></tr></table>	Name	Ssn	Home_phone	Address	Office_phone	Age	Gpa	Dick Davidson	422-11-2320	NULL	3452 Elgin Road	749-1253	25	3.53	Barbara Benson	533-69-1238	839-8461	7384 Fontana Lane	NULL	19	3.25	Rohan Panchal	489-22-1100	376-9821	265 Lark Lane	749-6492	28	3.93	Chung-cha Kim	381-62-1245	375-4409	125 Kirby Road	NULL	18	2.89	Benjamin Bayer	305-61-2435	373-1616	2918 Bluebonnet Lane	NULL	19	3.21	4	3	3	4
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5 c	Explain what is Recursive Relationship Type with an example	2	3	3	2																																										