SECTION A

1. Answer the questions after carefully reading the text.

(a) Compare Char and Varchar datatype of SQL.

(b) Prerna needs to remove all the rows from SALE_HISTORY table to release the storage space, but she does not want to remove the table structure. Which statement should she use?

(c) Meena uses a STUDENT table with following columns:

\[ \text{NAME, CLASS, COURSE_ID, COURSE_NAME} \]

She needs to display names of students who have not been assigned any course or have been assigned “pathology” course. Pathology course’s names end with “Pathology”. She wrote the following query:

\[
\text{SELECT NAME, CLASS} \\
\text{FROM STUDENT, COURSE} \\
\text{WHERE COURSE_NAME = NULL OR COURSE_NAME = “%pathology”;}
\]

But the query is not producing result. Identify the problem.

(d) What is the importance of primary key in a table? Explain with example.

(e) The Title and Price columns of table “Library” are given below:

<table>
<thead>
<tr>
<th>TITLE</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastering C++</td>
<td>295</td>
</tr>
<tr>
<td>Guide Network</td>
<td>300</td>
</tr>
<tr>
<td>Mastering SQL</td>
<td>450</td>
</tr>
<tr>
<td>Dos GUIDE</td>
<td>400</td>
</tr>
<tr>
<td>Basic for beginners</td>
<td>299</td>
</tr>
<tr>
<td>Mastering Window</td>
<td>Null</td>
</tr>
</tbody>
</table>
Based on this information, find the output of the following queries:

(a) SELECT MIN(Price) from library;
(b) SELECT COUNT(Title) from library WHERE Price < 150;
(c) SELECT AVG(price) from library WHERE title like '%e%';
(d) SELECT title from library where price = (select max(price) from library);

(f) A table ACCOUNT in a database has 3 columns and 30 rows. The DBA has added 3 more columns and 50 more rows to the table. But the table has about 15 records where balance is null. What is the degree and cardinality of this table now?

Q2  
(a) Name the constraints(s) which can be added at both the levels (table and column).
(b) What are different types of SQL functions? Explain and give examples.
(c) Consider the table Hospital given below.

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Age</th>
<th>DEPARTMENT</th>
<th>DateOfAdm</th>
<th>Charges</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sandeep</td>
<td>64</td>
<td>Surgery</td>
<td>23/02/98</td>
<td>300</td>
<td>M</td>
</tr>
<tr>
<td>2</td>
<td>Ravina</td>
<td>24</td>
<td>Orthopedic</td>
<td>20/01/98</td>
<td>200</td>
<td>F</td>
</tr>
<tr>
<td>3</td>
<td>Karan</td>
<td>45</td>
<td>Orthopedic</td>
<td>10/02/98</td>
<td>200</td>
<td>M</td>
</tr>
<tr>
<td>4</td>
<td>Tarun</td>
<td>12</td>
<td>Surgery</td>
<td>01/01/98</td>
<td>300</td>
<td>F</td>
</tr>
<tr>
<td>5</td>
<td>Zubin</td>
<td>36</td>
<td>ENT</td>
<td>12/01/98</td>
<td>250</td>
<td>M</td>
</tr>
<tr>
<td>6</td>
<td>Ketaki</td>
<td>16</td>
<td>ENT</td>
<td>12/02/98</td>
<td>300</td>
<td>F</td>
</tr>
<tr>
<td>7</td>
<td>Ankita</td>
<td>29</td>
<td>Cardiology</td>
<td>20/02/98</td>
<td>800</td>
<td>F</td>
</tr>
<tr>
<td>8</td>
<td>Zareen</td>
<td>45</td>
<td>Gynecology</td>
<td>22/02/98</td>
<td>Null</td>
<td>F</td>
</tr>
<tr>
<td>9</td>
<td>Kush</td>
<td>19</td>
<td>Cardiology</td>
<td>13/01/98</td>
<td>800</td>
<td>M</td>
</tr>
<tr>
<td>10</td>
<td>Shailya</td>
<td>31</td>
<td>Medicine</td>
<td>19/02/97</td>
<td>400</td>
<td>F</td>
</tr>
</tbody>
</table>

Write commands in SQL for (i) to (xii)
(i) To show all information about the patients of cardiology department.
(ii) To list the names of female patients who are in orthopaedic department.
(iii) To display Patient’s name, charges, Age for male and female patients.
(iv) To count the number of patients with Age > 30.
(v) Increase the charges of male patient in ENT department by 3%.
(vi) Add another column email_id with suitable data type.
(vii) Delete the records of all female patients in Surgery department.
(viii) Display a report listing name, age, charges and amount of charges including VAT as 2% on charges name the column as total charges and keep the data in ascending order of name.
(ix) To display the difference of highest and lowest charges of each department having maximum charges more than 300.
(x) Find out the details of patients whose age is same or more than that of patient whose hospital charges are maximum.
(xi) Display the details of all the patients who are hospitalised in 1998.
(xii) Display the charges of various departments. A charge amount should appear only once.

Find out the output for SQL commands (xiii) to (xvi).

(xiii) SELECT COUNT(DISTINCT Department) FROM HOSPITAL;
(xiv) SELECT MAX(Age) FROM HOSPITAL WHERE SEX='M';
(xv) SELECT AVG(Charges) FROM HOSPITAL WHERE SEX='F';
(xvi) SELECT SUM(Charges) FROM HOSPITAL WHERE DATEOFadm < '12/08/98';

Q3 (a) Write an SQL command for creating a table student whose structure is given below:

<table>
<thead>
<tr>
<th>FIELD NAME</th>
<th>DATATYPE</th>
<th>SIZE</th>
<th>CONSTRAINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rno</td>
<td>Number</td>
<td>3</td>
<td>Part of Primary Key</td>
</tr>
<tr>
<td>Class</td>
<td>Varchar</td>
<td>5</td>
<td>Part of Primary Key</td>
</tr>
<tr>
<td>Percentage</td>
<td>Number</td>
<td>5,2</td>
<td>&gt;0 and &lt;=100</td>
</tr>
<tr>
<td>Projno</td>
<td>Number</td>
<td>6</td>
<td>FK – Project(pno)</td>
</tr>
<tr>
<td>Address</td>
<td>Varchar</td>
<td>30</td>
<td>Default Hyderabad</td>
</tr>
</tbody>
</table>
(b) In a database there are two tables ‘LOAN’ and ‘BORROWER’ as shown below:

<table>
<thead>
<tr>
<th>Loan_number</th>
<th>Branch_name</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-170</td>
<td>Downtown</td>
<td>3000</td>
</tr>
<tr>
<td>L-230</td>
<td>Redwood</td>
<td>4000</td>
</tr>
<tr>
<td>L-260</td>
<td>Perryridge</td>
<td>1700</td>
</tr>
</tbody>
</table>

**BORROWER**

<table>
<thead>
<tr>
<th>Customer_Name</th>
<th>Loan_no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jones</td>
<td>L-170</td>
</tr>
<tr>
<td>Smith</td>
<td>L-230</td>
</tr>
<tr>
<td>Hayes</td>
<td>L-155</td>
</tr>
</tbody>
</table>

(i) Identify the primary key column in the table LOAN.

(ii) How many rows and columns will be there in the natural join of these two tables?

(c) Consider the tables PEOPLE and PROPERTIES given below:

**PEOPLE**

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone</th>
<th>PID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aisha</td>
<td>9411223344</td>
<td>1</td>
</tr>
<tr>
<td>Karan</td>
<td>9422114455</td>
<td>2</td>
</tr>
<tr>
<td>Rosy</td>
<td>9433112244</td>
<td>3</td>
</tr>
</tbody>
</table>

**PROPERTIES**

<table>
<thead>
<tr>
<th>PID</th>
<th>SPID</th>
<th>Farm_Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Old house farm</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>Nanada’s farm</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Will’s farm</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>Tall farm</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>The florist</td>
</tr>
</tbody>
</table>
(d) Find the outputs:

(a) SELECT ROUND(20009,111,2);
(b) SELECT SQRT(81),SQRT(17),SQRT(-1);
(c) SELECT MID('ABS Public School',11,8), TRIM(LEADING '!' FROM '!!!!WELCOME!!!!!!');
(d) SELECT SUBSTR(RTRIM('INDIA IS GREAT '),3,9);
(e) SELECT CONCAT(UPPER('xiHum'), LOWER('xiSc'), UPPER(SUBSTR('xiCom',2,3)));

SECTION B

4. a) What is a combo box? When would you prefer a combo box over a list?
   b) Write code to obtain list of selected items from a list namely List1.
   c) How are protected members different from private members of a class?
   d) What are the actual and formal parameters of a method?

5. Well Tech Institute offers two post graduate courses, one in computers and one in management. The students can avail certain optional facilities. The basic interface for accepting the details of facilities availed by a student is as follows

![Image of a form with fields for Enrolment Number, Courses (MBA, MEA), Facilities Available (Library, Mess, Hostel), and Charges]

Write the code and the event procedures for incorporating the following functionality:

(a) The library facility should be selected by default. And the default course choice
should be computers course.

(b) When user clicks clear button all the text fields should be cleared.

(c) Whenever user selects the HOSTEL facility, the MESS facility should get selected automatically, which the user can deselect later if desired.

(d) Given that the charges for library, mess and hostel are Rs 500, Rs 1500 and Rs 2000 respectively per month, write a method calculate() that calculates and displays the charges per semester, for the facilities. This method should be called when user clicks Calculate button.

(e) Make sure that Enrollment Number entered is non-negative and non-zero value. If it is not give an appropriate message.

6. Answer the following questions.

(a) Find out the output:

(i) What will the function compute(15,6) return?

```java
int compute(int x, int y)
{
    // Assuming x>=0 and y>=0
    if(x>=y)
    {
        x=x-y;
        return compute(x,y);
    }
    else
    {
        return x;
    }
}
```

(ii) int x,y;
```java
for(x=1;x<=4;x++)
{
    for(y=1; y<=4;y++)
    {
        System.out.print("\"+-x\"");
    }
    System.out.println();
}
```

(b) Find the errors from the following code segments and rewrite the corrected code underlining the correction made:

(i) Switch(x) {
    Case 1:
    
```java
    case 1:
    ```
n1 = 10;
n2 = 20;
Case 2:
n3 = 30;
break;
n1 = 40;
}

(c) Rewrite the following while loop using a for loop

int s = 0;
while (s <= 13){
if (s%2 == 2)
{
    System.out.println("color code red");
}
else{
    System.out.println("color code blue");
} System.out.println("New color code");
s = s + 1;
}

7. Answer the following questions.

a) Write a function in Java to accept a number in text field and display a message “Adult” if
   the number entered by the user is more than 20

b) Write a method in Java to take a number as argument and print the product of its digit, as if a
   number entered is 234 then the program gives output as 24.

c) Write the output of the following code

int j = 10, x = 0, i = 0;
for (i = 1; i <= 4; i++)
{
    if (i%2 == 0)
        x = x + (i + j);
    j = j - 2;
} System.out.println(x);

d) Write the following code segment using for.. loop without effecting the output of the code:
int Num=6;
int Temp=Num;
while (Num>=1)
{
    Temp=Temp-1;
    if (Temp% 2== 0)
        System.out.println(" is Even");
    else
        System.out.println(" is Odd");
    Num=Num-2;
}
e) Write the code to print the sum of digits of a number.