

ID No: 623

Semester V

[Total No. of Pages: 02]

Time: 90 minutes

Department: Department of Computer Science
Title of the Course: ADBMS
Course Code: CSL2301

Max. Marks: 40

Instructions:

For Section A

- There is one question having five parts. Each part is having four distinct options out of which only one choice will be correct. There is no negative marking for incorrect answers.

For Section B

- There are 6 Questions of 2 marks each. There is a choice to attempt 5 questions out of 6.

For Section C

- There are 4 Questions of 5 marks each. There is a choice to attempt 3 questions out of 4.

For Section D

- There are 2 Questions of 10 marks each. There is a choice to attempt 1 question out of 2.

Section-A

(All Questions are Compulsory, Each question carries 01 mark)

1.

a)

```
<book category="dbms">
  <bname>dbms Tutorials</bname>
  <Pages>400</pages>
  <cost>$500.00</cost>
</book>
```

How many nodes and attributes are there in the document?

- | | |
|--------------------------|--------------------------|
| (i) 3nodes, 1 attribute | (ii) 4nodes, 1 attribute |
| (iii) 1node,4 attributes | (iv) 3nodes, 2 attribute |

b) A heterogeneous distributed database is which of the following?

- The same DBMS is used at each location and data are not distributed across all nodes.
- The same DBMS is used at each location and data are distributed across all nodes.
- A different DBMS is used at each location and data are not distributed across all nodes.
- A different DBMS is used at each location and data are distributed across all nodes.

c) CREATE SEQUENCE ord_seq

```
INCREMENT BY 10
START WITH 120
MAXVALUE 9999
NOCYCLE;
```

SQL>CREATE TABLE ord_Items (ord_no NUMBER(4)DEFAULT ord_seq.NEXTVAL, item_no NUMBER(3), quantity NUMBER(3) CHECK (quantity BETWEEN 100 AND 200), expiry_date date, CONSTRAINT it_pk PRIMARY KEY (ord_no,item_no), CONSTRAINT ord_fk FOREIGN KEY(ord_no) REFERENCES orders(ord_no));

The command to create a table fails. Identify the reason for the SQL statement failure?

- i) You cannot use CONSTRAINT like it is used in above query.
 - ii) You cannot use the BETWEEN clause in the condition of a CHECK constraint.
 - iii) You cannot use the NEXTVAL sequence value as a DEFAULT value for a column.
 - iv) You cannot use ORD_NO and ITEM_NO columns as a composite primary key because ORD_NO is also the FOREIGN KEY.
- d) A transaction manager is which of the following?
- (i) Maintains a log of transactions
 - (ii) Maintains before and after database images
 - (iii) Maintains appropriate concurrency control
 - (iv) All of the above.
- e) %TYPE can be used to declare variable
- (i) Similar to already declared database & database column
 - (ii) Similar to already declared only
 - (iii) Simialr to database columns only
 - (iv) Similar to record type

Section-B

(Attempt any 5 questions, each question carries 02 marks)

2. Differentiate between Homogeneous and Heterogeneous distributed database environments.

3. Consider you are altering a sequence. Justify the below statement by taking example:
"A new MAXVALUE that is less than the current sequence number cannot be imposed."

4. List the Correctness Rules of Fragmentation.

5. How logical data independence is different from physical data independence?

6. Below are table details:

Emp(empid, ename,salary,dno)
Department(Deptno ,dname)

Create or replace view dept_sum_vu select dname, Minimum of salary, Maximum of salary, Average of salary employee. Also add an alias (name, minsal, maxsal, avgsal) for each column name.

7. Given below is an XML file named "bookmark.xml". Write an XPATH expression to select all title elements in bookmark element from bookstore element those has price smaller than 150.

<?xml version="1.0" encoding="ISO-8859-1"?>

<bookstore>

<book category=" CHILDREN">

<title lan="en"> Jungle book</title>

<price>99.89</price>

</book>

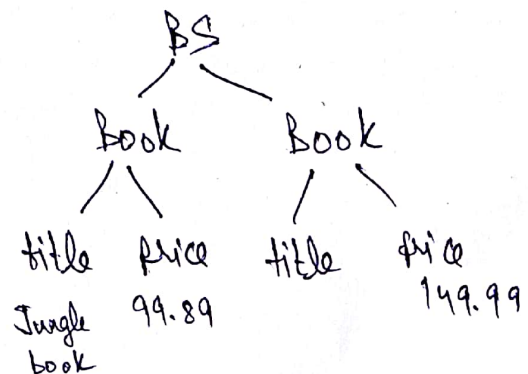
<book category=" CHILDREN">

<title lan="en"> The Book of the Thousand Nights and a Night </title>

<price>149.99</price>

</book>

</bookstore>



Section-C

(Attempt any 3 questions, each question carries 5 marks, subparts (if any) carry equal weightage)

8. Write a PL/SQL block that will accept an account number from the user, check if the users balance is less than minimum balance, then deduct Rs. 100/- from the balance. Consider table acct_master having attributes (acct_no number(5), acct_name varchar2(10), balance number(10)).
9. Create XML DTD correspond to semi-structure data as a xml tree as shown in figure below. Also specify the various notations used while specifying the elements in XML DTD.

```
<?xml version="1.0"?>
<!DOCTYPE list SYSTEM "simple_recipe.dtd">
<list>
<recipe TYPE = SWEET>
  <author>Carol Schmidt</author>
  <recipe_name>Chocolate Chip Bars</recipe_name>
  <meal>Dinner</meal>
  <ingredients>
    <item>2/3 C butter</item>
    <item>2 C brown sugar</item>
    <item>1 tsp vanilla</item>
    <item>1 3/4 C unsifted all-purpose flour</item>
    <item>1 1/2 tsp baking powder</item>
    <item>1/2 tsp salt</item>    <item>3 eggs</item>
    <item>1/2 C chopped nuts</item>
    <item>2 cups (12-oz pkg.) semi-sweet choc. chips</item>
  </ingredients>
  <directions>
    Preheat oven to 350 degrees.
    Melt butter; combine with brown sugar and vanilla in large mixing bowl.
    Set aside to cool. Combine flour, baking powder, and salt; set aside.
    Add eggs to cooled sugar mixture; beat well.
    Stir in reserved dry ingredients, nuts, and chips.
    Spread in greased 13-by-9-inch pan.
    Bake for 25 to 30 minutes until golden brown; cool. Cut into squares.
  </directions>
</recipe>
</list>
```

10. Discuss the architecture of a DDBMS. How it is different from parallel databases?

11. Mr. Rashid is working on a database of employees of his university. He wants to fetch the count of all the employees working in dept_no 99. Raise a user-defined exception if there exist no employees in dept_no 99.

Section-D

(Attempt any one question, each question carries 10 marks, subparts (if any) carry equal weightage)

12. (a) What is a fragment of a relation? What are the main types of fragments? Consider the table below and corresponds to that table solve the following queries: (6 marks)

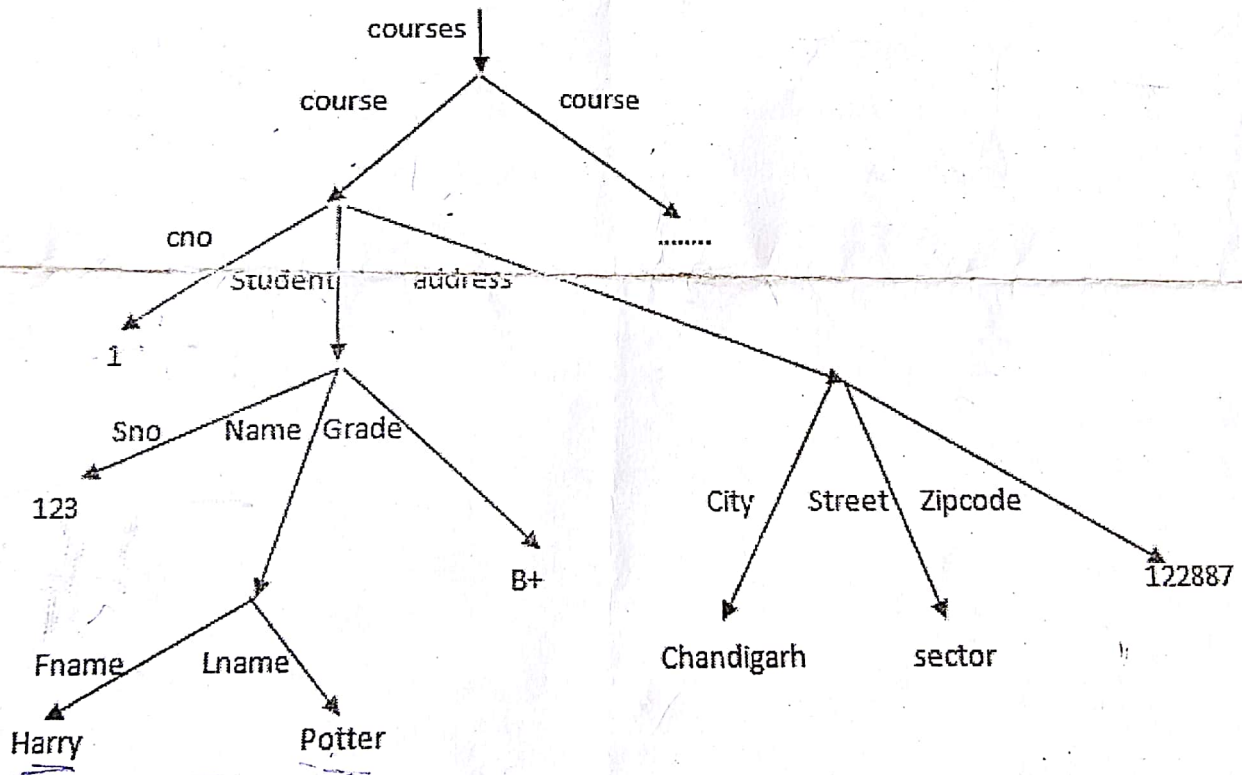
PROJ			
PNO	PNAME	BUDGET	LOC
P1	Instrumentation	150000	Montreal
P2	Database Develop.	135000	New York
P3	CAD/CAM	250000	New York
P4	Maintenance	310000	Paris
P5	CAD/CAM	500000	Boston

- (I) Horizontal fragmentation of PROJ relation
- PROJ1: projects with budgets less than 200,000
 - PROJ2: projects with budgets greater than or equal to 200,000
- (II) Vertical fragmentation of PROJ relation
- PROJ1: information about project budgets
 - PROJ2: information about project names and locations

(b) Why is data replication useful in DDBMSs? What typical units of data are replicated?

(4 marks)

13. Given below is the XML Hierarchical tree structure. Construct an XML schema for the following model in which cno is unique and sno is primary key.



END TERM EXAMINATION

FIFTH SEMESTER 2017-18

CSL2301-ADVANCED DATABASE MANAGEMENT SYSTEM

Time allowed: 03 Hours

Max. Marks: 60

General Instructions:

- Follow the instructions given in each section.
- Make sure that you attempt the questions in order.

SECTION-A (5x1 mark=05 marks)

(Question 1 (i) to 1(v) has four choices, out of which only one is correct, no negative marking for wrong answer)

Q1

(i) Location transparency allows for which of the following?

(a) Users to treat the data as if it is at one location

(b) Programmers to treat the data as if it is at one location

(c) Managers to treat the data as if it is at one location

(d) All of the above

(ii) CREATE SEQUENCE ord_seq

INCREMENT BY 10

START WITH 120

MAXVALUE 9999

NOCYCLE;

SQL>CREATE TABLE ord_items (ord_no NUMBER(4)DEFAULT ord_seq.NEXTVAL, item_no NUMBER(3), qty NUMBER(3) CHECK (qty BETWEEN 100 AND 200), expiry_date date, CONSTRAINT it_pk PRIMARY KEY (ord_no,item_no), CONSTRAINT ord_fk FOREIGN KEY(ord_no) REFERENCES orders(ord_no));

The command to create a table fails. Identify the reason for the SQL statement failure?

(a) You cannot use CONSTRAINT like it is used in above query.

(b) You cannot use the BETWEEN clause in the condition of a CHECK constraint.

(c) You cannot use the NEXTVAL sequence value as a DEFAULT value for a column.

(d) You cannot use ORD_NO and ITEM_NO columns as a composite primary key because ORD_NO is also the FOREIGN KEY.

(iii) The complexity of Cartesian product is

(a) $O(n)$

(b) $O(n^2)$

(c) $O(n \log n)$

(d) None of the above

(iv) A set of vertical fragments $L_1, L_2, L_3, \dots, L_n$ includes all the attributes of R but share only _____ is called _____ fragmentation.

(a) Primary key, Complete Vertical

(b) Primary key, Complete horizontal.

(c) Superkey, Mixed.

(d) Primary key, Primary Key

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(v) What notation '+' specify in XML?

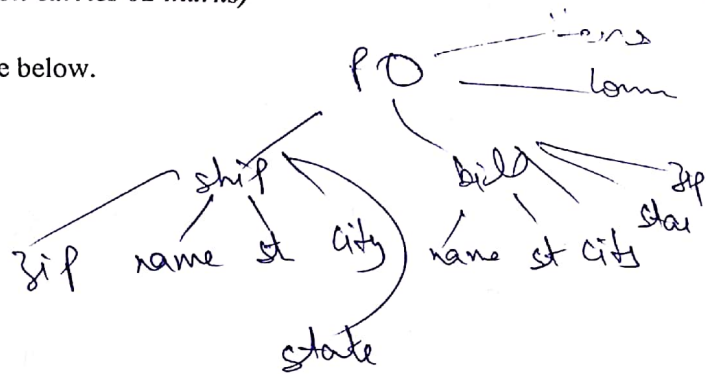
- (a) An element can be repeated zero or more times in the document
- (b) An element can be repeated one or more times in the document
- (c) An element can be repeated zero or one time in the document
- (d) None of the Above

SECTION-B (5x2 marks=10 marks)

(Attempt any 5 questions, each question carries 02 marks)

Q2 ^{2m} Create XML DTD correspond to xml tree as shown in figure below.

```
<?xml version="1.0"?>
<Employee_Info>
  <Employee Employee_Number="105">
    <Name>Masashi Okamura</Name>
    <Department>Design Department</Department>
    <Telephone>03-1452-4567</Telephone>
    <Email>okamura@xmltr.co.jp</Email>
  </Employee>
</Employee_Info>
```



Q3 Generate a query graph for the following SQL expression:

```
SELECT ENAME, RESP
FROM EMP, ASG, PROJ
WHERE EMP.ENO = ASG.ENO
AND ASG.PNO = PROJ.PNO
AND PNAME = "CAD/CAM"
AND DUR_36
AND TITLE = "Programmer"
```

Q4 Illustrate various steps for Query Processing with help of a diagram.

- Q5 (a) Create a view named stu_vw that contains the roll_number, student_name and branch for all students having cgpa>7 in the student table.
- (b) Create a sequence to be used with the primary key column of the emp table. The sequence should start at 100 and have a maximum value of 2000. Your sequence should increment by ten numbers and it should repeat itself in order. Name the sequence emp_seq.

Q6 What different types of transparencies should be provided with a DDBMS?

Q7 "Data mining as a step in the process of knowledge discovery." Elaborate

SECTION-C (5x5 marks=25 marks)

(Attempt any 5 questions, each question carries 05 marks)

Q8 ^{5m} Create XML DTD correspond to semi-structure data as a xml tree as shown in figure below. Also specify the various notations used while specifying the elements in XML DTD.


```

<?xml version="1.0"?>
<!DOCTYPE list SYSTEM "simple_recipe.dtd">
<list>
  <recipe TYPE = SWEET>
    <author>Carol Schmidt</author>
    <recipe_name>Chocolate Chip Bars</recipe_name>
    <meal>Dinner</meal>
    <ingredients>
      <item>2/3 C butter</item>
      <item>2 C brown sugar</item>
      <item>1 tsp vanilla</item>
      <item>1 3/4 C unsifted all-purpose flour</item>
      <item>1 1/2 tsp baking powder</item>
      <item>1/2 tsp salt</item>      <item>3 eggs</item>
      <item>1/2 C chopped nuts</item>
      <item>2 cups (12-oz pkg.) semi-sweet choc. chips</item>
    </ingredients>
    <directions>
      Preheat oven to 350 degrees.
      Melt butter; combine with brown sugar and vanilla in large mixing bowl.
      Set aside to cool. Combine flour, baking powder, and salt; set aside.
      Add eggs to cooled sugar mixture; beat well.
      Stir in reserved dry ingredients, nuts, and chips.
      Spread in greased 13-by-9-inch pan.
      Bake for 25 to 30 minutes until golden brown; cool. Cut into squares.
    </directions>
  </recipe>
</list>

```

Q9 For the given table Account (Acc_No, Balance, Branch_Name, Type)

Acc_No	Balance	Branch_Name
A_101	5000	Pune
A_102	10,000	Baroda
A_103	25,000	Delhi

a) Horizontal Fragmentation row-wise.

b) Vertical Fragmentation such that V1 contains Balance and V2 contains Branch_Name.

- Q10 What are cursors? Write a program to increase the salary of employees with post='manager' will get 5% increment and employees with post='clerk' will get 3% increment.
- Q11 Suppose that a data warehouse for Big University consists of the following four dimensions: student, course, semester, and instructor, and two measures count and avg grade. When at the lowest conceptual level (e.g., for a given student, course, semester, and instructor combination), the avg grade measure stores the actual course grade of the student. At higher conceptual levels, avg grade stores the average grade for the given combination.

(a) Draw a snowflake and Factconstellation schema diagram for the data warehouse.

- Q12 Discuss the architecture of a DDBMS. How it is different from parallel databases.

- Q13 A large supermarket tracks sales data by Stock-keeping unit (SKU) for each item, and thus is able to know what items are typically purchased together. Let the database of transactions consist of the sets {1,2,3,4}, {1,2,3,4,5}, {2,3,4}, {2,3,5}, {1,2,4}, {1,3,4}, {2,3,4,5}, {1,3,4,5}, {3,4,5}, {1,2,3,5}. Using the Apriori algorithm build a list of frequent purchased item pairs from this data assuming the min support = 4.

SECTION-D (2x10 marks=20 marks)

(Attempt any 2 questions, each question carries 10 marks)

- 10
Q14 Create xml schema correspond to the xml document as shown in figure below:

```
<?xml version="1.0"?>
<purchaseOrder xmlns="http://tempuri.org/po.xsd" orderDate="1999-10-20">
  <shipTo country="US">
    <name>Alice Smith</name>
    <street>123 Maple Street</street>
    <city>Mill Valley</city>
    <state>CA</state>
    <zip>90952</zip>
  </shipTo>
  <billTo country="US">
    <name>Robert Smith</name>
    <street>8 Oak Avenue</street>
    <city>Old Town</city>
    <state>PA</state>
    <zip>95819</zip>
  </billTo>
  <comment>Hurry, my lawn is going wild!</comment>
  <items>
    <item partNum="872-AA">
      <productName>Lawnmower</productName>
      <quantity>1</quantity>
      <USPrice>148.95</USPrice>
      <comment>Confirm this is electric</comment>
    </item>
    <item partNum="926-AA">
      <productName>Baby Monitor</productName>
      <quantity>1</quantity>
      <USPrice>39.98</USPrice>
      <shipDate>1999-05-21</shipDate>
    </item>
  </items>
</purchaseOrder>
```

- Q15 a) Suppose a company maintains its record in a database and it has two tables named as employee and department. An employee table has the fields emp_no, emp_name, emp_hiredate, emp_deptno. And department table has the fields Dept_no, dep_name, dep_loc. Then based on this information create a stored procedure that displays the senior most member of each department. The seniority is judged on the basis of employee's hire date.

- b) Simplify the following query, expressed in SQL, on given relation ASG using idempotency rules:

ASG

ENO	PNO	RESP	DUR
E1	P1	Manager	12
E2	P1	Analyst	24
E2	P2	Analyst	6
E3	P3	Consultant	10
E3	P4	Engineer	48
E4	P2	Programmer	18
E5	P2	Manager	24
E6	P4	Manager	48
E7	P3	Engineer	36
E8	P3	Manager	40

```

SELECT ENO
FROM ASG
WHERE RESP = "Analyst"
AND NOT(PNO="P2" OR DUR=12)
AND PNO != "P2"
AND DUR=12

```

Q16 . a) What are the factors that an organization needs to consider before choosing between OLAP & OLTP?

(4 marks)

b) Apply k-means clustering algorithm to the data given below: (6 marks)

The following data set consisting of the scores of two variables on each of seven individuals:

Subject	A	B
1	1.0	1.0
2	1.5	2.0
3	3.0	4.0
4	5.0	7.0
5	3.5	5.0
6	4.5	5.0
7	3.5	4.5