

Roll No. _____

Pandit Deendayal Petroleum University, Gandhinagar
School of Technology

End-Semester Examination

B. Tech. (ICT)

Date: 26/12/2018

Course Name :Database Management Systems

Semester - V

Time: 10.00 am to 1.00 pm

Course Code :17CP202T

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on the question paper.
2. Assume suitable data wherever required and mention it clearly.
3. You are required to answer all the questions in sequence as given in the question paper.

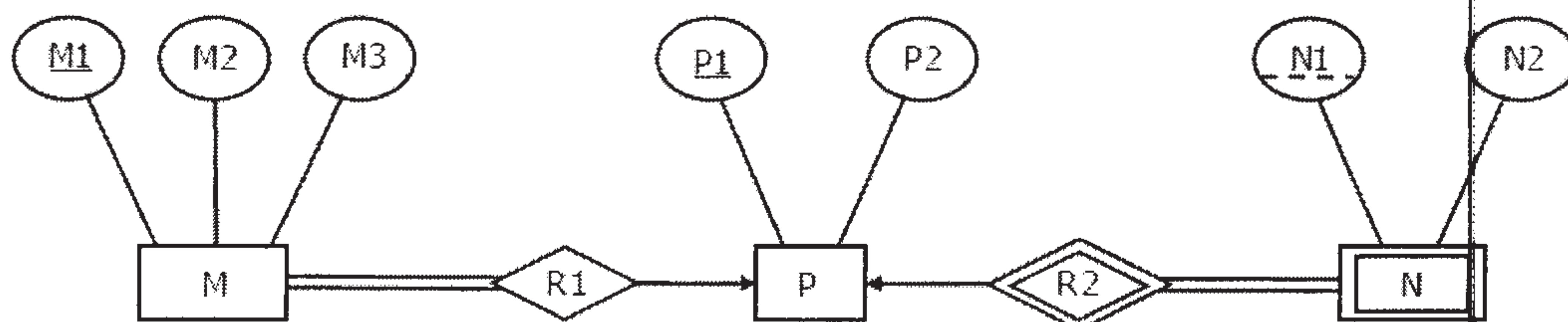
Q.1 Answer the following questions (Any Five).

(10)

Note : Write the justification in all questions except III and VI

- (I) Consider a schema $R(A, B, C, D)$ and functional dependencies $A \rightarrow B$ and $C \rightarrow D$. Then the decomposition of R into $R_1(A, B)$ and $R_2(C, D)$ is
- A) dependency preserving and loss less join
 - B) loss less join but not dependency preserving
 - C) dependency preserving but not loss less join
 - D) not dependency preserving and not loss less join

- | | |
|------|------------------------------------|
| (II) | Consider the following ER diagram. |
|------|------------------------------------|



The minimum number of tables needed to represent M, N, P, R1, R2 is

- A) 2
B) 3
C) 4
D) 5

- | | |
|-------|---------------------------------|
| (III) | Write full form of DBA and AES. |
|-------|---------------------------------|

- | | |
|------|--|
| (IV) | Which of the following concurrency control protocols ensure both conflict serializability and freedom from deadlock? |
|------|--|

- I. 2-phase locking
- II. Time-stamp ordering

- A) I only
B) II only
C) Both I and II
D) Neither I nor II

- (V) Consider the following functional dependencies hold for relations $R(A, B, C)$ and $S(B, D, E)$: $B \rightarrow A, A \rightarrow C$

The relation R contains 200 tuples and the relation S contains 100 tuples. What is the minimum and maximum number of tuples possible in the $R \bowtie S$

- | | |
|------|--|
| (VI) | CREATE TABLE TEMP (ID INT, NAME VARCHAR(100)), |
|------|--|

```
INSERT INTO TEMP VALUES (1, "ABC"); INSERT INTO TEMP VALUES (1, "ABC");
INSERT INTO TEMP VALUES (1, "BCD"); INSERT INTO TEMP VALUES (1, "CDE");
```

What is output of SELECT COUNT(*) FROM TEMP GROUP BY NAME;

Q.2 Attempt Following (Any Five):

(40)

- (I) Consider the airport management system. Compare the file system and DBMS for the said example in eight category.

(II)	Explain Embedded SQL with example.	
(III)	Explain lossless and lossy decomposition with example in each.	
(IV)	Explain 1NF, 2NF,3NF and BCNF with example in each	
(V)	Explain ACID property with example in each.	
(VI)	Explain the mandatory and role based access control with example in each	
(VII)	Explain the block nested loop join with cost analysis.	

Q.3Attempt Following (Any Five):

(20)

(I) Consider two transactions T1 and T2, data X and Y, and four schedules S1, S2, S3, S4 of T1 and T2 as given below:

T1 = Read₁[X] Write₁[X] Write₁[Y]
T2 = Read₂[X] Read₂[Y] Write₂[Y]
S1 = Read₁[X] Read₂[X] Read₂[Y] Write₁[X] Write₁[Y] Write₂[Y]
S2 = Read₁[X] Read₂[X] Read₂[Y] Write₁[X] Write₂[Y] Write₁[Y]
S3 = Read₁[X] Write₁[X] Read₂[X] Write₁[Y] Read₂[Y] Write₂[Y]
S4 = Read₁[X] Read₂[Y] Read₂[X] Write₁[X] Write₁[Y] Write₂[Y]
Which of the above schedules are conflict-serializable? Show the steps.

(II) Let R(A,B,C,D,E,G,H) with functional dependencies CD → AB, C → D, D → EH, AE → C, A → C, B → D. Find the minimal cover for R.

(III) Let R(A,B,C,D,E,F,G) with functional dependencies AB → CD, AF → D, DE → F, C → G , F → E, G → A. Find {C}⁺, {AB}⁺, {AF}⁺, {CF}⁺, {BG}⁺, {ABE}⁺, {CDF}⁺, {AEG}⁺

(IV) Information about a collection of students is given by the relation **studinfo(studid, name, gender)**. The relation **enroll(studid, courseid)** gives which student has enrolled for (or taken) that course(s). Assume that every course is taken by at least one male and at least one female student. What does the following relational algebra expression represent?

$$\pi_{courseid} \left(\left(\pi_{studid} \left(\sigma_{gender = "Female"} (studinfo) \right) \times \pi_{courseid} (enroll) \right) - enroll \right)$$

(V) Let R(A,B,C,D,E,F,G) with functional dependencies DF → CG,BC → FG,E → AG,ABC → EG. Find all the candidate keys of the R.

(VI) Every schedule which is view-serializable is also conflict serializable. True/False. Justify using example.

(VII) Every relation which is in 3NF is also in BCNF. True/False. Justify using example.

Q.4 Write SQL statement as well as output of each of the following queries (Any Ten):

(30)

range is the maximum distance the boat can travel without refueling. Note that the Employee relation describes captain and other kinds of employees as well as every captain is certified for some boat, and only captains are certified to run the boat. All query must give ascending order output with respect to first column in it. Capacity and seats shows number of persons. Speed is in miles per hr. range and distance is in kilometers.

(I)	Find the name of oldest age employee who is not the captain.	
(II)	Find the names of captains who are licensed to drive boat having lowest speed.	
(III)	Find the names of boats with GREEN color such that all captains certified to operate them have salaries more than 500.	
(IV)	For each captain who is certified for more than two boats, find the eid and the maximum range of the boats for which she or he is certified.	
(V)	For all boats having atleast four certified captains, find the names of boat and average salary of captains	
(VI)	For all trips, print the id of trip and number of boats possible on that trip.	
(VII)	Find the names of captains for whom the salary that they are getting is less than price of the trips (at least one)that they are eligible.	
(VIII)	Compute the difference between the average salary of a captains and the average salary of all employees (including captains).	
(IX)	For all boats, print the name of boat and total trip for which boat can be used.	
(X)	Print the id of employees having exactly five letters first name or last name.	
(XI)	For each category of trip, print the category name and total number of GREEN boats eligible for them.	

Best Wishes

BOATS					
<u>BID</u>	BNAME	RANGE	COLOR	CAPACITY	SPEED
1	MOSTLY WATER	5689	RED	500	156.3
2	BELOW ME	589	VIOLET	28	89.6
3	RAINBOW'S END	2586	BLUE	69	589.3
4	JUMPING JACK	32	WHITE	58	65.9
5	UNLEASHED	7896	PINK	36	169.3
6	FULLY INVOLVED	458	GREEN	58	58
7	SWEET BASIL	5896	GREEN	59	68.6
8	SKY WALKER	215	BLACK	57	45.6
9	PEACEFUL WIND	2586	RED	47	58
10	MORNING JOY	3469	VIOLET	25	89
11	SLIPSTREAM	9000	BLUE	36	125.6
12	BRAVEHEART	879	WHITE	89	698.7
13	AMBIANCE III	4589	PINK	56	58.9
14	TANGLED UP	1569	GREEN	79	69.6
15	LITTLE ESCAPE	588	GREEN	64	58

TRIPS						
<u>TNO</u>	START	END	DISTANCE	SEATS	CATEGORY	PRICE
1	NORTHBEACH	LIGHTROCK	2568	50	ADVENTURE	698
2	MERRIMEAD	IRONMIST	6968	60	ECO	693
3	DRACWYNNE	NORTHBEACH	525	80	GEO	584
4	MALLOWROSE	MERRIMEAD	265	500	RURAL	529
5	EASTSPRING	DRACWYNNE	2548	25	SPACE	698
6	ROSENESS	MALLOWROSE	212	30	SUSTAINABLE	415
7	ICENESS	EASTSPRING	256	60	INDUSTRIAL	236
8	NORTHBEACH	ROSENESS	365	80	MEDICAL	25
9	MERRIMEAD	ICENESS	698	90	CULTURAL	258
10	DRACWYNNE	BEACHDEN	745	100	GEO	698
11	MALLOWROSE	LIGHTROCK	521	25	SUSTAINABLE	458
12	EASTSPRING	IRONMIST	2584	50	MEDICAL	251
13	ROSENESS	FAIRLEY	698	80	ECO	236
14	ICENESS	WOODSILVER	2542	70	INDUSTRIAL	215
15	IRONMIST	WOODSILVER	6989	60	INDUSTRIAL	458

EMPLOYEE			
EID	ENAME	SALARY	AGE
1	RIKKI KERNS	369	26
2	CAREY GUEST	568	69
3	ELVIS CORREA	524	64
4	EDIE LEA	215	58
5	LEONARDO STREET	258	63
6	IRINA RAYBURN	485	54
7	ELVIN MONROE	586	58
8	ELZA MANZO	985	51
9	STEFANIA RICKS	582	64
10	VALENTIN MICHAEL	475	94
11	LIANNE ECHEVARRIA	147	52
12	KAITLYN MUIR	254	48
13	DIEDRE ASHE	256	48
14	LORAIN JETER	2589	22
15	KEITH SILVER	254	89
16	FLORETTA BOWER	2578	87
17	SHAMIKA HANDLEY	2369	52
18	LAUREL LUKE	2548	54
19	LEESA OAKLEY	254	21
20	MERRI SCHOLL	2518	58
21	RICHELLE MASTERS	4589	45

CERTIFIED	
EID	BID
15	2
4	10
6	12
7	8
4	9
15	8
17	7
10	12
4	6
10	14
6	3
2	13
10	7
3	11
10	2
1	10
8	1
4	1
6	13
15	4
13	12
9	9
10	3
20	3
1	1
9	2
19	12
20	9
17	6
7	2
21	10
18	4
17	11
15	1
3	14
2	8
4	15
18	7
5	7
17	5
13	3
19	5