University of Engineering and Management, Kolkata
1st Term Examination, September, 2023
Programme Name: B.Tech in CSE / CSE (AIML) / CSE (IOT, CYS, BCT)
Semester: 5th
Course Name: Database Management Systems
Course Code: PCCCSE501

Full Marks: 30 | Date: 12th September, 2023 | Time: 1.30 PM – 2.30 PM

Part - A
Attempt 5 questions
Each question carries 2 Marks (2 X 5)

1.A. Define weak entity set with a real life example.

Or

1.B. Define cardinality constraints on a database system.

2.A. Identify the criterion for a relation R to be in BCNF .

Or

2.B. Compare trivial and non-trivial functional dependency with proper example.

3.A. Suppose R is a relation of 'n' attributes {A1, A2, A3, ..., An} as a function of n.
Discuss how many super keys R has, if the only key present in R is A1 .

Or

3.B. Describe the schema versus instance for a relation.

4.A. Identify the difference between the functions DELETE & TRUNCATE in SQL.

Or

4.B. Discuss the use of GROUP BY command in SQL.

5.A. "All candidate keys are super keys but the converse is not true" – Is the statement true or false? Justify your answer.

Or

5.B. Compute the number of candidate keys present in a relation R (A, B, C, D, E):
$A \rightarrow BC$; $CD \rightarrow E$; $B \rightarrow D$; $E \rightarrow A$

Part - B
Attempt 2 questions
Each question carries 5 Marks (5 X 2)

6.A. Find the canonical cover of R (A, B, C, D):
F : A → BC ; AC → D ; D → B ; AB → D

Or

6.B. For a given relation R (ABCDEH) having FD Sets as follows:
F 1 :{A → C , AC → D , E → AD , E → H }
F2 : { A → CD , E → AH }
Analyse whether F1 & F2 sets are equivalent or not.

7.A. Given the following schema, analyse the following queries using the relational algebra: **[2.5 + 2.5]**

Passenger (pid, pname, pgender, pcity)
Agency (aid, aname, acity)
Flight (fid, fdate, time, source, destination)
Booking (pid, aid, fid, fdate)

1. Find passenger names for those who do not have any bookings in any flights.
2. Find agency names who do not have any bookings for the passenger with id = 123.

Or

7.B. Given the following schema, analyse the following queries using the relational algebra: **[1+2+2]**

employee (ename, street, city)
works (ename, companyname, salary)
company (companyname, city)
manages (ename, managername)

1. Find the name, street and cities of residence of the employee who work for first bank corp. and earn more than 10,000
2. Find the name of employees who do not work for first bank corp.
3. Find all companies located in every city in which the first bank corp. is located.

Part - C
Attempt 1 question
Each question carries 10 Marks (10 X 1)

8.A. Consider the following Relation (R) and Justify the given decompositions as Lossless / Lossy: **[5 X 2]**

A	B	C	D	E
aaa	122	1	p	w
bbb	555	2	q	x
aaa	777	1	r	y
ccc	888	3	s	z

1. R1 (ABC), R2 (DE)
2. R1 (ABCD), R2 (ACDE)
3. R1 (ABC), R2 (CDE)
4. R1 (ABCD), R2 (DE)
5. R1 (ABC), R2 (BCD), R3 (DE)

Or

8.B. Evaluate the highest Normal Form of each of the following relations: [5+5]
R1 (A, B, C) with FDs are $A \rightarrow B$, $A \rightarrow C$, $C \rightarrow B$
R2 (A, B, C, D) with FDs are $A \rightarrow BC$, $CD \rightarrow B$

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