

Ex./CSE/T/312/12/2012

BCSE EXAMINATION, 2013

(3rd Year, 1st Semester)

DATABASE MANAGEMENT SYSTEMS

Full Marks : 100

Time : Three Hours

Attempt *any five* questions.

1. (a) A system maintains the attendance information in the examination by storing roll and subjectcode. Score of each student for each subject is also stored provided he/she appeared in the examination for the subject. When score is stored, if it is less than 40 then automatically roll and subjectcode is copied in backlog register. Whenever score is updated, if the new score is more than 40 then corresponding entry in backlog register has to be deleted (if it exists). If new score is less than 40 then corresponding entry (if not present in backlog register) has to be made.

Design the database, write down the SQL statements to create the tables and take other necessary measures to fulfill the requirement. 16

- (b) Define foreign key. 4

[*Turn over*]

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2. (a) In relational model what are domain, relation. Schema and relation state ? 7

(b) Comment on the ordering of values in a tuple. 3

(c) Consider the relations :

DEPT (DCODE, DNAME) and EMP (ECODE, ENAME, DCODE, BASIC)

(i) Write relational algebra expression to display DCODE and corresponding average basic for all departments. 2

(ii) Write relational calculus expression to find maximum basic. 3

(iii) Write relational algebra and relational calculus expressions to find out the department codes in which nobody works. 5

3. (a) Define entity type and entity set in the context of ERD. 3

(b) Explain constraints on relation type in ERD. 4

(c) Draw ERD/EERD for the following system :

In a cricket tournament, number of teams have participated. For each team, its name, rank, no. of matches played, won, lost, name of coach are stored. A team has number of players whose name and date of birth are stored. A player may be a bowler, batsman,

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wicketkeeper or combination of the same. Accordingly, special information has to be stored. For every match, played between which teams, details of officials and result are stored. 8

(d) How does ERD help in identifying foreign key ? 5

4. (a) In an admission handling system, each candidate has unique enrollment-id. He/she can submit multiple preferences to denote the choices regarding institutes and courses. System allots one from the given preference list. Consider following information are stored for a candidate :

Enrollment-id, name, date of birth, category, for each preference, preference-no, institute code, institute name, course code, course name and payment information consists of Draft-no, Draft-date, Bank name, branch and amount.

(i) What is the problem in INSERT operation with the given schema ? 5

(ii) Consider the FDS for the given schema :

Enrollment-id → name, date of birth, category, Draft-no
Enrollment-id, preference-no → institute code, course code.

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institute code → institute name

course code → course name

Draft-no → Draft-date, Bank name, branch, amount

Normalize the schema upto 3NT, Show Primary and foreign key at each step. 10

- (b) Explain, the meaning of dependency preserving decomposition and mention its advantage. 5

5. Consider the following tables :

VEWDOR (VENDOR-ID, VENDOR. NAME)

ITEM (ICODE, INAME, RATE)

SUPPLY (SUPPLY-ID, SUPPLY-DT, VENDOR-ID)

SUPPLY-DETAILS (SUPPLY-ID, ICODE, QTY)

- (a) for each vendor, show VENDOR-ID and ICODE of the items never supplied by the vendor. 5
- (b) show VENDOR-ID and total value of all the supplies (Σ QTY and RATE) made by each VENDOR in 2012. List will contain only those entries with total value more than 1,00,000 and it will appear in the descending order of total value. 6
- (c) find out the name of the costliest item. 4
- (d) find out the name of the vendors who have not supplied and item in 2012. 5

[Turn over]

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6. (a) What are the possible reasons for variable length second ? How will you convert the records into a fixed length one ? Also specify the limitations (if any) of the solution. 10
- (b) Consider a relation EMP (ECODE, ENAME, DCODE, BASIC) and it is ordered based on ECODE. ECODE based and DCODE based search are very frequent. Explain, what measures will you take to make the searches efficient ? 6
- (c) Explain the basic advantage of using B/B⁺ tree over binary search tree in indexing. 4
7. (a) Two relations R1 and R2 are to be joined. None of them are sorted on join attribute. Tuples of each relation are physically stored together. Memory is large enough to hold the tuples of either R1 or R2 (not both). Write down a join strategy so that disk access is optimized. Mention the number of disk block access required according to your strategy. 6
- (b) Specify, when does the state transition of a transaction occur ? 4
- (c) Explain the difference in logbased recovery scheme for immediate database update and deferred database update strategy. 5
- (d) Explain, what is conflict serializable schedule ? 5

[Turn over]

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8. Write short notes on the following :

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| (a) Functional units of DBMS. | 6 |
| (b) Security features of DBMS. | 4 |
| (c) Two phase locking protocol. | 5 |
| (d) Weak entity type and its implementation. | 5 |
