

**3/EH-73 (iii) (Syllabus-2015)**

**2 0 1 8**

( October )

**COMPUTER SCIENCE**

( Elective/Honours )

**( Database Management System )**

( CS-301 T )

Marks : 56

Time : 2½ hours

*The figures in the margin indicate full marks  
for the questions*

Answer **one** question from each Unit

**UNIT—I**

1. (a) What is a database? Discuss the characteristics of the database approach. 1+4=5
- (b) Explain the various categories of end users. 6
- (c) Discuss any *two* from the following : 2+2=4
- (i) Weak entity type
  - (ii) Recursive relationship
  - (iii) Generalization

( Turn Over )

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2. (a) Describe the three-schema architecture with a diagram. 5
- (b) A database is being constructed to keep track of the teams and games of a sports league. A team has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game for each team, the positions they played in that game and the result of the game. Design an ER diagram for this application, stating any assumptions you make. Choose your favourite sport. 8
- (c) Discuss the concept of specialization in the EER model. 2

UNIT—II

3. (a) How are file blocks allocated on a disk? Discuss in brief with diagrams. 5
- (b) How is secondary indexing technique different from primary indexing? 3
4. (a) How can you improve the rate of performance for disk accessing using RAID technology? 4
- (b) Differentiate between fixed-length and variable-length records. 4

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UNIT—III

5. (a) What are the various relational integrity constraints? Discuss each in brief with example. 2+3=5
- (b) Discuss any two from the following in terms of relational algebra : 2+2=4
- (i) INTERSECTION
- (ii) NATURAL JOIN
- (iii) CARTESIAN PRODUCT
- (c) Assuming the tables Employee (SSN, FName, LName, Salary, DeptId, Age, Address, Pincode) and Department (DeptNo, DName, DLocation). Write SQL for the following : 3×2=6
- (i) List the tuples of all the employees who work for a department located in Shillong.
- (ii) List out the department details for all the departments where employees are going to get retired this year.
6. (a) What are the possible violations for an INSERT operation? Give example for each. 4
- (b) Explain the syntax of creating a view with an example. 5

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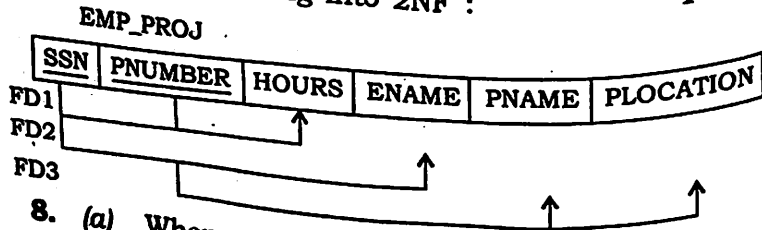
(c) With reference to the above tables, write the relational algebra for the following :  $3 \times 2 = 6$

(i) List the details for all the employees working for Research Department earning salary between 25000 to 40000.

(ii) For every department located in Jowai, list out the employees getting an average salary of 30000.

UNIT—IV

7. (a) What are the various interpretations of NULL values for a tuple in a database? 3
- (b) Discuss 2NF. Given the FD's, normalize the following into 2NF :  $1 + 2 = 3$



8. (a) When are two sets of functional dependencies said to be equivalent? 3
- (b) Consider the following sets of FD :
- F :  $A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H$
- G :  $A \rightarrow CD, E \rightarrow AH$
- Determine whether they are equivalent. 3

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UNIT—V

9. (a) What is a transaction? What are the desirable properties of a transaction? Briefly discuss each.  $2 + 4 = 6$
- (b) Discuss any two of the following :  $3 \times 2 = 6$
- (i) Two-phase locking protocol
- (ii) Deadlock detection
- (iii) Encryption
10. (a) What are conflicting operations? Check whether the following schedules are serializable or not :  $2 + 2 + 2 = 6$
- (i)  $r_1(x); r_2(x); w_2(x); w_1(x); r_2(y); r_3(y); w_2(y); w_3(y)$
- (ii)  $r_3(x); r_1(x); w_3(x); w_2(x); w_1(x)$
- (b) Describe the wait-die and wound-wait protocols for deadlock prevention. 3
- (c) What is the role of the DBA in maintaining database security? 3

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