# B. E. Fifth Semester (Computer Technology) / SoE – 2014-15 Examination

**Course Code : CT 1316 / CT 316** **Course Name : Database Management Systems**

Time : 3 Hours ] [ Max. Marks : 60

**Instructions to Candidates :—**

(1) All questions carry marks as indicated.
(2) Assume suitable data wherever necessary.
(3) Illustrate your answers wherever necessary with the help of neat sketches.

1. Solve any **One** of the following :—

(A) (A1) Draw an ER – Diagram for a Hospital with a set of patients and a set of Medical Doctors, with each patient a log of the various conducted tests is also associated. 4 (CO 1)

(A2) Differentiate between Database System and File System. 4 (CO 1)

(A3) Explain : (i) Primary Key, (ii) Foreign Key. 2 (CO 1)

**OR**

(B) (B1) Explain the differences between Strong and Weak Entity Sets. Why sometimes weak entity sets are needed in database design ? 3 + 1 = 4 (CO 1)

(B2) Elaborate Generalization and Specialization in detail. 4 (CO 1)

(B3) Comment on "The database management system is one of the most complex varieties of software in existence." 2 (CO 1)

2. (A) Solve any **One** of the following :—

(A1) Justify the concept of Referential Integrity Constraint with example. 4 (CO 1)

(A2) Explain the various SET operators with example. 4 (CO 1)

(A3) Compare DDL and DML commands. 2 (CO 1)

**OR**

(B) (B1) Consider the following database :

Employee (Emp_no, Name, Skill, Pay_rate)

Position (Posting_no, Skill)

Duty – Allocation (Posting_no, Emp_no, day, shift)

Write SQL queries for following :—

(1) Get complete details from Duty – Allocation relation.

(2) Find the shift details for Employee "ABC".

(3) Get a list of Employees not assigned a duty.

(4) Get a count of different employees on each shift. 4 (CO 1)

(B2) Let the following Relational schema be given as R(A, B, C) and S(D, E, F). Give an expression in SQL that is equivalent to following query :—

(a) $\pi_{A}(R)$.

(b) $\sigma_{B=17}(R)$.

(c) $R \times S$.

(d) $\pi_{A, F}(\sigma_{C=D}(R \times S))$. 4 (CO 1)

(B3) What is the need of View ? 2 (CO 1)

3. (A) Solve any **One** of the following :—

(A1) How the tuples of the relation schema is represented by B – Trees and $B^{+}$ – Trees ? 4 (CO 2)

(A2) What is Functional Dependency ? Explain any three types of Functional Dependency. 4 (CO 2)

(A3) Describe various Armstrong's axioms. 2 (CO 2)

**OR**

(B) (B1) Let R be a Relation : R = (A, B, C, D, E, F, G) having the FDs :

(a) $A \longrightarrow B$.

(b) $BC \longrightarrow D$.

(c) $BC \longrightarrow E$.

(d) $AEF \longrightarrow G$.

(e) $B \longrightarrow G$.

Find out the candidate key of R. Identify the given relation is in which normal form, Convert it to 2 NF. 4 (CO 2)

(B2) Compare 3 NF with BCNF. 4 (CO 2)

(B3) Justify the role of Clustering Index. 2 (CO 2)

4. (A) Solve any **One** of the following :—

(A1) What is Transaction ? Discuss various states of Transaction during execution. 5 (CO 3)

(A2) Explain : Serial, Non – Serial and Serializable schedule. 3 (CO 3)

(A3) What is Growing Phase and Shrinking Phase in 2 PL protocol ? Give any example. 2 (CO 3)

**OR**

(B) (B1) Check whether the following Schedule is Conflict Serializable or not. Justify your answer.

S

| T1 | T2 | T3 |
|---|---|---|
| R(x) | | |
| | R(z) | |
| R(z) | | R(x) |
| | | R(y) |
| | | W(x) |
| | R(y) | |
| | W(z) | |
| | W(y) | |

5 (CO 3)

(B2) Write a note on Time stamp based protocol. 3 (CO 3)

(B3) Elaborate any two Concurrency Control problems. 2 (CO 3)

5. (A) Solve any **One** of the following :—

(A1) What is Recovery ? How Shadow Paging Scheme can be applied to the database ? 1 + 4 (CO 4)

(A2) Give the significance of checkpoint. 3 (CO 4)

(A3) Why Buffer Management is needed ? 2 (CO 4)

**OR**

(B) (B1) List and explain the various types of failure that occur in Database system. 5 (CO 4)

(B2) How Log Based Recovery technique is implemented ? 3 (CO 4)

(B3) Discuss the different storage types (any two). 2 (CO 4)

6. (A) Solve any **One** of the following :—

(A1) What are the various characteristics of object oriented database ? 5 (CO 4)

(A2) Give the significance of the object oriented data model. 3 (CO 4)

(A3) State the advantages of Object Oriented DBMS. 2 (CO 4)

**OR**

(B) (B1) Why Object Oriented DBMS is needed ? Give its real – time applications. 5 (CO 4)

(B2) State the disadvantages of Object Oriented DBMS. 3 (CO 4)

(B3) Differentiate between DBMS and OODBMS. 2 (CO 4)