B. E. Fifth Semester (Computer Technology) Examination

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

Time : 3 Hours] [Max. Marks : 60

Instructions to Candidates :—

(1) All questions are compulsory.
(2) All questions carry marks as indicated.
(3) Retain the construction Line.

1. Solve any **Two** :—

(a) An E-R diagram can be viewed as a graph. What do the following mean in terms of the structure of an enterprise schema ?

(i) The graph is disconnected.

(ii) The graph is acyclic. 4

(b) List five responsibilities of a database management system. For each responsibility, explain the problems that would aries if the responsibility were not discharged. 4

(c) Consider a database used to record the marks that students get in different exams of different course offerings. Construct an E-R diagram that models exams as entities, and uses a ternary relationship, for the above database. 4

2. Solve any **Two** :—

(a) Consider the relations :

(1) Suppliers(SID, Sname, Rating)

(2) Parts(PID, Pname, Color)

(3) Catalog (SID, PID, Cost)

(i) Retrieve SIDs of Suppliers who rating > 10 using Relational algebra and SQL.

(ii) Retrieve SIDs of Suppliers who supplied red parts using relational algebra and SQL. 3.5

(b) Explain the different clauses of SELECT-FROM-WHERE statement. Give example for 3 types. 3.5

(c) Let the following relation schemas be given :

R = (A, B, C)

S = (D, E, F)

Let relations r(R) and s(S) be given. Give an expression in SQL that is equivalent to each of the following queries.

(a) $\pi A(r)$

(b) $\sigma B = \pi(r)$. 3.5

3. Solve any **Two** :—

(a) Consider the universal relation R = {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies :

F = { {A, B} -> {C}, A} -> {D, E}, {B} -> {F}, {F} -> {G, H}, {D} -> {I, J} }.

What is the key for R ? Decompose R into 2NF, then 3NF relations. 3.5

(b) Define static hashing. Write a note on hashing and bucket overflow. 3.5

(c) How does B-tree differ from a B+- tree ? Why is a B+- tree usually preferred as an access structure to a data file ? 3.5

4. Solve any **Two** :—

(a) What is a recoverable schedule ? Why is recoverability of schedules desirable ? Are there any circumstances under which it would be desirable to allow nonrecoverable schedules ? Explain your answer. 4

(b) Discuss on two-phase locking protocol and strict two-phase locking protocol. 4

(c) How can you implement atomicity in transactions ? Explain. 4

5. Solve any **Three** :—

(a) Explain the deferred and immediate modification versions of the log based recovery scheme. 5

(b) Explain the purpose of the checkpoint mechanism. How often should check points be performed ? 5

(c) Explain the difference between the three storage types-volatile, nonvolatile, and stable - in terms of I/O cost. 5

(d) Compare the deferred and immediate-modification versions of the log based recovery scheme in terms of ease of implementation and overhead cost. 5

6. Solve any **Two** :—

(a) List the advantages and disadvantages of OODBMS. 7.5

(b) Explain the concept of polymorphism for Object Oriented Database. 7.5

(c) Explain Inheritance for OODBMS. 7.5