No of Pages : 3 **Course Code : 12XW32**

Roll No:
(To be filled in by the candidate)

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

SEMESTER EXAMINATIONS, OCTOBER / NOVEMBER - 2015

MSc - SOFTWARE SYSTEMS Semester: 3

12XW32 DATABASE MANAGEMENT SYSTEM

Time: 3 Hours **Maximum Marks: 100**

INSTRUCTIONS:

1. Answer **ALL** questions from GROUP – I.
2. Answer any **FOUR** questions from GROUP – II.
3. Answer any **ONE** question from GROUP – III.
4. Ignore the box titled as **"Answers for Group III"** in the Main Answer Book.

GROUP - I **Marks : 10 x 3 = 30**

1. Define DBMS. What does the term "relation" in Relational Data Base Management System mean?
2. Identify how the concepts of primary key, candidate key and super key are related with an example.
3. Match the following terms (i) to (vi) with appropriate definitions.

(i) Relationship type	a. can be broken down into component parts
(ii) Recursive relationship	b. relates instances of a single entity type
(iii) Degree	c. specifies max and min number of instances
(iv) Entity type	d. association between entity types
(v) Composite attribute	e. collection of similar entities
(vi) Multi-valued attribute	f. number of participating entity types in a relationship
	g. new relation

4. Why are integrity constraints essential in database approach? Constraints are usually named at the time of defining the relations to identify errors upon violation of them. Which constraint(s) need(s) no name? Why?
5. Justify the statement – "A weak entity set always has a total participation constraint with respect to its identifying relationship".
6. Bring out the significance of NULL values in the database instances.
7. In a certain situation, the DBA executes ***truncate*** command. Suggest him an alternate command stating its significance.
8. Given the relation schemes R(A, B, C) and S(D, E, F) and their instances. Give an expression in SQL that is equivalent to each of the following queries.

   (a) $\pi_A(R)$ (b) $\sigma_{B=17}(R)$ (c) $\pi_{A,F}(\sigma_{C=D}(R \times S))$
9. Why and when is cascading rollback of transactions important? Give an example.
10. Differentiate PL/SQL procedure and function.

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GROUP - II

Marks : 4 x 12.5 = 50

11. (a) Describe the three level ANSI/SPARC database architecture. Also discuss the information stored in each level with an example. (6.5)

    (b) Brief the component modules of database management system with a neat sketch. (6)

12. Study the Grade Report of a student given below and draw the Entity Relationship Diagram for ABC College. Identify the various entities, attributes, relationships and cardinality constraints in the ER diagram. Assume that each course is taught by one teacher but a teacher can teach more than one course. A student should take up at least one course. Additional information of the hall number in the campus address, Home and Office Phone numbers of teachers and the age of the student are needed for some other reports.

ABC COLLEGE OF ENGINERRING AND TECHNOLOGY STUDENT GRADE REPORT - APRIL 2015				
Name:	Anny Thomas		**RollNo:** 12XW42	
Campus Address:	Block A Hall 10			
Major:	MSc SWE			
Course ID	**Title**	**Teacher Name**	**Teacher Location**	**Grade**
XW 35	Database Management System	Codd	B104	A
XW 46	System Analysis	Parsons	B317	B

13. (a) Briefly explain the read/write mechanism used in magnetic disk storage device. How will you estimate the total time needed to transfer a block of data to disk? (6.5)

    (b) What is hashing? Explain the various techniques to avoid hash collision. (6)

14. What are the significances of indexed sequential file organization over others? Explain in detail the primary, secondary and clustered indexes with examples.

15. Define database security. Discuss the various security and integrity threats in a database environment. Also brief the defense mechanisms to protect the databases.

GROUP - III

Marks : 1 x 20 = 20

16. Define Transaction. Explain the properties of a transaction with examples. State and explain the types of system log records and the associated states of the transactions to recover from failures.

    Consider the following two transactions:

*T*1: read(*A*); read(*B*);

if *A* = 0 **then** *B* := *B* + 1;

write(*B*).

*T*2: read(*B*); read(*A*);

if *B* = 0 **then** *A* := *A* + 1;

write(*A*).

Let the consistency requirement be *A* = 0 or *B* = 0, with *A* = *B* = 0 the initial values. Give a precise note on the problems associated with concurrently executing these transactions. Show any one of the interleaved execution involving these two transactions that preserves the consistency of the database.

17. State the pitfalls of relational database approach. Define normalization. Analyze the following XYZ Project Information data.

ATTRIBUTE NAME	SAMPLE VALUE	SAMPLE VALUE	SAMPLE VALUE
Emp-code	1003	1110	23453
Lastname	WILSON	BAKER	JOHNSON
Education	HS, BBA. MBA	HS	HS, BS
Deptcode	MKTG	OPS	ENG
Department	MARKETING	OPERATIONS	ENGINEERING
Deptmgr	SMITH	CALHOUN	ROBERTS
Jobclass	23	11	23
Title	SALES AGENT	ASSEMBLER	ENGINEER
Dependents	GERALD, MARY	SALLY	
Birthdate	5/5/60	4/5/55	3/3/62
Hiredate	1/2/90	5/5/95	1/1/85
Training	LEVEL 1, LEVEL 2	LEVEL 1	LEVEL 1, LEVEL 2
Salary	32,500	28,000	32,500

To solve the problem of the poor organization of data at the XYZ Information System, the officials decided that all information should be organized using a RDBMS.

With these data and assumption, answer the following.

(i) From the above table, choose the appropriate column(s) defining its primary key.

(ii) State the roll of functional dependencies in the process of normalization and define 1NF, 2NF and 3NF.

(iii) Based on your answer to (ii), fix any anomalies that violate normal form rules, and show the dependencies for each of the tables. You are not needed to show the data in the tables.

(iv) Finally obtain a data base that is in 3NF.

/END/