

S.Y. B.Sc. (IT) : Sem. III
Database Management Systems



Time : 2½ Hrs.]

Prelim Question Paper

[Marks : 75

- Instructions :**
- (1) All questions are compulsory.
 - (2) Make suitable assumptions wherever necessary and state the assumptions made.
 - (3) Answers to the same questions must be written together.
 - (4) Numbers to the right indicate marks.
 - (5) Draw neat labeled diagrams wherever necessary.
 - (6) Use of Non-programmable calculators is allowed.

1. Attempt the following (any **THREE**) [15]

- (a) Explain database architecture.
- (b) Explain hierarchical and Network model.
- (c) Explain the concept of entity relationship model.
- (d) List and Explain different levels of abstraction.
- (e) What are the basic building blocks of data model? Explain with example.
- (f) State and explain any 5 Codd's rules for relational database.

2. Attempt the following (any **THREE**) [15]

- (a) Define Relational Algebra .Explain Selection and projection operation
- (b) Explain the concept of determination and functional dependencies.
- (c) What is normalization?What is its objective?Give a distinguishing characteristic of 1NF,2NF 3NF and BCNF.
- (d) (i) Using the EMPLOYEE table structure shown in table 1, write the relational schema, draw its dependency diagram and identify all dependencies (including all partial and transitive dependencies). You can assume that the table does not contain repeating groups and that any invoice number may reference more than one product. (*Hint*: This table uses a composite primary key.)

PROJ_NUM	PROJ_NAME	EMP_NUM	EMP_NAME	JOB_CLASS	CHG_HOUR	HOURS
15	Evergreen	103	June E. Arbough	Elect. Engineer	\$84.50	23.8
		101	John G. News	Database Designer	\$105.00	19.4
		105	Alice K. Johnson *	Database Designer	\$105.00	35.7
		106	William Smithfield	Programmer	\$35.75	12.6
		102	David H. Senior	Systems Analyst	\$96.75	23.8
18	Amber Wave	114	Annelise Jones	Applications Designer	\$48.10	24.6
		118	James J. Frommer	General Support	\$18.36	45.3
		104	Anne K. Ramoras *	Systems Analyst	\$96.75	32.4
		112	Darlene M. Smithson	DSS Analyst	\$45.95	44.0
22	Rolling Tide	105	Alice K. Johnson	Database Designer	\$105.00	64.7
		104	Anne K. Ramoras	Systems Analyst	\$96.75	48.4
		113	Delbert K. Joenbrood *	Applications Designer	\$48.10	23.6
		111	Geoff B. Wabash	Clerical Support	\$26.87	22.0
		106	William Smithfield	Programmer	\$35.75	12.8
25	Starflight	107	Maria D. Alonzo	Programmer	\$35.75	24.6
		115	Travis B. Bawangi	Systems Analyst	\$96.75	45.8
		101	John G. News *	Database Designer	\$105.00	56.3
		114	Annelise Jones	Applications Designer	\$48.10	33.1
		108	Ralph B. Washington	Systems Analyst	\$96.75	23.6
		118	James J. Frommer	General Support	\$18.36	30.5
		112	Darlene M. Smithson	DSS Analyst	\$45.95	41.4

A TABLE WHOSE STRUCTURE MATCHES THE REPORT FORMAT

- (ii) Using the initial dependency diagram drawn in question 2.1, remove all partial dependencies, draw the new dependency diagrams, and identify the normal forms for each table structure you created.
- (iii) Using the table structures you created in question 2.2, remove all transitive dependencies and draw the new dependency diagrams. Also identify the normal forms for each table structure you created.

- (e) Define Super key, Candidate key, Primary key and Foreign key with examples.
- (f) Given the relational schemas and relational algebra write the domain calculus for the following:
 - (i) For R(A,B) and S(C,D) write domain calculus for $r \times s$
 - (ii) For R(A,B,C,D) and S(B,D,E) write domain calculus for $r \bowtie s$
 - (iii) For R(A,B) write domain calculus for $\Pi_A(\sigma_{B=17}(r))$
 - (iv) For R(A,B,C) and S(A,B,C) write domain calculus for $r - s$

3. Attempt the following (any THREE) [15]

- (a) State the rules for performing DML operations on a view.
- (b) Write short note on DML, DDL and DCL.
- (c) What are constraints? What are the different types of constraints? Explain.
- (d) Explain GROUP BY AND ORDER BY clauses with examples.
- (e) What are joins? Explain different types of joins.
- (f) Difference between tables and Views.

4. Attempt the following (any THREE) [15]

- (a) State and Explain the ACID properties of transactions.
- (b) List and explain different states through which transaction goes through during its execution.
- (c) Explain lock based protocols.
- (d) List the problems in concurrent execution of Transactions.
- (e) Define Deadlock. Explain deadlock detection.
- (f) Explain Shadow paging recovery in detail.

5. Attempt the following (any THREE) [15]

- (a) What is a cursor? Explain implicit and explicit cursors.
- (b) Write a PL/SQL block that is used to display Fibonacci series of a number entered by user.
- (c) Explain the types of PL/SQL exceptions.
- (d) List the difference between a procedure and a function
- (e) Explain the structure of PL/SQL blocks. How is a sub program different from anonymous blocks?



Paper Discussion Schedule for all Subjects

Date	Day	Timing	Centre
21 Oct. 2018	Sunday	8.00 a.m. to 10.00 a.m.	Dadar
21 Oct. 2018	Sunday	1.00 p.m. to 3.00 p.m.	Andheri
21 Oct. 2018	Sunday	3.30 p.m. to 5.30 p.m.	Borivali
21 Oct. 2018	Sunday	1.00 p.m. to 3.00 p.m.	Thane
21 Oct. 2018	Sunday	3.30 p.m. to 5.30 p.m.	Ghatkopar
22 Oct. 2018	Monday	6.00 p.m. to 8.00 p.m.	Nerul