

## A7-R4: INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS

अवधि: 03 घंटे  
DURATION: 03 Hours

अधिकतम अंक: 100  
MAXIMUM MARKS: 100

ओएमआर शीट सं.:					
OMR Sheet No.:					

रोल नं.:					
Roll No.:					

उत्तर-पुस्तिका सं.:					
Answer Sheet No.:					

परीक्षार्थी का नाम: \_\_\_\_\_; परीक्षार्थी के हस्ताक्षर: \_\_\_\_\_  
Name of Candidate: \_\_\_\_\_; Signature of candidate: \_\_\_\_\_

### परीक्षार्थियों के लिए निर्देश:

### Instructions for Candidate:

कृपया प्रश्न-पुस्तिका, ओएमआर शीट एवं उत्तर-पुस्तिका में दिये गए निर्देशों को ध्यान पूर्वक पढ़ें।	Carefully read the instructions given on Question Paper, OMR Sheet and Answer Sheet.
प्रश्न-पुस्तिका की भाषा अंग्रेजी है। परीक्षार्थी केवल अंग्रेजी भाषा में ही उत्तर कर सकता है।	Question Paper is in English language. Candidate can answer in English language only.
इस मॉड्यूल/पेपर के दो भाग हैं। भाग एक में चार प्रश्न और भाग दो में पाँच प्रश्न हैं।	There are <b>TWO PARTS</b> in this Module/Paper. <b>PART ONE</b> contains <b>FOUR</b> questions and <b>PART TWO</b> contains <b>FIVE</b> questions.
भाग एक "वैकल्पिक" प्रकार का है जिसके कुल अंक 40 हैं तथा भाग दो, "व्यक्तिपरक" प्रकार है और इसके कुल अंक 60 हैं।	<b>PART ONE</b> is Objective type and carries 40 Marks. <b>PART TWO</b> is subjective type and carries 60 Marks.
भाग एक के उत्तर, इस प्रश्न-पत्र के साथ दी गई ओएमआर उत्तर-पुस्तिका पर, उसमें दिये गए अनुदेशों के अनुसार ही दिये जाने हैं। भाग दो की उत्तर-पुस्तिका में भाग एक के उत्तर नहीं दिये जाने चाहिए।	<b>PART ONE</b> is to be answered in the <b>OMR ANSWER SHEET</b> only, supplied with the question paper, as per the instructions contained therein. <b>PART ONE</b> is <b>NOT</b> to be answered in the answer book for <b>PART TWO</b> .
भाग एक के लिए अधिकतम समय सीमा एक घण्टा निर्धारित की गई है। भाग दो की उत्तर-पुस्तिका, भाग एक की उत्तर-पुस्तिका जमा कराने के पश्चात दी जाएगी। तथापि, निर्धारित एक घंटे से पहले भाग एक पूरा करने वाले परीक्षार्थी भाग एक की उत्तर-पुस्तिका निरीक्षक को सौंपने के तुरंत बाद, भाग दो की उत्तर-पुस्तिका ले सकते हैं।	Maximum time allotted for <b>PART ONE</b> is <b>ONE HOUR</b> . Answer book for <b>PART TWO</b> will be supplied at the table when the answer sheet for <b>PART ONE</b> is returned. However, candidates who complete <b>PART ONE</b> earlier than one hour, can collect the answer book for <b>PART TWO</b> immediately after handing over the answer sheet for <b>PART ONE</b> .
परीक्षार्थी, उपस्थिति-पत्रिका पर हस्ताक्षर किए बिना अथवा अपनी उत्तर-पुस्तिका, निरीक्षक को सौंपे बिना, परीक्षा हाल नहीं छोड़ सकता है। ऐसा नहीं करने पर, परीक्षार्थी को इस मॉड्यूल/पेपर में अयोग्य घोषित कर दिया जाएगा।	Candidate cannot leave the examination hall/room without signing on the attendance sheet or handing over his Answer sheet to the invigilator. Failing in doing so, will amount to disqualification of Candidate in this Module/Paper.
प्रश्न-पुस्तिका को खोलने के निर्देश मिलने के पश्चात एवं उत्तर देने से पहले उम्मीदवार यह जाँच कर यह सुनिश्चित कर ले कि प्रश्न-पुस्तिका प्रत्येक दृष्टि से संपूर्ण है।	After receiving the instruction to open the booklet and before answering the questions, the candidate should ensure that the Question booklet is complete in all respect.

जब तक आपसे कहा न जाए तब तक प्रश्न-पुस्तिका न खोलें।

**DO NOT OPEN THE QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO.**

**PART ONE**  
**(Answer all the questions)**

**1. Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)**

- 1.1 A relation that has no partial dependencies is in which normal form  
A) First  
B) Second  
C) Third  
D) BCNF
- 1.2 The following are components of a database except \_\_\_\_\_.  
A) User Data  
B) Metadata  
C) Documentation  
D) Indexes
- 1.3 A functional dependency between two or more non-key attributes is called  
A) Transitive dependency  
B) Partial transitive dependency  
C) Functional dependency  
D) Partial functional dependency
- 1.4 In the relational modes, cardinality is termed as:  
A) Number of tuples  
B) Number of attributes  
C) Number of tables  
D) Number of constraints
- 1.5 \_\_\_\_\_ is a classical approach to database design?  
A) Left-Right approach  
B) Right-Left approach  
C) Top-Down approach  
D) Bottom-Up approach
- 1.6 A table that displays data redundancies yields \_\_\_\_\_ anomalies  
A) Insertion  
B) Deletion  
C) Update  
D) All of the above
- 1.7 Commit command is used for  
A) To restore the old values  
B) To save the current table  
C) To save the current values  
D) To recover the old table

- 1.8 A lock that allows concurrent transactions to access different rows of the same table is known as  
A) Field-level lock  
B) Row-level lock  
C) Table-level lock  
D) Database-level lock
- 1.9 Candidate key is defined as  
A) Foreign key  
B) Minimal Super key  
C) Non-Primary key  
d) None of the above
- 1.10 Consider the join of a relation R with relation S. If R has m tuples and S has n tuples, then the maximum size of join is:  
A)  $2(m + n)$   
B)  $m + n$   
C)  $(m + n) / 2$   
D)  $m \times n$
- 2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and enter your choice in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)**
- 2.1 A type of query that is placed within a WHERE or HAVING clauses of another query is called super key.
- 2.2 An entity set that does not have sufficient attributes can be used for primary key.
- 2.3 In an E-R diagram attributes are represented by ellipse.
- 2.4 Related fields in a relation are grouped to form a menu.
- 2.5 Count function in SQL returns the number of distinct values.
- 2.6 Data in the database can be modified by changing the data dictionary.
- 2.7 Key to represent relationship between tables is called Secondary Key.
- 2.8 The result of the UNION operation between Relation R and Relation S is a relation that includes all the tuples of R and S which have common columns.
- 2.9 The command to delete a particular column in a relation is DELETE.
- 2.10 Data integrity refers to the correctness and completeness of the data in a database.

3. Match words and phrases in column X with the closest related meaning/ word(s)/phrase(s) in column Y. Enter your selection in the “OMR” answer sheet supplied with the question paper, following instructions therein. (1x10)

X		Y	
3.1	This Operation is used if we are interested in only certain columns of a table.	A.	Select
3.2	These users are unsophisticated users who interact with the system by using permanent application programs.	B.	Projection
3.3	A file manipulation command that extracts some of the records from a file is called.	C.	Consistency
3.4	Which of the operations constitute a basic set of operations for manipulating relational data?	D.	Naive.
3.5	The operator is used to compare a value to a list of literals values that have been specified.	E.	Relational Calculus
3.6	What type of relationship exists between a Master table and Transaction table?	F.	One to Many
3.7	Is not a physical database object?	G.	Domain
3.8	Which of the following is an aggregate function?	H.	Compare
3.9	Is a meaning of C in ACID properties of transactions.	I.	Relational Algebra
3.10	A set of possible data values is called	J.	Between
		K.	AVG
		L.	View
		M.	Degree.

4. Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Choose the most appropriate option, enter your choice in the “OMR” answer sheet supplied with the question paper, following instructions therein. (1x10)

A.	Instance	B.	Savepoint	C.	Field
D.	Group By	E.	Data Dictionary	F.	Primary Key
G.	Relationship Set	H.	Tuple	I.	Normalization
J.	Relational Calculus	K.	QBE	L.	Data integrity
M.	Trigger				

- 4.1 \_\_\_\_\_ represents an actual occurrence of an associated generalized entity.
- 4.2 \_\_\_\_\_ is a method of query creation that allows the user to search for documents based on an example in the form of a selected text string or in the form of a document name or a list of documents.
- 4.3 \_\_\_\_\_ represents a single, implicitly structured data item in a table.
- 4.4 \_\_\_\_\_ is combination of unique and not Null.
- 4.5 On update cascade ensures \_\_\_\_\_.
- 4.6 A \_\_\_\_\_ is a set of SQL statements stored in the database catalog and it is executed or fired whenever an event associated with a table occurs.
- 4.7 \_\_\_\_\_ creates points within groups of transactions in which to ROLLBACK.
- 4.8 The SQL \_\_\_\_\_ clause is used in collaboration with the SELECT statement to arrange identical data into one set.
- 4.9 In an Entity-Relationship diagram “Diamonds” Represents \_\_\_\_\_.
- 4.10 When a sequence is created, it is documented in \_\_\_\_\_.

**PART TWO**  
**(Answer any FOUR questions)**

- 5.**
- a) Discuss the different types of database failures that may occur in a database environment.
  - b) Differentiate between immediate update and deferred update recovery techniques.
  - c) Explain the purpose of the checkpoint mechanism. How often should checkpoints be performed?

**(6+5+4)**

- 6.**
- a) Discuss the types of database security issues.
  - b) Discuss each of the following terms:
    - i) Database Authorization
    - ii) Database Authentication
    - iii) Audit Trail
    - iv) Database Encryption
    - v) Granting & revoking privileges

**(5+10)**

- 7.**
- a) Explain 3-level ANSI-SPARC database architecture.
  - b) What is data dependence? Explain physical data dependence and logical data dependence.
  - c) Define Normalization also differentiates between 3NF and BCNF.

**(5+5+5)**

- 8.**
- a) Explain the operators used in relational algebra with their symbols.
  - b) Using Relational Algebra notation select the Record from EMPLOYEE Table where
    - i) Department Number is 10
    - ii) Salary is greater than Rs. 80,000
  - c) Explain the degree of a relationship in E-R Model.

**(6+4+5)**

- 9.**
- a) **Consider the relational database**
    - o Employee (Eno, Ename, Pay)
    - o Position (Pno, Skill)
    - o Duty (Pno, Eno, Shift)

Give expression in SQL for the following:

- i) Find the names of employee who are possessed skill of clerk.
- ii) Get employees who are working on day shift.
- iii) Find the names and pay of all the employees who are not allocated duty.
- iv) List the no. of employees shift wise.
- v) List of all the employee with Pno in sorted order of Skill.

- b) Explain the importance of Integrity Constraints, also discuss each role.

**(10+5)**

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