

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:

Name of Candidate: _____; Signature of candidate: _____

परीक्षार्थी के हस्ताक्षर:

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 दे 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 TWO PARTS in this Module/Paper. PART ONE contains FOUR questions and PART TWO contains FIVE questions.
भाग एक "वैकल्पिक" प्रकार का है जिसके कुल अंक 40 हैं तथा भाग दो, "व्यक्तिपरक" प्रकार है और इसके कुल अंक 60 हैं।	PART ONE is Objective type and carries 40 Marks. PART TWO 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।	PART ONE is to be answered in the OMR ANSWER SHEET only, supplied with the question paper, as per the instructions contained therein. PART ONE is NOT to be answered in the answer book for PART TWO .
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 PART ONE is ONE HOUR . Answer book for PART TWO will be supplied at the table when the answer sheet for PART ONE is returned. However, candidates who complete PART ONE earlier than one hour, can collect the answer book for PART TWO immediately after handing over the answer sheet for PART ONE .
परीक्षार्थी, उपस्थिति-पत्रिका पर हस्ताक्षर किए बिना एवं अपनी उत्तर-पुस्तिका, निरीक्षक को सौंपे बिना, परीक्षा हॉल 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 and 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.
नोट: यदि हिन्दी संस्करण में कोई त्रुटि / विसंगति पाई जाती है, तो उस अवस्था में अंग्रेजी संस्करण ही मान्य होगा । Note: In case of any discrepancy found in Hindi language, English version will be treated as final.	

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 Log is used by
A) Concurrency Control Component
B) Query Processing Component
C) Recovery Component
D) None of the above
- 1.2 The view of total database content is
A) Conceptual view B) Internal view
C) External view D) Physical View
- 1.3 Drop table structure is
A) DML Statement B) DDL Statement
C) Query Statement D) None of the above
- 1.4 The conceptual model is
A) Dependent on both hardware and software
B) Dependent on hardware
C) Dependent on software
D) Independent of both hardware and software
- 1.5 Three Level architecture of the database system provides
A) Data Dependency
B) Data Manipulation Facilities
C) Data Abstraction
D) None of the above
- 1.6 Update table is a
A) DDL Command B) DML command
C) Both A) and B) D) None of the above
- 1.7 MVD is called as:
A) Many Value Dependency
B) More Value Dependency
C) Multiple Value Dependency
D) All of the Above
- 1.8 Relational calculus is a
A) Procedural language
B) Non- Procedural language
C) Data definition language
D) High level language
- 1.9 The method in which records are physically stored in a specified order according to a key field in each record is
A) Hash B) Direct
C) Sequential D) All of the above

- 1.10 Which of the following is the permission to access a named object in a prescribed manner?

- A) Role B) Privilege
C) Permission D) All of these

- 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 Assertion is a condition that must always be satisfied by the database.
- 2.2 The external schema defines how and where the data are organized in physical data storage.
- 2.3 Data and metadata are the same.
- 2.4 A table can have only one candidate key.
- 2.5 In BCNF, a relation must only have candidate keys as determinant.
- 2.6 A query tree is also called a relational algebra tree.
- 2.7 In a growing phase, a transaction acquires all the required locks.
- 2.8 NON DUPLICATE keyword is used to eliminate duplicate tuples from the resultant relation.
- 2.9 View is a virtual relation.
- 2.10 In an ER diagram double line represents partial participation of an entity in a relationship.

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	It produces the relation that has attributes of R1 and R2	A.	2NF
3.2	What is the cardinality of a table with 100 rows and 10 columns	B.	Update
3.3	When all columns in a relation describe and fully depend upon the primary key, the relation is said to be in	C.	Procedural Language
3.4	What is degree of a table with 100 rows and 10 columns	D.	3NF
3.5	A sub query that executes once for each row in outer query is called	E.	Cartesian product
3.6	When all columns in a relation describe and non-transitively depend upon the primary key, the relation is said to be in	F.	10
3.7	Relational Algebra is	G.	100
3.8	Which ensure the durability of the transaction	H.	Concurrency control
3.9	Which ensure the isolation of the transaction	I.	Co-related & nested query
3.10	Command used to change the definition of a table is	J.	Recovery management
		K.	Alter
		L.	BCNF
		M.	Transaction Management

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.	Domain	B.	Entity Set	C.	Null
D.	BCNF	E.	Attribute	F.	Join
G.	Alter	H.	Alternate Key	I.	Rectangle
J.	Row	K.	Primary Key	L.	Update
M.	Triangle				

- 4.1 An _____ is a set of entities of the same type that share the same properties, or attributes.
- 4.2 Minimum Super key is known as _____.
- 4.3 The descriptive property possessed by each entity set is _____.
- 4.4 The term tuple refers to a _____ of a table.
- 4.5 A set of possible data values is called _____.
- 4.6 _____ is stronger than 3NF.
- 4.7 Not applicable condition can be represented in relation entry as _____.
- 4.8 A data manipulation command that combines the records from one or more tables is called _____.
- 4.9 In E-R diagram generalization is represented by _____.
- 4.10 To delete a particular column in a relation the command used is _____.

PART TWO
(Answer any FOUR questions)

5.

- a) What is a database? Describe the advantages and disadvantages of using of DBMS.
- b) Draw and explain the three level architecture of the database system.
- c) What is data independence? Explain the difference between physical and logical data Independence.

(5+5+5)

6.

- a) Explain the integrity constraints: Not Null, Unique, Primary Key with an example each.
Is the combination 'Not Null, Primary Key' a valid combination? Justify.
- b) Compute the closure of the following set F of functional dependencies for relation Schema
R = (A, B, C, D, E). $A \rightarrow BC$, $CD \rightarrow E$, $B \rightarrow D$, $E \rightarrow A$.
List the candidate keys for R.
- c) Explain the reasons why recovery of interactive transactions is more difficult to deal with than is recovery of batch transactions. Is there a simple way to deal with this difficulty?

(5+6+4)

7.

- a) Consider the following relations for a database that keeps track of business trips of sales persons in a sales office:
SALESPERSON (SSN, Name, start_year, Dept_no)
TRIP (SSN, From_city, To_city, Departure_Date, Return_Date, Trip_ID)
EXPENSE(TripID, Account#, Amount)
Specify the following queries in relational algebra:
i) Give the details (all attributes of TRIP) for trips that exceeded \$2000 in expenses.
ii) Print the SSN of salesman who took trips to 'Honolulu'
- b) What are views? Explain how views are different from tables.
- c) Given the following relations
TRAIN (NAME, START, DEST)
TICKET (PNRNO., START, DEST, FARE)
PASSENGER (NAME, ADDRESS, PNRNO.)
Write SQL expressions for the following queries:
Note: Assume NAME of Train is a column of Ticket.
i) List the names of passengers who are travelling from the start to the destination station of the train.
ii) List the names of passengers who have a return journey ticket.
iii) Insert a new Shatabdi train from Delhi to Bangalore.
iv) Cancel the ticket of Tintin.

(4+3+8)

8.

- a) Explain different types of failures that occur in Oracle database.
- b) Describe the GRANT function and explain, how it relates to security. What types of privileges may be granted? How are they revoked?
- c) Consider the decomposition of relation scheme, shipping = (Ship, Capacity, Date, Cargo, Value) with the set of functional dependencies, $F = \{Ship \rightarrow Capacity ; Ship, Date \rightarrow Cargo, Cargo; Capacity \rightarrow Value\}$ into $R1 = \{Ship, Capacity\}$ with $F1 = \{Ship \rightarrow Capacity\}$ and $R2 = \{Ship, Date, Cargo, Value\}$ with $F2 = \{Ship, Date \rightarrow Cargo, Value\}$. Is this decomposition in BCNF? Is this decomposition lossless and dependency preserving? Justify your answers.

(6+4+5)

9.

- a) What do you mean by integrity constraints? Explain the two constraints, check and foreign key in SQL with an example for each. Give the syntax.
- b) Information about a bank is about customers and their account. Customer has a name, address which consists of house number, area and city, and one or more phone numbers. Account has number, type and balance. We need to record customers who own an account. Account can be held individually or jointly. An account cannot exist without a customer. Arrive at an E-R diagram. Clearly indicate attributes, keys, the cardinality ratios and participation constraints.
- c) Explain checkpoints. How does it help in reducing the amount of time required during recovery?

(5+6+4)

