A7-R5 : DATABASE TECHNOLOGIES

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 : _____

परीक्षार्थी के हस्ताक्षर :
; **Signature of Candidate :** _____

परीक्षार्थियों के लिए निर्देश :	Instructions for Candidates :
कृपया प्रश्न-पुस्तिका, ओएमआर शीट एवं उत्तर-पुस्तिका में दिये गए निर्देशों को ध्यानपूर्वक पढ़ें।	Carefully read the instructions given on Question Paper, OMR Sheet and Answer Sheet.
प्रश्न-पुस्तिका अंग्रेजी भाषा में है। परीक्षार्थी उत्तर लिखने के लिए केवल अंग्रेजी भाषा का ही प्रयोग कर सकते हैं।	Question Paper is in English language. Candidate has to 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** है तथा **भाग दो** ''व्यक्तिपरक'' प्रकार का है और इसके कुल अंक **60** है।	**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 पश्चात् 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** to the Invigilator.
परीक्षार्थी, उपस्थिति-पत्रिका पर हस्ताक्षर किए बिना और अपनी उत्तर-पुस्तिका, निरीक्षक को सौंपे बिना, परीक्षा हॉल/कमरा नहीं छोड़ सकते हैं। 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/her 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 पश्चात् एवं उत्तर लिखना आरम्भ करने से पहले उम्मीदवार यह जाँच कर सुनिश्चित कर लें कि प्रश्न-पुस्तिका प्रत्येक दृष्टि से संपूर्ण है।	After receiving the instruction to open the booklet and before starting to answer 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 Questions. Each question carries ONE mark)

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 DBMS manages the interaction between _____ and database.
   (A) Users
   (B) Clients
   (C) End Users
   (D) Stake Holders

1.2 Database is generally _____
   (A) System-centered
   (B) User-centered
   (C) Company-centered
   (D) Data-centered

1.3 Which of the following model was developed by Hammer and Mc Leod in 1981?
   (A) SDM
   (B) OODBM
   (C) DDM
   (D) RDM

1.4 Object = _____ + relationships.
   (A) data
   (B) attributes
   (C) entity
   (D) constraints

1.5 A collection of related data is known as _____
   (A) Information
   (B) Valuable information
   (C) Database
   (D) Metadata

1.6 Which of the following operation contains all pairs of tuples from the two relations, regardless of whether their attribute values match ?
   (A) Join
   (B) Cartesian product
   (C) Intersection
   (D) Set difference

1.7 Which of the following is a characteristic of an entity ?
   (A) Relation
   (B) Attribute
   (C) Parameter
   (D) Constraint

1.8 The restrictions placed on the data is known as
   (A) Relation
   (B) Attribute
   (C) Parameter
   (D) Constraint

1.9 IMS stands for ?
   (A) Information Mastering System
   (B) Instruction Management System
   (C) Instruction Manipulating System
   (D) Information Management System

1.10 The RDBMS terminology for a row is..
   (A) Tuple.
   (B) Relation.
   (C) Attribute.
   (D) Degree.

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 database is called "self-describing" because it contains a description of itself.

2.2 In a database, data is stored in spreadsheets which have rows and columns.

2.3 A database has data and relationships.

2.4 One of the reasons why OODBMSs have not been widely used for business information systems is that OOP is obsolete.

2.5 In an enterprise-class database system, business users interact directly with database applications, which directly access the database data.

2.6 Applications are programs that interact directly with the database.

2.7 The purpose of a database is to help people stop using spreadsheets.

2.8 Microsoft Access is an enterprise-class database product.

2.9 Structured Query Language (SQL) is an internationally recognized standard language that is understood by all commercial database management system products.

2.10 The XML family of standards is very important in database processing today.

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

(1x10)

	Column X		Column Y
3.1	DBMS	A.	Forms
3.2	SQL	B.	Database Management System
3.3	RDBMS	C.	E.F Codd
3.4	E R Diagram	D.	Structured query Language
3.5	integrity constraints	E.	Hide sensitive information
3.6	Normalization	F.	IS A
3.7	trigger	G.	Relational database management system
3.8	subschema	H.	Zap
3.9	relational schema	I.	DBMS to Graphics program
3.10	used to delete an entire file except for a file structure	J.	transparent DBMS
		K.	Domains
		L.	It is a procedural code which is executed automatically in response to certain events on a particular table or view.
		M.	RDBMS

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	Foreign key	B	attributes	C	independent	D	"A Relational Model of Data for Large Shared Data Banks"
E	Row	F	relational model	G	table	H	tuple
I	Header	J	E.F Codd	K	data	L	Normalization
M	Domain						

4.1 The relational model is based on the core concept of _____

4.2 The foundation of relational database technology was laid by _____

4.3 Dr. E.F Codd, in paper titled _____ laid the basic principles of the RDBMS.

4.4 The primary key uniquely specifies _____ within a table.

4.5 In the RDBMS terminology, a record is called a _____

4.6 Degree of a table means the number of _____ in a table.

4.7 A domain is a set of _____ values.

4.8 _____ was first proposed by Codd as an integral part of the relational model.

4.9 A _____ is a field in a relational table that matches the primary key column of another table.

4.10 An index is one way of providing quicker access to _____

PART-TWO

(Answer any FOUR Questions)

5. (a) What are prime and non-prime attributes? For a given functional dependencies AB->D, BC->D, AB->E and relation R(A,B,C,D,E), find the closure of relation, prime and non-prime attributes, full and partial functional dependencies.

(b) What are the ACID properties of transactions? Explain suitable methods to handle deadlocks in database transactions.

(c) Differentiate between DDL and DML commands in SQL.

(6+5+4)

6. (a) Explain Specialization and Generalization with suitable example.

(b) Differentiate between partial functional dependency and full functional dependency.

(c) What are distributed databases? Explain the concept of data replication and fragmentation.

(4+5+6)

7. (a) Explain the concept of normalization. List the definition of first, second and third Normal form. Explain BCNF with a suitable example.

(b) Explain how the database three schema architecture provides data independence

(7+8)

8. (a) What do you understand by lossless and lossy decomposition? Suppose that we decompose the schema R = (A, B, C, D, E) into R1 (A, B, C) and R2 (A, D, E). Show that this decomposition is lossless-join decomposition if the following set of functional dependencies holds :

$A \rightarrow BC$

$CD \rightarrow E$

$B \rightarrow D$

$E \rightarrow A$

(b) Differentiate between super key, candidate key and primary key with the help of suitable examples

(7+8)

9. (a) What are the two multi-version schemes for concurrency control ? Explain in detail.

(b) What are the join in DBMS ? Explain types of join with suitable example.

(8+7)

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