

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 Candidate :

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 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 का 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, ओएमआर उत्तर-पुस्तिका पर 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. 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 जाँच कर यह 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 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** Which of the following is a wide-column store ?

(A) HBase
(B) Riak
(C) MongoDB
(D) Redis

- 1.2** A table in the Database which belongs to 2NF but not 3NF is said to be in :

(A) 1NF
(B) 2NF
(C) 3NF
(D) BCNF

- 1.3** Which one of the following is invalid ?

(A) A table with primary key containing NULL values
(B) A table with foreign key containing NULL values
(C) A table with primary key containing no NULL values
(D) A table with foreign key containing no NULL values

- 1.4** Consider a schema $R(A, B, C, D, E)$ and functional dependencies $A \rightarrow B$ and $C \rightarrow D, C \rightarrow E$. - the decomposition of R into $R_1(A, B)$ and $R_2(C, D, E)$ is :

(A) dependency preserving and lossless
(B) lossless but not dependency preserving
(C) dependency preserving but not lossless
(D) not dependency preserving and not lossless

- 1.5** In respect to Boyce Codd Normal Form(BCNF) which is not true for its Functional Dependencies :

(A) The left hand side contains a primary key
(B) The left hand side contains a candidate key
(C) The left hand side contains a super key
(D) The left hand side contains a foreign key

- 1.6** In a relation $R(A, B, C, D, E)$ it is known that A, B are the candidate keys, how many super - keys are possible :

(A) 21
(B) 16
(C) 24
(D) 23

1.7 Consider the following dependencies in $R(A, B, C, D, E)$, $AB \rightarrow CDE$, $A \rightarrow C$, $C \rightarrow D$, $C \rightarrow E$, $B \rightarrow A$ which is not a part of closure of A ? (A) B (B) C (C) D (D) E	2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and ENTER in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)
1.8 Consider the following dependencies in $R(A, B, C, D, E)$, $AB \rightarrow CDE$, $B \rightarrow C$, $C \rightarrow D$, $C \rightarrow E$, $BC \rightarrow A$, $A \rightarrow B$, which can be a primary key ? (A) A (B) B (C) C (D) D	2.1 NoSQL databases are built to allow the insertion of data without a pre-defined schema 2.2 A table cannot have the same field as Primary Key and Foreign Key.
1.9 A table $R(A, B, C, D)$ is subject to partial dependency. R might be in : (A) 1NF (B) 2NF (C) 3NF (D) BCNF	2.3 The number of Super Keys is always greater than number of Candidate Keys. 2.4 In DBMS user is unaware of physical address where data is stored.
1.10 For a weak entity set to be meaningful, it must be associated with another entity set, called the : (A) Owner Set (B) Identifying Set (C) Neighbour Set (D) Strong entity set	2.5 To delete a table from the memory we use "DELETE" in SQL. 2.6 A dependency preserving decomposition is lossless. 2.7 The prime attributes must be present in the primary key. 2.8 A foreign key cannot have made up of a combination of columns. 2.9 Primary Key uniquely identifies the entity set. 2.10 InterBase is a relational database management system.

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	"Sharding" a database across many server instances can be achieved with	A.	DROP
3.2	SQL command to remove a table	B.	SAN
3.3	Modifying (updating) data in a database	C.	A->D
3.4	Entity that cannot be uniquely identified by its attributes alone	D.	DML
3.5	MariaDB is owned by	E.	Weak Entity
3.6	A->BC and C->D gives	F.	D->A
3.7	Spurious tuples are	G.	Oracle
3.8	Citus Data is owned by	H.	Missing tuples
3.9	Has no predefined schema	I.	RDBMS
3.10	Data and its relationships are stored in separate tables	J.	NoSQL
		K.	ACID
		L.	Extra tuples
		M.	Microsoft

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

A.	replication	B.	primary	C.	foreign
D.	super	E.	candidate	F.	DCL
G.	spurious	H.	disturbed	I.	Weak
J.	closure	K.	duplication	L.	combination
M.	distributed				

- 4.1 Most NoSQL databases support automatic _____ meaning that you get high availability and disaster recovery.
- 4.2 Performing join of tables after lossy decomposition gives rise to _____ tuples.
- 4.3 All the attributes that can be determined by a particular attribute form the _____ of that attribute.
- 4.4 If the registration number of a student is unique, the registration number, name and class of a student together is a _____ key.
- 4.5 A primary key is an element from the set of _____ keys.
- 4.6 A _____ database is a database which contains two or more files in different sites either on the same network or on entirely different networks.
- 4.7 An entity set that does not have sufficient attributes to form a primary key is a _____ entity set.
- 4.8 Grant and Revoke are the commands in _____.
- 4.9 For the decomposition to be lossless the common attribute must be a _____ key to one of the tables.
- 4.10 The primary key of a table can be the _____ key of another table.

PART TWO

(Answer any FOUR questions)

5. (a) What is "Polyglot Persistence" in Nosql ?
(b) What is the key difference between Replication and Sharding ?
(c) What is Data Wizard ? (5+5+5)
6. (a) Differentiate between relational heirarchial and network models in DBMS.
(b) What are ACID properties of transaction ?
(c) What are the different levels of abstraction in the DBMS ? (3+8+4)
7. (a) What is the difference between two and three-tier architectures ?
(b) How are RDBMS preferable option over the DBMS ?
(c) What is a VIEW, and how will you define it ? (5+5+5)

8. (a) What are those two parameters that help to drop the database ?
(b) What is a transaction in MariaDB ?
(c) What is an index ?
(d) Define LOCK in database. Describe different type of locks. State the necessary and sufficient conditions for lock to be implemented in Database. (4+4+3+4)
9. For a Student Management System as a case-study. Write the syntax of the following in MariaDB.
(a) Updation of Student Record.
(b) Count of total number of records in table of database.
(c) To fetch all the records of student's from a table in Database, who are pursuing 'A' level. (5+5+5)

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SPACE FOR ROUGH WORK

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