BRAINWARE UNIVERSITY

Term End Examination 2019 - 20

Programme – Master of Technology in Computer Science and Engineering

Course Name – Advanced DBMS

Course Code – PCC-MCS102

(Semester – 1)

Time allotted: 2 Hours 30 Minutes Full Marks: 60

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group –A

(Multiple Choice Type Question) 20 x 1 = 20

1. *Choose the correct alternative from the following* (Answer any Twenty)

(i) Which software components that are typically necessary for building a distributed database?

a. The data communication component (DC)
b. The data dictionary (DD)
c. The database management component (DB) and distributed database component (DDB)
d. All of these

(ii) Selection and projection operations are called

a. Enumerator
b. Reducer
c. Distributor
d. Synchronizer

(iii) Cold restart is required if

a. We want to make backup of the database
b. The log information is lost at a site
c. We want to reconstruct the most recent state of a failed site
d. None of these

(iv) Preservation of functional dependency is ensured by which of the correctness rule of the fragmentation?

a. Disjointness
b. Completeness
c. Reconstruction
d. All of these

(v) Changes made in a database are called

a. Transaction
b. Replication
c. Commit
d. Fragmentation

(vi) The attribute AGE is calculated from DATE_OF_BIRTH. The attribute AGE is

a. Single valued
b. Multi valued
c. Composite
d. Derived

(vii) Which of the following is a single valued attribute

a. Register_number
b. Address
c. SUBJECT_TAKEN
d. Reference

(viii) For a weak entity set to be meaningful, it must be associated with another entity set, called the

a. Identifying set
b. Owner set
c. Neighbour set
d. Strong entity set

(ix) The entity set person is classified as student and employee. This process is called _____

a. Generalization
b. Specialization
c. Inheritance
d. Constraint generalization

(x) The refinement from an initial entity set into successive levels of entity subgroupings represents a _____ design process in which distinctions are made explicit.

a. Hierarchy
b. Bottom-up
c. Top-down
d. Radical

(xi) A _____ constraint requires that an entity belong to no more than one lower-level entity set.

a. Disjointness
b. Uniqueness
c. Special
d. Relational

(xii) Which of the following is another name for a weak entity?

a. Child
b. Owner
c. Dominant
d. All of the mentioned

(xiii) Which forms simplifies and ensures that there are minimal data aggregates and repetitive groups:

a. 1NF
b. 2NF
c. 3NF
d. All of the mentioned

(xiv) The normal form which satisfies multivalued dependencies and which is in BCNF is

a. 4 NF
b. 3 NF
c. 2 NF
d. All of the mentioned

(xv) Which of the following has each related entity set has its own schema and there is an additional schema for the relationship set?

a. A many-to-many relationship set
b. A multivalued attribute of an entity set
c. A one-to-many relationship set
d. None of the mentioned

(xvi) The algorithm that takes a set of dependencies and adds one schema at a time, instead of decomposing the initial schema repeatedly is

a. BCNF algorithm
b. 2NF algorithm
c. 3NF synthesis algorithm
d. 1NF algorithm

(xvii) Relation R with an associated set of functional dependencies, F, is decomposed into BCNF. The redundancy (arising out of functional dependencies) in the resulting set of relations is

a. Zero
b. More than zero but less than that of an equivalent 3NF decomposition
c. Proportional to the size of F+
d. Indeterminate

(xviii) _____ can help us detect poor E-R design.

a. Database Design Process
b. E-R Design Process
c. Relational scheme
d. Functional dependencies

(xix) In which of the following, a separate schema is created consisting of that attribute and the primary key of the entity set.

a. A many-to-many relationship set
b. A multivalued attribute of an entity set
c. A one-to-many relationship set
d. All of the mentioned

(xx) Suppose the user finds the usage of *room number* and *phone number* in a relational schema there is confusion. This is reduced by

a. Unique-role assumption
b. Unique-key assignment
c. Role intergral assignment
d. None of the mentioned

(xxi) In the schema (dept name, size) we have relations *total inst 2007*, *total inst 2008*. Which dependency have lead to this relation?

a. Dept name, year→size
b. Year→size
c. Dept name→size
d. Size→year

(xxii) Representations such as the in the dept year relation, with one column for each value of an attribute, are called _____ they are widely used in spreadsheets and reports and in data analysis tools.

a. Cross-tabs
b. Snapshot
c. Both Cross-tabs and Snapshot
d. All of the mentioned

(xxiii) Which of the following is the oldest database model?

a. Relational
b. Deductive
c. Physical
d. Network

(xxiv) Which of the following schemas does define a view or views of the database for particular users?

a. Internal schema
b. Conceptual schema
c. Physical schema
d. External schema

(xxv) Which of the following is an attribute that can uniquely identify a row in a table?

a. Secondary key
b. Candidate key
c. Foreign key
d. Alternate key

Group – B

(Short Answer Type Questions) 4 x 5 = 20

Answer any *four* from the following

2.	(a)	What do you mean by distributed database?	2
	(b)	Compare the features of distributed database versus centralized database.	3
3.	(a)	What is replication?	2
	(b)	Describe quorum algorithm.	3
4.	(a)	Explain the distribution and logical correlation property in respect to distributed database.	2
	(b)	Classify the difference between distributed application and local application over DDBMS.	3
5.	(a)	What is functional dependency?	3
	(b)	Define foreign key.	2
6.	(a)	What is the difference between Semi Join and Natural Join?	2
	(b)	What is physical image of a global relation? Explain with an example	3
7.		How distributed database is differ from the centralized database in respect to data independency and data redundancy?	5

Group – C

(Long Answer Type Questions) 2 x 10 = 20

Answer any *two* from the following

8.	(a)	Why do we use distributed databases? Briefly point out the reason.	4
	(b)	What do you mean by unary and binary operations on relational model?	2
	(c)	Consider the Global Relation: **PATIENT** (Number, Name, SSN, Amount-due, Dept, Doctor, Med-Treatment) **DEPARTMENT** (Dept, Location, Director) **STAFF** (Staffnum, Director, Task) Define their fragmentation as follows:	
		(i) DEPARTMENT has a horizontal fragmentation by *Location*, with two locations; each department is conducted by one *Director*.	2
		(ii) There are several staff members for each department, led by the Department's Director. *Staff* has a horizontal fragmentation derived from that of *Department* and a semi-join on the *Director* attribute.	2

9. Write down the 2-phase commitment protocol with diagram. 10

10. Consider each order has unique order_id for each order, following information are stored : 10
Order (order_id, order_dt, customer name, customer address, salesman name, salesman address) and for each requested item store
Store (itemcode, itename, quantity and rate).
Further assume, following functional dependencies :

salesman name → salesman address
customer name → customer address
order_id → order_dt, salesman name, customer name.
order_id, icode → quantity
icode → iname, rate

Normalize the data structure up to 3NF, showing the steps. Indicate PK & FK also

11. (a) Briefly describe architectural models for distributed DBMSs with respect to 6

i) the autonomy of local systems

ii) their distribution

iii) their heterogeneity

(b) Define horizontal and vertical fragmentation with suitable examples. 4
