Register Number:……..

KUMARAGURU
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B.E DEGREE EXAMINATIONS: MAY 2018

(Regulation 2015)

Fourth Semester

COMPUTER SCIENCE AND ENGINEERING

U15CST402 : Database Management Systems

COURSE OUTCOMES

CO1: Summarize the basic concepts of database management systems [K_2]

CO2: Construct an Entity Relationship diagram for an application [K_3]

CO3: Solve the database problems using SQL and embedded SQL [K_3]

CO4: Construct a relational database model using normalization [K_3]

CO5: Outline relational database storage and retrieval [K_2]

CO6: Explain the basic concepts of transaction management [K_2]

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Match the DBMS architecture layers (List I) with its sub components (List II) CO1 [K_2]

List I	List II
A. Application layer	i. Buffer Manager
B. Query Processor	ii. Indices
C. Storage Manager	iii. Administration Tools
D. Disk Storage	iv. Compiler and linker

	A	B	C	D
a)	ii	i	iii	iv
b)	iii	iv	ii	i
c)	ii	iv	iii	i
d)	iii	iv	i	ii

2. _____ is a pictorial representation of the schema of a database that shows the relations in the database, their attributes, and primary key and foreign keys. CO1 [K_2]

a) ER Diagram b) Schema Diagram

c) Use case Diagram d) Sequence Diagram

3. Which of the following functions are not the aggregate functions in SQL? CO2 [K_3]

1. avg
2. min
3. exists
4. max
5. unique

a) 1,3 b) 1,4

c) 3,5 d) 2,3

4. Which of the following conditions are valid for query defining the view that is updatable (that is, inserts, updates or deletes can be applied on the view)? CO2 [K_2]

   1. The from clause has only one database relation.
   2. The select clause contains only attribute names of the relation, and does not have any expressions, aggregates, or distinct specification.
   3. The query does have a group by or having clause
   4. Any attribute listed in the select clause can be set to null.

   a) 1,4 b) 2,3
   c) 1,2 d) 3,4

5. Assertion (A): Database normalization is a database schema design technique, by which an existing schema is modified to minimize redundancy and dependency of data. CO3 [K_2]
   Reason (R): Normalization of a Database is achieved by following a set of rules called 'forms' in creating the database.

   a) Both A and R are Individually true and R is the correct explanation of A
   b) Both A and R are Individually true but R is not the correct explanation of A
   c) A is true but R is false
   d) A is false but R is true

6. A relation is _____ if every field contains only atomic values that is, no lists or sets. CO3 [K_2]

   a) 1 NF b) 2 NF
   c) 3 NF d) BCNF

7. Sequence the following shuffled storage device hierarchy into correct decreasing order (according to its accessing speed). CO4 [K_2]

   1. Flash memory
   2. Main memory
   3. Magnetic disk
   4. cache

   a) 2-3-4-1 b) 1-3-2-4
   c) 3-4-2-1 d) 4-2-1-3

8. Match the RAID levels (List I) with its description (List II) CO5 [K_2]

List I	List II
A. Level 0	i. block striping, mirroring
B. Level 1	ii. bit striping, parity
C. Level 3	iii. block striping, distributed parity
D. Level 5	iv. Block striping, no redundancy

	A	B	C	D
a)	ii	i	iii	iv
b)	iii	iv	ii	i
c)	iv	i	ii	iii
d)	iii	iv	i	ii

9. Assertion (A): Information residing in volatile storage does not usually survive system crashes. CO5 [K_2]
Reason (R): Access to volatile storage is extremely fast.

a) Both A and R are Individually true and R is the correct explanation of A
b) Both A and R are Individually true but R is not the correct explanation of A
c) A is true but R is false
d) A is false but R is true

10. Sequence the following shuffled steps in correct order for recovery after a system crash. CO6 [K_2]

1. Whenever a log record of the form <Ti start> is found, Ti is added to undo-list.
2. The list of transactions to be rolled back, undo-list, is initially set to the list L in the <checkpoint L> log record.
3. Whenever a log record of the form <Ti abort> or <Ti commit> is found, Ti is removed from undo-list.
4. Whenever a normal log record of the form <Ti , Xj , V1, V2>, or a redo-only log record of the form <Ti , Xj , V2> is encountered, the operation is redone; that is, the value V2 is written to data item Xj .

a) 2,4,1,3
b) 4,2,1,3
c) 3,1,4,2
d) 3,4,2,1

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

11. List any four database system applications with examples. CO1 [K_2]
12. Explain candidate key and primary key with suitable example. CO1 [K_2]
13. Illustrate the following components of ER diagram with suitable example. CO2 [K_2]
    i. Entity
    ii. Relationships between Entities - Weak and Strong
    iii. Attributes for any Entity
    iv. Weak Entity
14. What are the three clauses of the basic structure of an SQL query? Give an example query for it. CO2 [K_2]
15. What the features of good relational database design? CO3 [K_2]
16. Define normalization. Explain first normal form with an example. CO4 [K_2]
17. Illustrate the steps involved in query processing. CO5 [K_2]
18. What are the two basic kinds of indices available in a database system? Explain about it. CO5 [K_2]
19. What are the properties of the transaction that a database system should maintain? CO6 [K_2]
20. List the various types of failure that may occur in a database system. CO6 [K_2]

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. i. With neat illustration explain about the database system architecture. Also discuss about two-tier and three-tier architecture. (10) CO1 [K_2]
    ii. List the different type of attributes with suitable examples. (4) CO1 [K_2]

22.	i.	Construct ER diagram for a university enterprise.	(7)	CO2	[K_3]
	ii.	What are the two approaches to accessing SQL from a general-purpose programming language? Construct JDBC and ODBC program to open a connection with a database, send queries and updates, and get back results with suitable example.	(7)	CO3	[K_3]
23.	i.	Define functions and procedures. How do you define a function in SQL? Write a procedure to register a student for a course section.	(7)	CO3	[K_3]
	ii.	Define triggers. Explain the need for triggers and write a trigger to maintain referential integrity.	(7)	CO3	[K_3]
24.	i.	List various aggregate functions available in SQL and explain the functions with suitable queries.	(8)	CO3	[K_2]
	ii.	Construct the following joins with suitable example queries. • Inner Join • Left Outer • Right Outer	(6)	CO3	[K_2]
25.		Briefly discuss about the various normal forms available for relational database design. Explain about the each form with suitable example.		CO4	[K_2]
26.		Briefly discuss about the following file organization techniques with neat illustration. i. Fixed-Length Records ii. Variable-Length Records		CO5	[K_2]
27.		When deadlock occurs? How do you prevent, detect and recover the deadlock? Explain with suitable examples.		CO6	[K_2]

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