

# ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2009 DATABASE MANAGEMENT SYSTEM SEMESTER - 6

Time: 3	Hours.	]			[ Full Marks : 70

### **GROUP - A**

## ( Multiple Choice Type Questions )

Cho	ose the	correct alternatives for the following	lowing	: 10 × 1 = 10				
1)	Overall logical structure of a database can be expressed graphically by							
	a) l	CR diagram	b)	Records				
	c) 1	Relations	d)	Hierarchy.				
ii)	A norn	A normal form in which every determinant is a key is						
*	a) 2	<b>enf</b>	<b>b</b> )	3NF				
	c) l	BCNF	d)	4NF.				
mi)	involves the view of data?							
r <sub>ga</sub> v	a) 1	External level	b)	Conceptual level				
*	c) l	Physical level	d)	None of these.				
iv)	One of	the shortcomings of file systematical	em is					
	a) (	lata availability	b)	fixed records				
	c) s	sequential records	d)	lack of security.				
v)	The ability to modify the internal schema without causing any change to external							
	schem	a is						
	a) ]	physical data independence	<b>b</b> )	logical data independence				
	c) (	external data independence	d)	none of these.				



V1)	The	information about	data in a da	itabase i	s called	
	a)	meta data		<b>b</b> )	tera data	
	c)	hyper data		<b>d</b> )	none of these.	
vii)	Whi	ch of the following	features is s	upporte	d in the relational databa	se model ?
	a)	Complex data typ	oes	<b>b</b> )	Multi-valued attributes	
	c)	Associations with	ı multipliciti	es d)	Generalization relations	hips.
viii)	Four	r DML commands	are			
	a)	CREATE, UPDAT	E, DELETE,	SELECT		
	<b>b</b> )	INSERT, UPDATI	E, DROP, SE	LECT		
	c)	CREATE, ALTER	, DELETE, S	ELECT		
	d)	INSERT, MODIFY	Y, DELETE,	SELECT		
	<b>e</b> )	INSERT, UPDATE	E, DELETE,	SELECT		
ix)		n the relation sch	ema Bank (	BankID	, AccountNumb, Balanc	e, Customer )
	-	ankID, AccountNucomer -> BankID }.	ımb -> Bal	lance; E	BankID, AccounNumb	> Customer;
1.4	Wha	t is the highest nor	rmal form for	r the rela	ation schema Bank?	
	a)	First		b)	Second	
	<b>c</b> )	Third		d)	Boyce Codde.	
x)	A rela	ation is considered	i to be in se	cond no	rmal form if it is in first	normal form
	and i	t has no	dependenci	les.		
	a)	referential		<b>b</b> )	functional	
	<b>c</b> )	partial key		d)	transitive.	



### GROUP - B

:83LD	(Short Answer Type Questions)	
	Answer any three of the following questions. $3 \times 5 =$	15
2.	a) What do you mean by functional dependency?	2
. E &	b) What are the main characteristics of functional dependencies?	3
3.	Define BCNF. How does it differ from 3NF ? Why is it considered a stronger th	an
3.	3 NF ?	- 2
4.	What are ACID properties of a database transaction? How are they selected to t	he
	concurrency control?	+ 2
		2

- What is the difference between a database and a table? 2 5. a)
  - Why are entity integrity and referential integrity important in a database? 3 b)
- Give an example of supertype/subtype relationship where the overlap rule a) 3 applies.
  - What is inheritance in generalization hierarchies? b)

### GROUP - C

nta tiame a subject taught by Roger

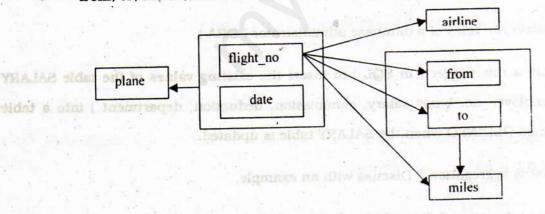
# (Long Answer Type Questions)

Answer any three of the following questions.

 $3 \times 15 = 45$ 

2

Given a database schema named PLANE\_INFO (flight\_no, date, plane, airline, a) from, to, miles ), the functional dependency diagram is given below:



Decompose it up to Boyce-Codd Normal Form (BCNF).



- b) Consider the relation R ( A, B, C ) and a set of functional dependencies  $F = \{A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C\}$ . Compute the canonical cover for F.
- c) Given  $F = \{A \to B, B \to C\}$ . Find an instance of a relation that satisfies F but does not satisfy  $B \to A$ . Can you find an instance that satisfies F but not  $A \to C$ ? 6 + 6 + 3
- 8. a) Consider the relation schemas given below:

STUDENT (student\_id, name)

ENROLLEDIN (student id, subject code)

SUBJECTS (subject\_code, lecturer)

Write relational algebra for the following:

- i) Who teaches CP1500 or CP3020
- ii) Who teaches at least two different subjects?
- iii) What are the names of the students taking a subject taught by Roger?
- b) Write down the differences between DBMS and Traditional File Processing System.
- c) Describe ACID properties in DBMS.
- d) Give an example of derived attribute.

(2+2+2)+3+4+2

- 9. a) Explain the roles of a database administrator (DBA).
  - b) Write a row trigger (in SQL) to insert the existing values of the table SALARY (employee\_no, basic\_salary, commission, deduction, department) into a table named OLDINFO when the SALARY table is updated.
  - c) What is aggregation? Discuss with an example.
  - d) Draw a functional dependency diagram (FD diagram) that is in 3 NF but not in BCNF. Decompose that FD diagram into BCNF.

    5+4+3+3



10. a) Draw an E-R diagram for the following:

A department store operates in several cities. In a city there is one headquarters coordinating the local operations. A city may have several stores. Stores hold any amount of items. Customers place their orders for any number of items to a given store.

- b) Why we need query optimization?
- Consider the relation R ( A, B, C, D, E ) with the set of  $F = \{A \rightarrow C, B \rightarrow C, C \rightarrow D, DC \rightarrow C, CE \rightarrow A\}$ . Suppose the relation has been decomposed by the relations R1 ( A, D) R2 ( A, B) R3 ( B, E) R4 ( C, D, E), R5 ( A, E). Is this decomposition lossy or lossless? Justify your answer.
- 11. Write short notes on any three of the following:

 $3 \times 5$ 

- a) Vertical and Horizontal Fragmentation
- b) Armstrong's axioms
- c) Two-phase locking protocol
- d) Conflict serializability
- e) Theta ( $\theta$ ) join.

**END**