

3rd semester MCA Examination – 2020

Data Base Systems (CS 3.4)

Full Marks – 70

Time – 3 Hours

(Answer All Questions)

1	a)	Define the followings: i) Schema and Instances ii) Derived attribute iii) IS A relationship iv) Data Independence	8
	b)	Consider the following scenario. The customers can buy many products. Each product is characterized by product code, price. The products are also of two types i.e. cosmetics and garments. Cosmetic products are characterized by expiry date and garment products are characterized by size chart. i) Identify the entities and relationships ii) Draw the ER diagram for the above scenario. OR	6
	c)	What is weak entity set? Explain its representation in ER diagram with example.	4
	d)	What is Data model? Explain the classification of data model.	5
	e)	Explain the different types of end users with the role of DBA.	5
2	a)	Explain the disadvantages of file system using as data storage.	6
	b)	Consider the following relation schemas.	8

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	<p>Student (<u>Roll</u>, Name, Semester, Branch)</p> <p>Project(<u>Project-name</u>, Company-name, Guide-name)</p> <p>Work (<u>Roll</u>, <u>Project-name</u>, duration)</p> <p>Write the following queries using relational algebra.</p> <p>i) Find the name of the students of 3rd semester MCA.</p> <p>ii) Find the name of the project in which Rajesh works.</p> <p>iii) Find the name of the students working under the guide Mr. S. Dash.</p> <p>iv) Find the duration of the projects carried out in Infosys.</p> <p style="text-align: center;">OR</p>	
c)	Explain the constraints in Enhanced ER Model.	6
d)	<p>Define the followings:</p> <p>i) Natural Join operation</p> <p>ii) Aggregate functions in Relational Algebra</p> <p>iii) Foreign key</p> <p>iv) Features of Relational model</p>	8
3 a)	What is Functional Dependency? Explain the basic axioms and inference rules on FDs.	7
b)	Write the rules for mapping the different entity sets into relation schemas. Map the ER diagram designed in Q. No. 1(b) to relation schemas.	7
	OR	

	c)	Explain the different constraints associated with relational model.	7
	d)	Discuss the specialization and generalization relationship associated with EER model.	
4 a)		What is cover of a set of Fds. Find the minimal cover of the set of FDs $F = \{A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C\}$	7
	b)	What is First Normal Form? Explain the concept of partial and transitive FD along with the related normal forms with suitable examples.	7
		OR	
	d)	Consider a relational schema R with attributes (A, B, C, D, E) and the set of functional dependencies $\{AB \rightarrow C, C \rightarrow DE\}$. Find the primary key of R. Give a lossless-join decomposition of R into BCNF.	7
	e)	Explain the different anomalies associated with database design.	7
5 a)		What is query optimization? Explain the basic processes required for query processing.	7
	b)	<p>Optimize the following query using heuristic query optimization algorithm.</p> <p>Select E.name, D.dname</p> <p>From Employee as E, Dept as D, Works as W</p> <p>Where E.id=W.id and D.dno=W.dno and D.capacity=20 and W.duration>10;</p> <p style="text-align: center;">OR</p>	7

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	Describe the followings. c) Query Tree d) Indexing e) Multivalued Dependency f) Collision in hashing	14
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