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Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

M.C.A. (First Semester - Regular) Examinations, January – 2026

MCA251003 – Database Management System

Time: 3 hrs | Maximum: 60 Marks

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions		CO #	Blooms Level
a.	What is data independence?	CO1	K3
b.	Define file organization.	CO5	K1
c.	Difference between trivial and non-trivial FD.	CO3	K3
d.	What is a foreign key?	CO2	K1
e.	Define concurrency control.	CO3	K3

PART – B **(10 x 5= 50 Marks)**

Answer ***ALL*** questions		Marks	CO #	Blooms Level
2. a.	Explain the structure, components, and functions of DBMS with a neat architecture diagram.	5	CO1	K2
b.	Explain the roles of Database Administrator (DBA) in managing and maintaining the database.	5	CO1	K3
	(OR)			
c.	Define Schema, Sub-schema, and Instance. Explain database users and database languages.	10	CO1	K2
3.a.	Explain ER diagram design process. Discuss constraints, keys, weak entities & design issues.	5	CO2	K1
b.	Explain the basic structure of the relational database model with an example.	5	CO2	K2
	(OR)			
c.	Write short notes on Join and Division operators.	5	CO2	K2
d.	Explain EER concepts (generalization, specialization, aggregation) and map EER to relational schema?	5	CO2	K3
4.a.	What is BCNF? Compare 3NF and BCNF with examples.	5	CO3	K2
b.	Explain functional dependency, closure of FD, attribute closure, and minimal cover.	5	CO3	K3
	(OR)			
c.	Explain decomposition, lossless join decomposition, and dependency preservation.	10	CO3	K2
5.a.	Define transaction. Explain ACID properties with real-time examples.	5	CO4	K2
b.	Explain serializability. Discuss conflict and view serializability with examples.	5	CO4	K2
	(OR)			
c.	Explain timestamp-based concurrency control and compare it with lock-based methods.	10	CO4	K3
6.a.	Explain query cost estimation for selection, join, and sorting operations.	5	CO5	K3
b.	Differentiate between clustered and non-clustered index.	5	CO5	K1
	(OR)			
c.	Explain indexing techniques: B+ tree, and hashing with examples.	5	CO5	K3
d.	Explain storage architecture in DBMS. Discuss how data moves between cache, main memory, and secondary storage.	5	CO5	K2

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