



B.E. DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Third Semester

COMPUTER SCIENCE AND ENGINEERING

U18CSI3204: Database Management Systems

COURSE OUTCOMES

CO1: Construct ER Model for a given database application.

CO2: Design relational schema using database design principles.

CO3: Identify the Key Constraints for relations and devise queries using SQL.

CO4: Apply indexing techniques to access and generate user reports for a database.

CO5: Building Web Applications using PHP & MySQL.

CO6: Illustrate the concepts for transaction processing and concurrency control for RDBMS.

Time: Three Hours

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Match List I with List II and find the corresponding answer with multiple choice code.

CO2 [K₂]

List I	List II
A. X (Cartesian Product)	i. Logical design of the database
B. Schema	ii. all pairs of tuples from different relations, regardless of whether their attribute values match
C. ρ	iii. Indivisible values
D. Atomic domain	iv. Alters the metadata

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

2. Match the ER model terms(List 1) with the notations (List 2)

CO1 [K₂]

List 1	List 2
A. Weak Entity	i). 
B. Key Attribute	ii). 
C. Multivalued Attribute	iii). 
D. Relationship	iv). 

- | | A | B | C | D |
|----|----|---|----|-----|
| a) | ii | i | iv | iii |
| b) | iv | i | ii | iii |

Course(course_id,name,credit,duration)

Student(roll,name,course_id)

Belongs_to (duration, position)

[Note: Appropriate relationships can be assumed to associate entities]

- b) Consider the following functional dependencies in relation R (A, B, C, D, E). 7 CO1 [K₃]
A → BC,
CD → E,
B → D,
E → A.
Check whether the given relation is in 3NF.
23. a) Consider the following employee database. 10 CO3 [K₃]
Employee(emp_name, street,city)
Works(emp_name,company_name, salary)
Company(company_name, city)
Manages(emp_name, manager_name)
Construct the SQL query for the following
a) Find the names and cities(residence city) of all employees who work for “First bank corporation” and earn more than 10,000.
b) Find all the employee names in the database who do not work for “First bank corporation”.
c) Find the company name that has the most employees.
d) Find the employee names who work in the companies located in “cbe”.
e) Find all the employee names who earn more than each employee of “Small Bank Corporation”.
- b) Enumerate the three data anomalies that are likely to occur because of data 4 CO3 [K₂]
redundancy with appropriate example.
24. a) Construct a B-Tree of order 3, when the keys arrive in the following order, 8 CO4 [K₂]
10, 24, 23, 11, 31, 16, 26, 35, 29, 20, 46, 28.
- b) Explain various RAID levels and elaborate the techniques used in each level to 6 CO4 [K₂]
achieve reliability.
25. a) Explain how serializability is ensured by two-phase locking protocol and time 7 CO6 [K₂]
stamp-based protocol.
- b) Explain the various recovery techniques during transaction. 7 CO6 [K₂]
26. a) Consider the three transactions T1, T2, and T3, and the schedules S1 and S2 14 CO6 [K₃]
given below. Draw the serializability (precedence) graphs for S1 and S2, and
state whether each schedule is serializable or not. If a schedule is serializable,
write down the equivalent serial schedule(s).
T1: r1 (X); r1 (Z); w1 (X);
T2: r2 (Z); r2 (Y); w2 (Z); w2 (Y);
T3: r3 (X); r3 (Y); w3 (Y);

S1: r1 (X); r2 (Z); r1 (Z); r3 (X); r3 (Y); w1 (X); w3 (Y); r2 (Y); w2 (Z); w2 (Y);
S2: r1 (X); r2 (Z); r3 (X); r1 (Z); r2 (Y); r3 (Y); w1 (X); w2 (Z); w3 (Y); w2 (Y);
