(101MC24)

M.C.A. DEGREE EXAMINATION, Model QP
MCA-First Semester
DATA STRUCTURES with C++

Time : Three hours **Maximum : 70 marks**

SECTION-A

Answer Question No.1 Compulsory: **7 x 2 = 14 M**

1. a) Define class and object
   b) What is dereferencing operator?
   c) What is the need of circular queues?
   d) how to improve the performance of binary search.
   e) What are the applications of Queues?
   f) List different graph traversal algorithms
   g) Define Multigraph.

SECTION-B

Answer ONE Question from each unit: **4 x 14 = 56 M**

UNIT - I

2. Write the features of object-oriented programming

OR

3. Define ADT. Explain data abstraction with an example.

UNIT – II

4. Write a pseudo code to insert, delete elements from a double linked list.

OR

5. Write the procedure to implement hashing with quadratic probing.

UNIT - III

6. Define Stack. Write a program to implement stack operations with linked list.

OR

7. Write an algorithm for quick sort and give calculate its time complexity with an example

UNIT - IV

8. Write the non-recursive binary tree traversal algorithm for pre and post orders.

OR

9. a) Explain graph representation with arrays and linked lists.
   b) Write a short notes on AVL Trees.

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M.C.A. DEGREE EXAMINATION, Model QP
MCA-First Semester
Database Management Systems

Time : Three hours **Maximum : 70 marks**

SECTION-A

Answer Question No.1 Compulsory: **7 x 2 = 14 M**

1.a) Discuss about Security Management in DBMS.
b) What is failure? Mention different causes for failure of a transaction?
c) What is Entity? Give Examples for Entity types.
d) What is closure set of functional dependencies?
e) What is the use for Trigger? Give any two advantages of Triggers.
f) What are the pros and cons of distributed database over centralized databases?
g) What is Data Fragmentation?
h) What is partitioned Hashing?

SECTION-B

Answer ONE Question from each unit: **4 x 14 = 56 M**

Unit-I

2.a) Discuss about three level architecture with representation of data in each level.
b) Discuss about levels of RAID.

OR

3.a) Compare and Construct the indexing of data by using B and B^+ Trees.
b) Discuss about Data Independency with an example.

Unit-II

4.a) Discuss about Arithmetic functions in SQL with example?
b) Express the following statements in terms of Relational Algebra
i. Fetch the Department Numbers consisting of more than three employees.
ii. Fetch the Employee aggregated salary for a department.

OR

5.a) Discuss about Views and its Limitations?
b) What is Index? Create an index for the employees belongs to the Accounts and Sales departments.

Unit-III

6.a) What is Functional Dependency? Explain the role of FD's in construction of Relational Schema.
b) Can I say that BCNF is equivalent Normal Form for III NF, Justify?

OR

7.a) What is Non-Loss Dependency? Explain with an example.

b) Discuss the following

i. II NF

ii. Multi-valued Dependency.

Unit-IV

8.a) What is Lock? Discuss about Shared and Exclusive Locking Process

b) Discuss about

i. Two-Phase Locking

ii. Time-Stamping Algorithm

OR

9.a) What is Dirty-Read Problem? Explain with an Example.

b) What is serializability? Discuss with aid of an example to test the conflicts in serializability?

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M.C.A. DEGREE EXAMINATION, Model QP
MCA-First Semester
Operating Systems

Time : Three hours **Maximum : 70 marks**

SECTION-A
Answer Question No.1 Compulsory: **7 x 2 = 14 M**

1. a) Write a short note on IPC
b) Define Critical Section
c) Explain system Boot.
d) List out deadlock characteristics
e) Write short notes on a log structured file system.
f) Define RAID. What are the RAID levels
g) Write any two applications of I/O interface.

SECTION-B
Answer ONE Question from each unit: **4 x 14 = 56 M**

UNIT – I

2. Explain Process Management & Memory Management?

OR

3. Write the Operating System Design and Implementation?

UNIT – II

4. Discuss the Multithreading Models?

OR

5. What is Thread? Explain the Thread Scheduling?
b) Describe the Semaphores

UNIT – III

6. a) What is Deadlock? Write the Deadlock Characterization?
b) Differences between the Deadlock Avoidance & Deadlock Detection?

OR

7. Explain the Page Replacement?

UNIT – IV

9. a) What is File system? Discuss the File System Mounting?
b) Compare Disk Scheduling & Disk Management?

OR

10. Explain the I/O Hardware and Kernal I/O Interface?

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M.C.A. DEGREE EXAMINATION, Model QP
MCA-First Semester
PROBABILITY AND STATISTICS

Time : Three hours **Maximum : 70 marks**

Answer Question No.1 compulsory.

Answer ONE question from each Unit.

1. a) Independence of multiplication rule.

b) If P(A)=1/3, P(B)=1/4S, P(A∩B)=1/5 then find P(AUB),P(A^c∩B).

c) What do you mean by continuous random variable

d) Define Degrees of freedom

e) What is maximum error of estimate for small sample.

f) What is Point estimation?

g) Define Weibull distribution

UNIT-I

2. a) Define probability and discuss the axioms of probability.

b) Define the conditional probability. A bag contains 5 white, 6 red and 7 black balls. Two balls are

drawn at random then find the Probability that they will be both black.

(OR)

3. a) A manufacture of cotter pins knows that 5% of his product is defective. If he sells cotter pins

in boxes of 100 and guarantees that not more than 10 pins will be defective. What is the probability that approximately a box will fail to meet the guaranteed quality?

b) Ten coins are thrown simultaneously then find the probability of getting atleast 7 heads?

UNIT-II

4. a) Define exponential distribution and find its mean, variance, reliability?

b) In a distribution exactly normal 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution.

(OR)

5. a) A study designed to investigate whether certain detonators used with explosive in coal mining

meet the requirement that atleast 90% will ignite the explosive when charged. It is found that

174 of 200 detonators function properly. Test the null hypothesis $p=0.9$ against the alternative

hypothesis $p<0.9$ at the 5% level of significance.

UNIT-III

6. a) Discuss about F-test for equality of two population variances. Two independent samples of 8 and 7 items respectively had the following values of the variables

Sample I	**9**	**11**	**13**	**11**	**16**	**10**	**12**	**14**
Sample II	**11**	**13**	**11**	**14**	**10**	**8**	**10**	

b) Define maximum error estimate? When we take a sample from an infinite population what happens to the standard error of the mean if the sample size is a. increased from 50 to 200 b. decreased from 225 to 25.

(OR)

7. a) Explain Type I and Type II errors with examples.

b) Measurements of the fat content of two kinds of ice creams Brand A and Brand B yielded the following sample data. Test the null hypothesis $\mu_1=\mu_2$ where μ_1 and μ_2 are the true average fact of the two fat contents of the two kinds of ice creams against the alternative hypothesis $\mu_1 \neq \mu_2$ at 5% level of significance.

Brand A 13.5 14.0 13.6 12.9 13.0

Brand B 12.9 13.0 12.4 13.5 12.7

UNIT-IV

8. The equations of two regression lines obtained in a correlation analysis are 3x+12y=19, 3y+9x=46. Find a) coefficient of correlation b) Mean values of x and y c)the ratio of the coefficient of variability of x to that of y.

(OR)

9.a) Find the least square regression equation of x_1 on x_2 and x_3 from the following data.

x_1	3	5	6	8	12	14
x_2	16	10	7	4	3	2
x_3	90	72	54	42	30	12

b) Explain the following i) Correlation ii) Matrix approach to least squares in MLR models.

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M.C.A. DEGREE EXAMINATION, Model QP
MCA-First Semester
Computer Organization

Time : Three hours **Maximum : 70 marks**

SECTION-A

Answer Question No.1 Compulsory: **7 x 2 = 14 M**

1. a) Draw logic diagram and truth table for XOR gate
   b) Define Bus. In what ways we can implement bus
   c) What is Program Counter
   d) Write two applications of logical micro operatons
   e) Perform 11010101 - 0110110 in binary using $2^{'s}$ complement method.
   f) Define write-back and write-through.
   g) Define locality of reference.

SECTION-B

Answer ONE Question from each unit: **4 x 14 = 56 M**

UNIT-I

2. a) Simplify the Boolean expression using K-map and implement using NAND gates $F(A,B,C,D) = \sum m(0,2,3,8,10,11,12,14)$
   b) State and Explain the DeMorgan's Theorem

(OR)

3. a) Explain the Working of SR Flip-flop with necessary circuit diagram.
   b) Write short notes on floating point representation.

UNIT-II

4. Implement Bus line for an 8-bit register using three state-buffers

(OR)

5. a) Illustrate the register transfer mechanism for P: R2 ← R1 with necessary diagrams
   b) List out the Register transfer notations for Arithmetic Micro Operations

UNIT-III

6. Demonstrate the general configuration of Micro programmed Control unit with a neat block diagram.

(OR)

7. Design a 4-bit ALU which performs arithmetic, Logical and shift operations.

UNIT – IV

8. Explain the process for signed magnitude addition and subtraction with flow chart

(OR)

9. Explain in detail about booth multiplication algorithm with an example?