

FACULTY OF SCIENCE
M.C.A. I – SEMESTER REGULAR EXAMINATIONS, MAR- 2023
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
PAPER – I

Time: 3 Hours]

[Max. Marks: 70

Note: Answer all questions from Section – A and Section – B

Section – A

(5x4=20)

Answer the following questions in not more than **ONE** page each:

1. Explain basic connectives.
2. Write about Cartesian product.
3. Explain Partitions of Integers.
4. What is a Monoid? Explain.
5. Write about Planar graphs.

Section – B

(5x10=50)

Answer the following questions in not more than **FOUR** pages each:

6. a) Explain the Laws of Logic with example. Simplify the following compound statement $\neg[\neg[(p \vee q) \wedge r] \vee \neg q]$.
(OR)
- b) i) What Set? Explain Set Operations.
ii) Explain Division Algorithm.
7. a) i) What is Function? Explain Special Functions.
ii) Prove that a relation on a set A is symmetric if and only if $R = R^{-1}$?
(OR)
- b) i) What is Partial Order? Explain Equivalence Relations.
ii) Explain Principle of Inclusion and Exclusion.
8. a) i) What is Recurrence Relation? Explain different types.
ii) Solve the recurrence relation $a_n + a_{n-1} - 6a_{n-2} = 0$ Where $n \geq 2$, $a_0 = -1$, $a_1 = 8$.
(OR)
- b) i) What is Generating Function? Explain.
ii) Solve the Recurrence Relation using Generating Function $a_n - 4a_{n-1} = 0$ for $n \geq 1$.
where $a_0 = 1$.
9. a) What is Algebraic Structure? Explain the general properties of Algebraic Structures.
(OR)
- b) i) What is a Group? Explain its properties.
ii) Explain Homomorphism.
10. a) Define Minimum Spanning Tree? Describe in brief about Kruskal's algorithm with example.
(OR)
- b) Define Graph. Explain Graph Representations.

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FACULTY OF SCIENCES
MCA I – SEMESTER REGULAR EXAMINATIONS, MAR- 2023
DATA STRUCTURES USING 'C'
PAPER – II

Time: 3 hours]

[Max. Marks: 70

Note: Answer all questions from Section – A and Section – B

Section – A

Answer the following questions in not more than **ONE** page each: (5x4=20)

1. Write about compilation and linking processes.
2. What is a Pre-processor directive? Explain.
3. Write applications of stacks.
4. Explain AVL Tree.
5. Explain selection sort.

Section – B

Answer the following questions in not more than **FOUR** page each: (5x10=50)

6. a) Explain and write a program for decision making and branching statements.
(OR)
b) Write a program explaining the different string operations.
7. a) Describe the concept of Pass by value and Pass by reference in detail.
(OR)
b) Write a program demonstrating the structures and Unions.
8. a) Write a program for inserting and deleting the elements from the Queues using array representation.
(OR)
b) Explain the process of inserting and deleting the elements in a double linked list.
9. a) Explain Binary search tree representation and write about tree traversals techniques.
(OR)
b) What is Graph? Write about Graph Traversals.
10. a) Write a program and explain Binary Search compare with Linear Search.
(OR)
b) What is hashing? Write about types of Hashing in detail.

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FACULTY OF SCIENCES
MCA I – SEMESTER REGULAR EXAMINATIONS, MAR- 2023
OBJECT ORIENTED PROGRAMMING USING JAVA
PAPER – III

Time: 3 hours]

[Max. Marks: 70

Note: Answer all questions from Section – A and Section – B

Section – A

Answer the following questions in not more than **ONE** page each: (5x4=20)

1. Explain the benefits of object oriented Development.
2. Write about Character streams.
3. Write about String Tokenizer.
4. Explain Event classes.
5. Write about serialization.

Section – B

Answer the following questions in not more than **FOUR** page each: (5x10=50)

6. a) Explain the Packages and interfaces with a program.
(OR)
b) What is inheritance? Explain different forms of inheritance with suitable program segments and real world example classes.
7. a) What are the uses of 'throw' and 'throws' clauses for exception handling?
(OR)
b) What is the difference between a thread and a process Explain in detail?
8. a) Write about collection interfaces and collection classes in detail.
(OR)
b) Explain the terms 1) Comparators 2) Iterators 3)Random access Interface in detail.
9. a) What is an adapter class? Explain their role in event handling.
(OR)
b) Why swing components are preferred over AWT components.
10. a) Write a program to copy the contents of file1 to file 2. Read the names of files as command line arguments.
(OR)
b) Write about driver manager class for database connectivity.

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FACULTY OF SCIENCE
M.C.A. I – SEMESTER REGULAR EXAMINATIONS, MAR-2023
COMPUTER ARCHITECTURE
PAPER – IV

Time: 3 Hours]

[Max. Marks: 70

Note: Answer all questions from Section – A and Section – B

Section – A

(5x4=20)

Answer the following questions in not more than **ONE** page each:

1. Explain Arithmetic Addition and Subtraction with an example.
2. Explain Bus system for four registers.
3. Short notes on control memory.
4. Draw block diagram of associative memory and explain.
5. Write about I/O Processor.

Section – B

(5x10=50)

Answer the following questions in not more than **FOUR** pages each:

6. a) Explain about Bus structure and Data transfer.
(OR)
b) Describe fixed and floating point representation with an example.
7. a) Write about Arithmetic Micro operations
(OR)
b) Explain about common bus system.
8. a) Explain about Stack Organization.
(OR)
b) Explain about Multiplication Algorithm.
9. a) Describe the Auxiliary Memory.
(OR)
b) What is Cache Memory? Explain about Direct mapping in cache memory organization.
10. a) What is Pipeline? Explain Arithmetic Pipeline.
(OR)
b) Explain Synchronous and Asynchronous data transmission.

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FACULTY OF SCIENCE
M. C. A. I – SEMESTER REGULAR EXAMINATIONS, MAR- 2023
PROBABILITY AND STATISTICS
PAPER – V

Time: 3 Hours]

[Max. Marks: 70

Note: Answer all questions from Section – A and Section – B

Section – A

(5x4=20)

Answer the following questions in not more than **ONE** page each:

1. What are vector Spaces and Sub Spaces?
2. Define the binomial distribution and find its mean and variance.
3. Explain random sampling.
4. Define Hypotheses testing.
5. Explain Correlation analysis.

Section – B

(5x10=50)

Answer the following questions in not more than **FOUR** pages each:

6. a) Explain linear transformation.

(OR)

- b) Explain Coordinate systems and write about linearly independent sets.

7. a) Given that
- $F(x) = \frac{K}{2^x}$
- is a probability distribution for a random variable that can take on the values
- $x = 0, 1, 2, 3, 4$
- .

(i) Find the value of K .(ii) Find an expression for the distribution function $F(x)$ of the random variable.

(OR)

- b) Explain Bayes' theorem in detail.

8. a) Determine the probability that
- \bar{x}
- will be between 22.39 and 22.41 if a random sample of size 36 is taken from an infinite population having the mean
- $\mu = 22.4$
- and
- $\sigma = 0.048$
- .

(OR)

- b) Explain determination of sample size in estimation.

9. a) Describe the Hypotheses testing of mean when the population standard deviation is known.

(OR)

b) A company claims that its light bulbs are superior to those of its main competitor. If a study showed that a sample of $n_1 = 40$ of its bulbs has a mean life time of 1647 hours of continuous use with a standard deviation of 27 hours, while a sample of $n_2 = 40$ bulbs made by its main competitor had a mean lifetime of 1638 hours of continuous use with a standard deviation of 31 hours, does this substantiate the claim at the 0.05 level of significance?

10. a) Explain chi-square as a test of independence with an example.

(OR)

- b) Explain Regression and estimation using regression line in detail.

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FACULTY OF SCIENCE
M. C. A. I – SEMESTER REGULAR EXAMINATIONS, MAR- 2023
MANAGERIAL ECONOMICS AND ACCOUNTANCY
PAPER – VI

Time: 3 Hours]

[Max. Marks: 70

Note: Answer all questions from Section – A and Section – B

Section – A

(5x4=20)

Answer the following questions in not more than **ONE** page each:

1. Define Eqimarginalism.
2. Explain types of Demand.
3. Define ISO quants.
4. Explain Capital Requirements.
5. Explain Book keeping.

Section – B

(5x10=50)

Answer the following questions in not more than **FOUR** pages each:

6. a) Explain marginalism and the fundamental concepts of Managerial Economics.
(OR)
b) Write about Managerial economics and its usefulness.
7. a) Explain Law of Demand and Elasticity of Demand in detail.
(OR)
b) Explain demand forecasting in detail.
8. a) Explain law of variable proportion and the concept of opportunity cost.
(OR)
b) Explain the concept of opportunity cost and Break-Even analysis in detail.
9. a) Write about the significance of capital requirements.
(OR)
b) Explain capital budgeting and methods of payback and discounted cash flow methods with problem.
10. a) Write about Principles and significance of double entry book keeping.
(OR)
b) Explain concept of preparation of final accounts in detail.

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