2M2A25035 (Pages : 1) Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Second Semester M.Sc Computer Science Degree Examination, April 2025

MCS2C01 - Design and Analysis of Algorithms

(2022 Admission onwards)

Time: 3 hours Max. Weightage : 30

Part A
(Answer any FOUR questions, Each question carries 2 weightage)

1. What do you mean by space complexity of an algorithm?
2. What is the use of Iteration method?
3. Write a note on Greedy method.
4. What is your understanding about Amdahl's Law?
5. Define Ω (Big Omega) notation.
6. What is the significance of the class NP?
7. Explain Parallel Prefix Computation with an example.

(4 X 2 = 8 weightage)

Part B
(Answer any FOUR questions, Each question carries 3 weightage)

8. Explain Kruskal's algorithm with an example.
9. How can we solve Sum of subsets problem using Backtracking?
10. What is Euler Tour Technique?
11. Explain the difference between deterministic and nondeterministic computation.
12. Explain Travelling Salesman Problem with an example.
13. Explain the procedure to analyze control structures.
14. Write a paragraph on the purpose of analyzing an algorithm. **(4 X 3 = 12 weightage)**

Part C
(Answer any TWO questions, Each question carries 5 weightage)

15. Solve the recurrence: $\mathbf{T(n) = 4T(n/2) + n^2}$
16. Find an optimal Huffman Code for the following set of frequencies

    P: 1, Q: 1, R: 2, S: 3, T: 5
17. Provide an example of a problem that is not in class **P** and explain why.
18. How does the concept of parallel computation relate to complexity classes?

(2 X 5 = 10 weightage)

2M2A25036 (Pages : 1) Reg. No:.....

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Second Semester M.Sc Computer Science Degree Examination, April 2025

MCS2C02 - Operating System Concepts

(2022 Admission onwards)

Time: 3 hours Max. Weightage : 30

PART A

Answer any four questions. Each question carries 2 weightage

1. Briefly discuss the functions of Operating System.
2. Explain about five state process model.
3. Define deadlock.
4. Briefly describe 'Thrashing'.
5. Differentiate preemptive and non-preemptive type of algorithms.
6. List any two mobile OS and compare.
7. Discuss CIA Triad.

(4 x 2 = 8 weightage)

PART B

Answer any four questions. Each question carries 3 weightage

8. What is Synchronization in OS? What are the different Synchronization mechanisms?
9. Differentiate between 'Overlays' and 'Swapping'.
10. Explain Real Time OS.
11. Briefly discuss about Round Robin process scheduling.
12. Differentiate between paging and segmentation.
13. Explain Banker's algorithm with its usage.
14. Discuss about Access control matrix.

(4 x 3 = 12 weightage)

PART C

(Answer any two questions. Each question carries 5 weightage

15. Explain about Linux Process and Thread management.
16. What do you meant by 'Race Condition'? Explain its significance and different ways to deal with it. Explain with suitable example.
17. Explain any two page replacement algorithms and find the page faults by simulating the algorithms using four frames.

    Consider the following page references : 7, 1, 0, 2, 1, 3, 1, 4, 2, 3, 0, 3, 2, 4 , 3, 6, 1, 7, 6, 2
18. Explain Readers / Writers problem and give solutions.

(2 x 5 = 10 weightage)

2M2A25037 (Pages : 1) Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Second Semester M.Sc Computer Science Degree Examination, April 2025

MCS2C03 - Computer Networks

(2022 Admission onwards)

Time: 3 hours Max. Weightage : 30

PART A

Answer any four questions.
Each question carries two weightage

1. List various guided communication media.
2. List various network topology.
3. Explain domain name system.
4. State the functions of bridges.
5. Explain the concept of congestion.
6. What is Ethernet?
7. Explain Authentication and Integrity.

(4x2=8weightage)

PART B

Answer any four questions.
Each question carries three weightage

8. Write a short note on history of computer networking.
9. Explain PPP and ATM.
10. Explain about the building of a web server.
11. Distinguish between UDP and TCP.
12. Explain the function of transport layer.
13. Explain the security network requirements and attack.
14. What is firewall? Explain its significance in computer network.

(4x3=12weightage)

PART C

Answer any two questions.
Each question carries five weightage

15. Explain the various layers of the OSI reference model.
    Compare it with TCP/IP model.
16. Explain error detection and correction
17. What is a router? Explain various IP routing in Internet.
18. Write an essay about principle of cryptography.

(2x5=10weightage)

2M2A25038 (Pages : 2) Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Second Semester M.Sc Computer Science Degree Examination, April 2025

MCS2C04 - Data Analysis & Visualization using Python

(2022 Admission onwards)

Time: 3 hours Max. Weightage : 30

PART A

Answer any *four* questions. Each question carries *2* weightage.

1. Explain the different types of Python data structures with examples.
2. What are control statements in Python? Describe the use of ***if-else*** and for loop with an example.
3. Describe exception handling in Python. What are the different types of exceptions? Give an example of try-except block.
4. What are user-defined modules and packages in Python? Explain how to create and use them.
5. Explain file handling in Python. How can you read and write data to a file?
6. What is data preprocessing in data analysis? Discuss its importance and common techniques for cleaning data.
7. Explain structured and unstructured data. How can they be used in data analysis?

(4 x 2 = 8 Weightage)

PART B

Answer any *four* questions. Each question carries *3* weightage.

8. Explain the steps involved in the data analysis process. How does data preprocessing fit into this process?
9. What is the difference between lists and tuples in Python? Which one would you choose for a data analysis project and why?
10. How can NumPy arrays be transposed? Provide examples of how transposition is useful in data manipulation.
11. Explain the concept of Index Hierarchy in Pandas. How does it benefit data analysis with large datasets?

12. What are universal array functions in NumPy? Provide examples of some common functions and explain how they simplify array processing.
13. Discuss the different types of plots available in Matplotlib for data visualization. Provide examples of when each type should be used.
14. What is the importance of data visualization in data analysis? Explain how visualization helps in understanding complex datasets.

(4 x 3 = 12 Weightage)

PART C

Answer any *two* questions. Each question carries *5* weightage.

15. Describe in detail the features and uses of Pandas. How does Pandas handle data manipulation and transformation? Include examples of common functions and methods used in Pandas.
16. Discuss the various techniques of data visualization in Python using Matplotlib. Explain how to create a line plot, bar plot, pie chart, and scatter plot, and explain their applications in real-world data analysis scenarios.
17. Explain the role of NumPy in data analysis and its key features. How do NumPy arrays differ from Python lists? Discuss how NumPy's array-based operations enhance performance and simplify data manipulation.
18. What is the significance of cleaning and preparing data before performing data analysis? Discuss various data cleaning techniques such as handling missing values, removing duplicates, and handling inconsistent data, and their importance in creating reliable datasets.

(2 x 5 = 10 Weightage)

2M2A25039 (Pages : 1) Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Second Semester M.Sc Computer Science Degree Examination, April 2025

MCS2C05 - Principles of software Engineering

(2022 Admission onwards)

Time: 3 hours Max. Weightage : 30

PART A

Questions 1 to 7. Answer any *four*. Each question carries *two* weightages.

1. Explain the Timeboxing Model of Software Development.
2. Define the Software Requirement and describe its importance in Software Engineering.
3. Recall the components of an SRS.
4. Define the Effort Adjustment Factor (EAF) in effort estimation.
5. Discuss the Procedural Approach to Quality Management.
6. Describe the concept of Abstraction.
7. Define static structure and dynamic structure in Structured Programming.

PART B

Questions 9 to 14. Answer *any four*. Each question carries *three* weightages.

8. Explain the Agile Process Model of Software Development.
9. Enumerate the characteristics of Software Requirement Specification (SRS).
10. Recall the major steps involved in the requirement analysis.
11. Elaborate on the major challenges to be addressed during project planning.
12. Explain the Risk Management Process.
13. Elaborate on Cohesion with its various types.
14. Elucidate various Coding Standards.

PART C

Questions 15 to 18. Answer any *two*. Each question carries *five* weightages.

15. Illustrate the Software Development Lifecycle with a neat block diagram.
16. a) Define the term requirement validation (2 wts)

    b) Differentiate Top-down and Bottom-up estimation models (3 wts)
17. Recall any five major risk items and the techniques to manage them.
18. Enumerate and explain various techniques for Refactoring.