

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II BTech (CSE) II Semester
BTCSE401 COMPUTER ORGANIZATION
MODEL QUESTION PAPER

Time: 3hrs.

Max.Marks: 75

SECTION-A (4 x 15=60)
Answer ALL Questions

- 1 (a) Explain different addressing modes with examples. [15M]
Or
(b) Explain Design of Accumulator logic. [15M]
- 2 (a) Write notes on asynchronous data transfer. [15M]
Or
(b) Explain direct memory access. [15M]
- 3 (a) Explain in brief main memory concepts. [08M]
(b) Explain in brief cache memory. [07M]
Or
(c) Explain the concepts of virtual memory? [15M]
- 4 (a) Explain 8085 Microprocessor Architecture? [15M]
Or
(b) Explain Intel 8085 Microprocessor Instructions?

SECTION-B (5 x 3=15M)
Answer any FIVE Questions

- 5 Write a short notes on
- a) Stack Organization.
 - b) Instruction cycle.
 - c) I/O vs memory bus.
 - d) Priority interrupts.
 - e) Associative memory.
 - f) Memory protection.
 - g) Write short notes on 8085 pin configuration.
 - h) Intel 8085 instructions of Arithmetic and logic group.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II BTech (CSE) II Semester
BTCSE402 DESIGN AND ANALYSIS OF ALGORITHMS
MODEL QUESTION PAPER

Time: 3hrs.

Max.Marks: 75

SECTION-A (4 x 15=60)

Answer ALL Questions

1. a) Write an algorithm for Matrix multiplication and find the Time complexity of it. [8M]
b) Differentiate between Big oh, Omega and Theta Notation [7M]
Or
c) What are the features of an efficient algorithm. Explain with an example. [8M]
d) Find the time complexity of an algorithm which finds the factorial of a number using recursion. [7M]
2. a) What is meant by Divide and Conquer approach. Write the General method of Divide – And – Conquer approach. [7M]
b) Write Divide – And – Conquer recursive Merge sort algorithm and derive the time complexity of this algorithm. [8M]
Or
c) Write with an example of Prim’s algorithm and Kruskal Algorithm. [10M]
d) Derive the Best, Worst and Average time complexities of Quick sort technique. [5M]
3. a) Solve the following instance of 0/1 Knapsack problem using Dynamic programming $n = 3$; $(W_1, W_2, W_3) = (3, 5, 7)$; $(P_1, P_2, P_3) = (3, 7, 12)$; $M = 4$. [8M]
b) Discuss the 4 – queen’s problem. Draw the portion of the state space tree for $n = 4$ queens using backtracking algorithm. [7M]
Or
c) What is a Hamiltonian Cycle? Explain how to find Hamiltonian path and cycle using backtracking algorithm. [7M]
d) Discuss Sum of subset problem and Travelling Sales Person Problem [8M]
4. a) Explain FIFO Branch and Bound solution [7M]
b) Explain how the traveling salesperson problem is solved by using LC Branch and Bound. [8M]
Or
c) What are the differences between backtracking and branch and bound solutions? [8M]
d) Explain the LC branch and bound algorithm [7M]

SECTION-B (5 x 3=15M)

Answer any FIVE Questions

5. a) What is Amortized analysis? Explain.
b) Describe the Algorithm Analysis of Binary Search.
c) Describe Single source shortest paths
d) State the Job – Sequencing Deadline Problem.
e) Define i) Principles of optimality ii) Feasible solution iii) Optimal solution.
f) Explain about Reliability Design.
g) Write about NP-Hard and NP-Complete Problems.
h) Distinguish between fixed – tuple sized and variable tuple sized state space tree organization.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II BTech (CSE) II Semester
BTCSE403 DATABASE MANAGEMENT SYSTEMS
MODEL QUESTION PAPER

Time: 3hrs.

Max.Marks: 75

SECTION – A (4x15=60 Marks)

Answer ALL Questions

1. a) Write a brief note on advantages and applications of DBMS [8M]
b) Briefly explain about Three-Schema Architecture with neat diagram [7M]
- Or**
- c.) Briefly discuss about Database System Environment with neat diagram [15M]
2. a) Explain in detail about various key constraints used in database system with examples [10M]
b) Explain about Relational Algebra Set Operations with examples [5M]
- Or**
- c) Explain in detail about Tuple and Domain Relational Calculus with examples [15M]
3. a) What is Normalization? Briefly explain the types of normal forms with an example [15M]
- Or**
- b) Explain how a dynamic multi level indexes can be created using B Trees and B+ Trees with example. [15M]
4. a) What is Serializability? Briefly explain the different types of Serializability [15M]
- Or**
- b) Briefly explain the following Concurrency Control Techniques
- i) Two Phase Locking Protocol [8M]
ii) Validation Concurrency Control [7M]

SECTION – B (5x3=15 Marks)

Answer any FIVE Questions

5. a) Define DBMS, Schema, Instance. What is weak entity? Explain with example
b) What is Data Independence? Specify the classification
c) Give a brief note on Insert, Delete, and Update Queries in SQL with examples
d) What is View in SQL? Create a view and perform DML operations on it
e) What is Functional Dependency? Classify.
f) Give a brief note on Buffering Blocks
g) What is Transaction? Discuss Characteristics of Transaction
h) Give a brief note on Shadow Paging technique.

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II BTech (CSE) II Semester
BTCSE404 FORMAL LANGUAGES AND AUTOMATA THEORY
MODEL QUESTION PAPER

Time: 3hrs.

Max.Marks: 75

SECTION – A (4x15=60 Marks)

Answer ALL Questions

1. a) Define DFA and NFA with examples. Differentiate them? [7M]
b) Design a DFA which accepts Odd number of 0's and 1's? [8M]
- Or**
- c) State and prove equivalence of NFA and DFA? [15M]
2. a) Closure Properties of Regular Sets? [10M]
b) Decision Algorithm for Regular Sets? [5M]
- Or**
- c) State and prove pumping lemma for Regular Sets? Give one example? [15M]
3. a) Design a PDA for the language $L=\{WCW^R/ W \text{ in } (a,b)^*\}$? [15M]
- Or**
- b) Design a PDA for the language $L=\{WW^R/ W \text{ in } (a,b)^*\}$? [15M]
4. a) Explain Universal Turing machines? [15M]
- Or**
- b) Discuss the Halting Problem of TM? [15M]

SECTION – B (5x3=15 Marks)

Answer any FIVE Questions

5. Write a short note on
- a) Function and relation
 - b) Sets
 - c) Regular expressions
 - d) Context free languages
 - e) Pushdown automata
 - f) Chomsky hierarchy
 - g) Turing machines
 - h) Undecidability of PCP

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II BTech (CSE) II Semester
BTCSE405 SOFTWARE ENGINEERING
MODEL QUESTION PAPER

Time: 3hrs.

Max.Marks: 75

SECTION – A (4x15=60 Marks)

Answer ALL Questions

1. a) Explain software development process models with a suitable example project for each model. **[15M]**

Or

b) Explain project management activities. **[15M]**

2. a) Briefly explain the requirements process. Consider a web application for conducting mid examinations. List major use cases for this system along with goals, preconditions and exception scenarios. **[15M]**

Or

b) What are the different architectural styles? Consider an online shopping website which provides many different features to perform various tasks. Suggest a suitable architectural style for this. **[15M]**

3. a) Explain structured design methodology with an example. **[15M]**

Or

b) Explain programming principles and guidelines **[15M]**

4. a) Describe how the measure cyclomatic complexity is derived and its usage during testing with an example. **[15M]**

Or

b) Explain any 2 black box test case design methods. **[8M]**

c) Explain any 2 white box test case design methods. **[7M]**

SECTION – B (5x3=15 Marks)

Answer any FIVE Questions

5.

a) Define software engineering.

b) Write a short notes on the problem of scale.

c) Defect injection and removal cycle.

d) Top Down vs Bottom Up effort estimation approach.

e) Consider a program containing many modules. If a global variable x must be used to share data between two modules A and B, how would you design the interfaces of these modules to minimise coupling.

f) Pair programming

g) Define error, fault and failure

h) Give relevant test cases for a login form.

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
BTCSE406 II BTech (CSE) II SEMESTER
DISCRETE MATHEMATICAL STRUCTURES
MODEL QUESTION PAPER

Max Time: 3 Hours

Max Marks: 75

SECTION-A (4× 15 = 60 M)

Answer ALL questions

1 a) i) Prove that $\{[p \rightarrow (q \vee r)] \wedge (\sim q)\} \rightarrow (p \rightarrow r)$ is a tautology. **[8M]**

ii) Prove the validity of the following argument

Lions are dangerous animals

There are lions

Therefore, there are dangerous animals.

[7M]

Or

b) i) Prove that $6^{n+2} + 7^{2n+1}$ is divisible by 43 for each positive integer n by using Mathematical induction. **[8M]**

ii) Prove the following example by contradiction.

The 10 integers 1,2,3,...,10 are randomly positioned around a circular wheel. Show that the sum of some set of 3 consecutively positioned numbers is at least 17. **[7M]**

2 a) i) How many ways can we get a sum of 4 or of 8 when two distinguishable dice are rolled?

How many ways can we get an even sum? **[8M]**

ii) How many integral solutions are there to $x_1 + x_2 + x_3 + x_4 + x_5 = 20$

where each $x_i \geq 2$? **[7M]**

Or

b. i) How many three-digit numbers are there which are even and have no repeated digits? **[8M]**

ii) Find the coefficient of X^{20} in $(X^3 + X^4 + X^5 + \dots)^5$. **[7M]**

3 a) i) Solve the recurrence relation

$a_n - 7a_{n-1} + 10a_{n-2} = 0$ for $n \geq 2$. **[8M]**

ii) Show that $n! \in O(n^n)$ and $n \log_2 n \in O(\log_2 n!)$. **[7M]**

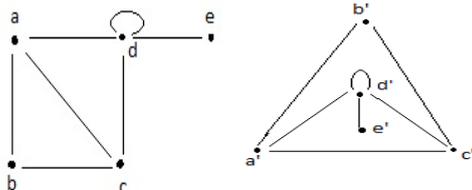
Or

b) i) Find a solution to $a_n - a_{n-1} = 3(n-1)$ where $n \geq 1$ and where $a_0 = 2$. **[8M]**

ii) Draw a poset diagram and determine all maximal and minimal elements for

$[D_{12}; |]$ and $[D_{20}; |]$. **[7M]**

4 a) i) Show that the following graphs are isomorphic. **[8M]**

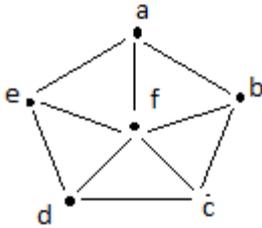


ii) Prove that a complete binary tree with n vertices the indices of the vertices in the ℓ th level comprise the complete interval 2^ℓ through $2^{\ell+1} - 1$. **[7M]**

Or

b. i) Explain kruskal's Algorithm for finding a Minimal Spanning tree. **[8M]**

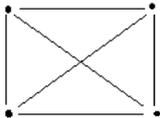
ii) Find the Chromatic number of the "wheel" graph shown in below. **[7M]**



SECTION-B (5×3=15M)
Answer any FIVE Questions

5

- a) If the product of two integers a and b is even then show that either a is even or b is even.
- b) Write the negation of the sentence“ There is no integer x such that x is prime and x+6 is prime”.
- c) How many ways can the letters of the English alphabet be arranged so that there are exactly 5 letters between the letters a and b.
- d) How many ways can a hand of 5 cards be selected from a deck of 52 cards.
- e) Solve $a_n - 6a_{n-1} + 12a_{n-2} - 8a_{n-3} = 0$ by generating functions.
- f) Draw the digraph for the relation R and compliment of a relation where $R = \{(a,b), (b,c), (b,d), (d,a), (c,c)\}$.
- g) Find the Hamiltonian cycle in the following graph.



- h) Prove that there does not exist a polyhedral graph with exactly seven edges.