

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019**Subject: Design and Analysis of Algorithms

Branch: CSE

Time: 3 hours

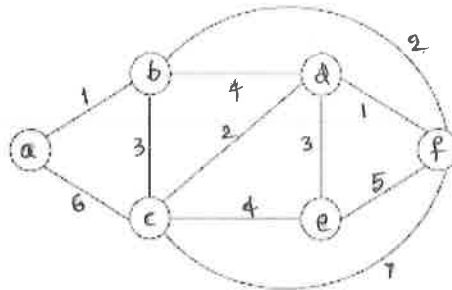
Max. Marks: 60

PART – AAnswer **ALL** questions of the following**5x2Marks=10 Marks**

1. Differentiate between priori & posterior analysis.
2. Define binary search worst case and best case analysis.
3. State the principle of optimality.
4. Define chromatic number of a graph.
5. Define non polynomial algorithms.

PART-BAnswer **ALL** questions of the following**5x10 Marks= 50Marks**

1. a) Write General Plan for Analyzing Time Efficiency of Recursive algorithms.
b) Solve the following recurrence relation. $x(n) = x(n/2) + n$ for $n > 1$, $x(1) = 1$ (solve for $n = 2^k$)
- OR
2. a) Explain weighting and collapsing rules through algorithms.
b) How to determine Bi-connected components? Explain with an algorithm.
3. a) Search the element 20 in the given data set using binary search. 7,9,20,54,82,101,112.
b) Find the minimum cost spanning tree for the following graph using kruskals algorithm.



OR

4. a) Interpret the concept of Quick Sort with an example
b) Discuss merge sort algorithm using divide and conquer method
5. a) Explain optimal binary search tree.
b) List the differences between BST and OBST
- OR
6. a) Explain Matrix chain multiplication with an example.
b) Find an optimal solution for the following knapsack instance using dynamic programming : $n=6$, $m=165$, profits and weights are $P = W = (100, 50, 20, 10, 7, 3)$.
7. a) Explain with the example how to find a Hamiltonian cycle.
b) Explain how branch and bound technique is used to solve knapsack problem.
- OR
8. a) Illustrate and generate a state space tree for m-coloring using suitable graph when $n=3$ and $m=3$.
b) Explain how the traveling sales person problem is solved using LC Branch and Bound
9. a) Write the differences between NP complete and NP hard problems.
b) Explain directed Hamiltonian cycle with example.
- OR
10. a) Differentiate between class P and class NP problem.
b) Distinguish between preemptive and non preemptive scheduling.

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019Subject: Object Oriented Programming through Java

Branch: CSE

Time: 3 hours

Max. Marks: 60

PART – AAnswer **ALL** questions of the following**5x2Marks=10 Marks**

1. Why java is Architectural Neutral?
2. What is String Buffer? Write its significance in java programming.
3. What is the necessity of using sub packages?
4. What is an event? List various event listeners.
5. What is JApplet?

PART-BAnswer **ALL** questions of the following**5x10 Marks= 50Marks**

1. a) Explain about Polymorphism with suitable example?
b) Describe the java buzzwords?

OR

2. a) Write a program to print fibonacci series using java. [6M]
b) Write short notes on Scope and life time of a variable in Java [4M]
3. a) What are the uses of *this* keyword? Give an example.
b) Define abstract class and abstract method with an example for each?

OR

4. Explain in detail about the access modifiers in java with suitable examples.
5. a) How to create user defined exception in java? [6M]
b) What is the purpose of finally block in java? [4M]

OR

6. a) Write a java program to create a bank application using interface. [6M]
b) Differentiate checked and unchecked exceptions in Java. [4M]
7. Explain in detail about event delegation model with suitable example program

OR

8. a) Define AWT. Explain about AWT class hierarchy.
b) What is use of Thread Group class in java?
9. a) Differentiate an Applet and an application in java. [4M]
b) Write a java program to set background and foreground colors using Frame class. [6M]

OR

10. Write a java program to design a calculator using swings to perform basic arithmetic operations.

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019Subject: Digital Logic Design

Branch: CSE

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Marks=10 Marks

1. What is meant by parity bit?
2. Prove that $x+x=x$
3. Minimize the Boolean Expression $xy'+y'z'+xy$
4. Define the terms in connection with a FF. a. Flip-flop b. Race around condition
5. Write about D Latch.

PART-B

Answer ALL questions of the following

5x10 Marks= 50Marks

1. a) Convert the following numbers
i) $(41.6875)_{10}$ to Hexadecimal number ii) $(11001101.0101)_2$ to base-8 and base-4
b) Subtract $(111001)_2$ from $(101011)_2$ using 1's complement?

OR

2. Perform the subtraction for following using 10's complement
i) $(52532)_{10} - (32500)_{10}$ ii) $(32945)_{10} - (56784)_{10}$
3. a) Obtain the dual of the following Boolean Expressions
i) $AB'C+AB'D+AB'$ ii) $A'B'C'+ABC'+A'B'C'D$
b) Obtain the truth table for the function $F = xy+xy'+y'z$ and design the circuit

OR

4. Obtain the simplified expression in SOP for the following Boolean functions using K-map
a) $f(w,x,y,z) = \sum (1,3,7,11,15) + \sum d(0,2,5)$ b) $f(A,B,C,D) = ABD + \overline{ACD} + \overline{AB} + \overline{ACD} + \overline{ABD}$
5. Implement the following minterms with PLA circuit diagram?
 $F_1(A,B,C) = \sum (3,5,6,7)$ $F_2(A,B,C) = \sum (0,2,4,7)$

OR

6. Implement the Boolean function using 8:1 multiplexer $F(A,B,C,D) = A'BD' + ACD + B'CD + A'C'D$
7. Derive the characteristic equation for J K Flip flop and explain the toggling Condition in Flip Flop?
8. Describe the analysis procedure of clocked sequential circuit.
9. Explain flow table and Race condition in Asynchronous sequential logic

OR

10. Explain non-critical race conditions with an example

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1. Solve $pq + qx = y$
2. State Stoke's theorem.
3. If $\phi(x, y, z) = 3x^2y - y^2z^2$, find $\nabla\phi$ at the point $(1, -2, -1)$.

4. Evaluate $\int_0^{\frac{\pi}{2}} \int_{\frac{\pi}{2}}^{\pi} \cos(x+y) dx dy$

5. Verify Cauchy's mean value theorem for $f(x) = \sin x$ and $g(x) = \cos x$ on $\left[0, \frac{\pi}{2}\right]$.

PART-BAnswer **ALL** questions of the following**5x10 Marks= 50Marks**

1. a) Using mean value theorem, for $0 < a < b$ prove that $1 - \frac{a}{b} < \log\left(\frac{b}{a}\right) < \frac{b}{a} - 1$ and hence Deduce

that $\frac{1}{6} < \log\left(\frac{6}{5}\right) < \frac{1}{5}$

- b) Expand $e^{x \sin x}$ in powers of x

OR

2. a) If $a < b$, prove that $\frac{b-a}{1+b^2} < \tan^{-1} b - \tan^{-1} a < \frac{b-a}{1+a^2}$ using Lagrange's mean value theorem and

hence deduce $\frac{5\pi+4}{20} < \tan^{-1} 2 < \frac{\pi+2}{4}$.

- b) Verify if $u = \frac{x-y}{x+y}$, $v = \frac{xy}{(x+y)^2}$ are functionally dependent and if so, find the relation between them.

3. a) Evaluate $\int_0^{\log 2} \int_0^x \int_0^{x+\log y} e^{x+y+z} dz dy dx$.

- b) Using cylindrical co-ordinates find the volume of the cylinder with base radius a and height h.

OR

4. Evaluate $\int_0^1 \int_x^{\sqrt{x}} (x^2 + y^2) dx dy$

5. a) If \vec{a} is a differentiable function and ϕ is a differentiable scalar function then prove that

$$\text{div}(\phi \vec{a}) = (\text{grad} \phi) \cdot \vec{a} + \phi \text{div} \vec{a}$$

- b) Calculate the angle between the normal's to the surface $xy = z^2$ at the points $(4, 1, 2)$ and $(3, 3, -3)$

OR

6. a) Prove that $\text{div}(r^n \vec{r}) = (n+3)r^n$, $\vec{r} = xi + yj + zk$ [6M]

- b) Find $\text{curl}(\vec{f})$, where $\vec{f} = \text{grad}(x^3 + y^3 + z^3 - 3xyz)$ [4M]

7. a) Find the work done in moving a particle in the force field $\vec{f} = 3x^2 \vec{i} + (2xz - y) \vec{j} + z \vec{k}$ along the straight line from $(0, 0, 0)$ to $(2, 1, 3)$

- b) If $\vec{f} = (2x^2 - 3z) \vec{i} - 2xy \vec{j} - 4x \vec{k}$ then evaluate $\int_V \nabla \cdot \vec{f} dv$ where V is the closed region

bounded by $x = 0, y = 0, z = 0, 2x + 2y + z = 4$

OR

8. Verify stoke's theorem for $\vec{f} = (x^2 + y^2) \vec{i} - 2xy \vec{j}$ taken round the rectangle bounded by the lines $x = \pm a, y = 0, y = b$

9. a) Form a partial differential equation by eliminating the arbitrary constants a, b, c from

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$$

- b) Solve $x^2(z - y)p + y^2(x - z)q = z^2(y - x)$

OR

10. a) Form the partial differential equation by eliminating arbitrary function f from

$$f(x^2 + y^2, x^2 - z^2) = 0$$

- b) Solve the P.D.E $px + qy = pq$ by Charpit's method.

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II B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS, MAY-2019Subject: Mathematical Foundation for Computer ScienceBranch: **Common to CSE & IT****Time: 3 hours****Max. Marks: 60****PART – A**Answer **ALL** questions of the following**5x2Marks=10 Marks**

1. Define Tautology. Explain with an example.
2. Define Relation with an example.
3. What is Monoid? Give an example
4. Find the coefficient of x^9 in $(2 - x)^{19}$?
5. Find the generating function of the sequence $\{1, 2, 3, \dots\}$.

PART-BAnswer **ALL** questions of the following**5x10 Marks= 50Marks**

1. Find the DNF and CNF of the Formula $1(P \vee Q) \leftrightarrow (P \wedge Q)$

OR

2. a) Show that formula $Q \vee (P \wedge \neg Q) \vee (\neg P \wedge \neg Q)$ is a tautology.
b) Find the formulas in Disjunctive Normal Form equivalent to the following well formed formulas $(\neg R) \rightarrow (((P \vee Q) \rightarrow R) \rightarrow \neg Q)$
3. a) Let $A = \{1, 2, 3, 4\}$ and R be the relation on A defined by $R = \{(1,1), (3,3), (1,3), (2,3), (3,2), (4,2)\}$. Determine the transitive closure of R .
b) Prove that the relation $R = \{(x, y) | x - y \text{ is divisible by } m\}$ over the positive integers is an equivalence relation.

OR

4. a) Prove that the following premises are inconsistent: $P \rightarrow (Q \rightarrow R), S \rightarrow (Q \wedge \neg R), P \wedge S$.
b) Draw the Hasse diagram for the divisibility relation on the set $A = \{2, 3, 6, 12, 24, 36\}$.
5. a) Show that the mapping $f: \mathbb{N} \rightarrow \mathbb{N}$ defined by $f(n) = n^2 + n + 1$ is one-one but not onto.
b) Explain about semigroup homomorphism and isomorphism

OR

6. a) Let $A = \{1, 2, 3, 4\}$ and a mapping $f: A \rightarrow A$ be given by $f = \{(1,2), (2,3), (3,4), (4,1)\}$. Find the composite functions f^2, f^3 and f^4 .
b) Explain the words (i) lattice (ii) distributive lattice (iii) Boolean algebras with examples.
7. a) Prove that $C(n+1, r) = C(n, r-1) + C(n, r)$.
b) From a group of 10 Professors how many ways can a committee of 5 members be formed so that at least one of Professor A and Professor B will be included?

OR

8. a) Find the number of integer solutions of $x_1 + x_2 + x_3 + x_4 + x_5 = 30$ where $x_1 \geq 2, x_2 \geq 3, x_3 \geq 4, x_4 \geq 2, x_5 \geq 0$.
b) Find the number of ways of giving 15 identical gift boxes to 6 persons A, B, C, D, E, F in such a way that the total number of boxes given to A and B does not exceed 6
9. a) Solve $a_n - 7a_{n-1} + 10a_{n-2} = 0, n \geq 2$, given $a_0 = 10, a_1 = 41$ using generating functions.
b) Solve the Recurrence Relation $a_{n+2} - a_{n+1} - 12a_n = 10, a_1 = \frac{1}{3}, a_0 = 0$.

OR

10. a) Solve $a_n + 5a_{n-1} + 5a_{n-2} = 0$, given that $a_0 = 0, a_1 = 2\sqrt{5}$.
b) Solve $a_n - 3a_{n-1} - 4a_{n-2} = 3^n$, given that $a_0 = 1, a_1 = 2$.

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Branch: Common to CSE & IT

Max. Marks: 60

5x2Marks=10Marks

- 5x10 Marks=50Marks**

10. a) Explain the vector processing with suitable examples?
b) Write short notes on SIMD array processor with their diagrams?

