AR20

CODE: 20IET21A **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

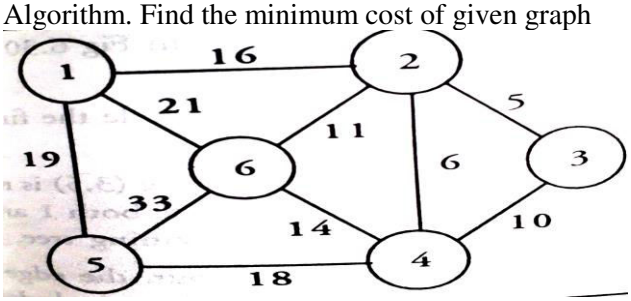
II B.Tech. II Semester Supplementary Examinations, August, 2023

Fundamental of Data Structures

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.		Define a Data Structure. Explain the types of Data Structures and its operations.	10M	CO1	K2
		(OR)			
2.	a)	Define an Algorithm. Explain the Characteristics of Algorithm.	6M	CO1	K2
	b)	Write an Algorithm for finding largest number for given three numbers.	4M	CO1	K2
		UNIT-II			
3.	a)	Write an Algorithm for Binary Search and write best case time complexity.	5M	CO2	K2
	b)	Using the Binary search Algorithm to find the searching elements are 727 and 275 in the given list **{75,151,203,275,318,489,524,591,647,727}**	5M	CO2	K3
		(OR)			
4.		Write an Algorithm for Quick sort with suitable example.	10M	CO2	K2
		UNIT-III			
5.	a)	Define a Stack. Write an algorithm for Stack operations.	6M	CO3	K2
	b)	To consider the infix expression **A+B*C-D**, convert from infix expression to postfix expression.	4M	CO3	K3
		(OR)			
6.		Write an Algorithm for conversion of infix to postfix expression with example.	10M	CO3	K2
		UNIT-IV			
7.	a)	Comparison between Arrays and Linked list	5M	CO4	K2
	b)	Write an Algorithm to insert a node to the beginning of a singly linked list?	5M	CO4	K3
		(OR)			
8.	a)	Define a Doubly linked list. Explain the operations of Doubly linked list.	5M	CO4	K2
	b)	Write an Algorithm insert a node to the beginning of a doubly linked list	5M	CO4	K3
		UNIT-V			
9.		Write an Algorithms for Binary Tree Traversals In-order ,Pre-order and Post order with example.	10M	CO5	K3
		(OR)			
10.		Define a Binary search tree. To construct a Binary Search Tree for a list {N,J,B,L,K,M,R,P}and insert an element Q and delete an element L in binary search tree.	10M	CO5	K3
		UNIT-VI			
11.	a)	Define of a Graph, Adjacency Matrix and Adjacency List	5M	CO6	K2
	b)	Write an Algorithm for Breadth First Search(BSF) with example.	5M	CO6	K2
		(OR)			
12.		Explain the procedure for minimum cost spanning tree using Prime's Algorithm. Find the minimum cost of given graph	10M	CO6	K2



AR20

CODE: 20IET21B **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, August, 2023

Advanced Coding-I

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a	Discuss reference variables and pointers in C++.	5	1	L6
	b	Build a C++ code for the following problem.	5	1	L3
		K-diff Pairs in an Array Given an array of integers nums and an integer k, return the number of unique k-diff pairs in the array. **Example**: Input: nums = [3,1,4,1,5], k = 2 Output: 2			
		(OR)			
2.	a	Demonstrate user defined functions in C++.	5	1	L2
	b	Build a C++ code for the following problem.	5	1	L3
		2-sum problem: Given an array of integers nums and an integer target, return indices of the two numbers such that they add up to target. You may assume that each input would have exactly one solution, and you may not use the same element twice. You can return the answer in any order. **Example:** Input: nums = [2,7,11,15], target = 9 Output: [0,1] Because nums[0] + nums[1] == 9, we return [0, 1].			
		UNIT-II			
3.		Demonstrate polymorphism in C++ with suitable examples.	10	2	L2
		(OR)			
4.		Discuss exception handling in C++.	10	2	L6
		UNIT-III			
5.	a	How can we measure the efficiency of an algorithm. Explain.	5	3	L1
	b	Find the time complexity for the recursive function given below.	5	3	L3

```
void test(int n)
{
    if(n>1){
        test(n-1);
        for(i=0; i<n; i++)
          cout << i;
        test(n-1);
     }
}
```

(OR)

6.	a	Explain Characteristics of an algorithm.	5	3	L1
	b	Find the time complexity for the recursive function given below.	5	3	L3

```
void test(int n)
{
    if(n>1){
        test(n/2);
        for(i=0; i<n; i=i+1)
          cout << i;

    }
}
```

UNIT-IV

7.		Discuss about Vectors STL container in C++ and their functions with examples. Also explain the difference between vector and array in C++.	10	4	L1

(OR)

8.		Discuss about Maps STL container, types of maps and their functions with example.	10	4	L1

UNIT-V

9.		Explain about Backtracking. Write a C++ solution Path with Maximum Gold problem. **Statement**: In a gold mine grid of size m x n, each cell in this mine has an integer representing the amount of gold in that cell, 0 if it is empty. Return the maximum amount of gold you can collect under the conditions: - Every time you are located in a cell you will collect all the gold in that cell. - From your position, you can walk one step to the left, right, up, or down. - You can't visit the same cell more than once. - Never visit a cell with 0 gold. - You can start and stop collecting gold from any position in the grid that has some gold. **Input**: grid = [[0,6,0],[5,8,7],[0,9,0]] **Output**: 24	10	5	L2,L3

(OR)

10.		Discuss Recursion. Write a C++ solution to generate all permutations of characters in a given string.	10	5	L2,L3

UNIT-VI

11.	a	Demonstrate the approach of Sieve of Eratosthenes.	5	6	L2
	b	Build a C++ solution for Rabbits in Forest. **Statement:** There is a forest with an unknown number of rabbits. We asked n rabbits "How many rabbits have the same color as you?" and collected the answers in an integer array answers where answers[i] is the answer of the ith rabbit. Given the array answers, return the minimum number of rabbits that could be in the forest. **Input**: answers = [1,1,2] **Output**: 5	5	6	L3

(OR)

12.	a	Demonstrate Extended Euclidean algorithm	5	6	L2
	b	Write a C++ solution for Ugly number. **Statement:** An ugly number is a positive integer whose prime factors are limited to 2, 3, and 5. Given an integer n, return true if n is an ugly number. **Input**: n = 6 **Output**: true **Explanation**: 6 = 2 × 3	5	6	L3

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CODE: 20IET21C **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech.II Semester Supplementary Examinations, August,2023

Competitive Programming – I

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
	UNIT-I			
1.	What is vector? Explain vectors and arrays.	10	1	L1
	(OR)			
2.	Explain Dynamic memory allocation and Pointers with example program.	10	1	L2
	UNIT-II			
3.	Define polymorphism with example programs.	10	2	L1
	(OR)			
4.	Write programs for Single, Multiple, Multilevel inheritances.	10	2	L2
	UNIT-III			
5.	Find time complexity for Matrix Multiplication. Explain in detail.	10	3	L3
	(OR)			
6.	Describe asymptotic notations in detail with example.	10	3	L2
	UNIT-IV			
7.	Define queue? Explain all operations for queue with example program.	10	4	L3
	(OR)			
8.	Write a program for double ended queue?	10	4	L2
	UNIT-V			
9.	What are the types of commands in SQL. Explain with queries.	10	5	L1
	(OR)			
10.	Explain different types of functions in SQL with queries	10	5	L3
	UNIT-VI			
11.	What are 9i joins? Explain with queries.	10	6	L1
	(OR)			
12.	Explain about Normal Forms.	10	6	L3

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CODE: 20IET211 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech. II Semester Supplementary Examinations, August, 2023

TRANSFORM THEORY

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	(a)	Evaluate $L[e^{2t} + 4t^3 - 2sin3t + 3cos3t]$	5M	CO1	K2
	(b)	Evaluate $L[e^{3t}sin2t]$	5M	CO1	K2
		(OR)			
2.	(a)	Evaluate $L[tsin3tcos2t]$	5M	CO1	K2 K2
	(b)	Evaluate $L\left[\frac{sin3tcost}{t}\right]$	5M	CO1	
		UNIT-II			
3.	(a)	Evaluate $L^{-1}\left[\frac{s^2}{(s+1)(s+2)(s+3)}\right]$	5M	CO2	K2 K2
	(b)	Evaluate $L^{-1}\left[\frac{s^2}{(s^2+4)(s^2+9)}\right]$	5M	CO2	
		(OR)			
4.		Using Laplace transform method, solve the following differential equation $y'' + 7y' + 10y = 4e^{-3t}$ given $y(0) = 0$ & $y'(0) = -1$.	10M	CO2	K3
		UNIT-III			
5.		Using Fourier Integral, Show that $\int_0^\infty \left(\frac{1-cos(\lambda\pi)}{\lambda}\right) sin\lambda x\, d\lambda = \begin{cases} \frac{\pi}{2}, if\ \ 0 < x \leq \pi \\ 0, if\ \ x > \pi \end{cases}$	10M	CO3	K3
		(OR)			
6.		Find the Fourier transform of $f(x) = \begin{cases} 1 - x^2, if\ \ -1 < x < 1 \\ 0, if\ \ x > 1\ or\ x < -1 \end{cases}$ and hence evaluate $\int_0^\infty \frac{xcosx - sinx}{x} dx$	10M	CO3	K3
		UNIT-IV			
7.		Find the Fourier sine and cosine transforms of $e^{-ax}, a > 0$ and hence deduce the integrals $\int_0^\infty \frac{cos(px)}{(p^2+a^2)} dp$ and $\int_0^\infty \frac{psin(px)}{(p^2+a^2)} dp$	10M	CO4	K3
		(OR)			
8.		Find the inverse Fourier cosine transform of $\frac{sinap}{p}$	10M	CO4	K2
		UNIT-V			
9.	(a)	Evaluate $Z[(n+1)^2]$	5M	CO5	K2
	(b)	Evaluate $Z[e^{-an}sinn\theta]$	5M	CO5	K2
		(OR)			
10.		Evaluate $Z[(cos\theta + isin\theta)^n]$ and hence deduce the values of $Z[cosn\theta]$ and $Z[sinn\theta]$	10M	CO5	K2
		UNIT-VI			
11.	(a)	Evaluate $Z^{-1}\left[\frac{z^2}{(z-3)(z-4)}\right]$ by using Convolution theorem.	5M	CO6	K3
	(b)	Evaluate $Z^{-1}\left[\frac{z}{(z+3)(z+8)}\right]$	5M	CO6	K2
		(OR)			
12.		Solve the difference equation $y_{n+2} - 3y_{n+1} + 2y_n = 0$, given that $y_0 = 0$ & $y_1 = 1$ by using Z-transforms.	10M	CO6	K3

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CODE: 20IET212 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech.II Semester Supplementary Examinations, August, 2023

NUMERICAL METHODS

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
	UNIT-I			
1.	Find the positive root of $x^3 - x - 4 = 0$ by using Regulai-Falsi method	10	1	K2
	(OR)			
2.	Find the positive root of f(x)= $x\log_{10}x = 1.2$, using Bisection method.	10	1	K2
	UNIT-II			
3.	Construct the difference table for the following data and hence evaluate y(5.8) using Newton's Back ward Interpolation Formula	10	2	K3

X	0	1	2	3	4	5	6
y(x)	0	1	16	81	256	625	1296

(OR)

4.	Using Lagrange's formula ,calculate y(10) from the following table	10	2	K3

x	5	6	9	11
y(x)	12	13	14	16

UNIT-III

5.	Find the first & second derivatives of the function tabulated below at the point x=1 , by using Newton's forward Interpolation Formula	10	3	K2

X	1	1.2	1.4	1.6	1.8	2
y(x)	0	0.128	0.544	1.296	2.432	4

(OR)

6.	Using Lagrange's formula , Compute first & second derivatives at x=9 from the following table	10	3	K3

x	1	2	4	8	10
y(x)	0	1	5	21	27

UNIT-IV

7.	By using Trapezoidal rule , Simpson's 1/3 rule and Simpson's 3/8 rule , to evaluate the integral $\int_0^4 e^x dx$	10	4	K3
	(OR)			
8.	Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ using Trapezoidal rule & Simpson's 1/3 rule .	10	4	K3
	UNIT-V			
9.	Obtain the values of y at x=1.1 , 1.2 & 1.3 using Runge-Kutta method of Fourth order, for the differential equation $\frac{dy}{dx} = x - y$, $y(1)$=0.4& h= 0.1	10	5	K3
	(OR)			
10.	Using Taylor's series method, evaluate y(0.2),y(0.4) &y(0.6) for the differential equation $\frac{dy}{dx} = x - y^2$, y(0)=1 & h=0.2	10	5	K3
	UNIT-VI			
11.	Fit a second degree polynomial $y = a+bx + cx^2$ to the following data by the method of least squares.	10	6	K3

X	1	2	3	4	5	6	7
Y	23	5.2	9.7	16.5	29.4	35.5	54.4

(OR)

12.	By the method of least squares , fit an exponential curve of the form y = a e^{bx}	10	6	K3

X	2	4	6	8	10
Y	4.077	11.084	30.128	81.897	222.62

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CODE: 20IET213 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, August, 2023

INTRODUCTION TO NUMBER THEORY

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
	UNIT-I			
1.	Determine g.c.d of 275 and 200, and express it in the form of m.275+n.200.	10	CO1	L3
	(OR)			
2.	Prove that $3^{2n+2} - 8n - 9$ is divisible by 64	10	CO1	L3
	UNIT-II			
3.	Show that $10^n + 3.4^{n+2} + 5 \equiv 0\ (Mod\ 9)$	10	CO2	L3
	(OR)			
4.	Solve the congruence $17x \equiv 9\ \ (Mod\ 276)$	10	CO2	L3
	UNIT-III			
5.	Show that 4(29!)+5! ≡ 0(mod 31). Find 4^{532}(mod 11) by Fermat theorem.	10	CO3	L3
	(OR)			
6.	Solve $x \equiv 2(mod3), x \equiv 4(mod5), x \equiv 5(mod7)$, using Chinese remainder theorem	10	CO3	L3
	UNIT-IV			
7.	Determine the number of divisors and sum divisors of 1800	10	CO4	L3
	(OR)			
8.	Determine $\emptyset(96), \emptyset(720)\ ,\ \emptyset(1200), \emptyset(3600)$ Determine $\mu(11), \mu(15)\ ,\ \mu(17), \mu(20)$	10	CO4	L3
	UNIT-V			
9.	Find NRP &N$\bar{R}$P when p=7,17,19	10	CO5	L3
	(OR)			
10.	Determine whether 85 is quadratic residue of 223 or not	10	CO5	L3
	UNIT-VI			
11.	Using Caesar cipher method , To decrypt the message " wklvlvkrzzhghflskhu " by using transformation $p \equiv c - 3(mod26)od26)$	10	CO6	L3
	(OR)			
12.	To encrypt the plaintext message "MILLENNIUM" using the key "YTWOK''	10	CO6	L3

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AR18

CODE: 18CET208 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech II Semester Supplementary Examinations, August, 2023

Mechanics of Solids-II

(CIVIL ENGINEERING)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

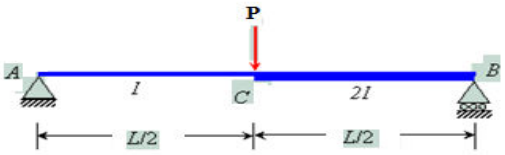
1. a) Describe various steps involved in finding the deflection in a cantilever or simply supported beam using differential equation approach? 4 M

   b) A cantilever beam AB supports UDL 'w' and a concentrated load P as shown in figure. Knowing that L = 2 m, w = 4 kN/m, P = 6 kN and EI = 5 MN.m^2, determine the deflection at A. 8 M

(OR)

2. a) Differentiate between moment area and differential equation approach. 4 M

   b) Determine the end slopes using moment area method for the beam shown below. Also find the central deflection. 8 M



UNIT-II

3. a) What are the assumptions in the Lame's theory? Mention the significance of compound cylinders? 4 M

   b) The internal and external diameters of a thick hollow cylinder are 80 mm and 120 mm respectively. It is subjected to an external pressure of 40 N/mm^2 and an internal pressure of 120 N/mm^2. Calculate the circumferential stress at the external and internal surfaces and determine the radial and circumferential stresses at the mean radius. 8 M

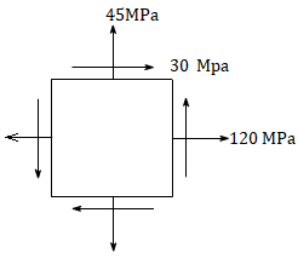
(OR)

4. a) A cylindrical pressure vessel 2.5 m in diameter and 5 m long is made from 15 mm thick steel plate having a Young's modulus of 207 GN/m^2 and a Poisson's ratio of 0.28. If strain gauges are fixed to the cylinder, aligned circumferentially and longitudinally, what strains would they record when the cylinder is subjected to an internal pressure of 3.2 Mpa? 4 M

   b) A compound cylinder is made by shrinking a jacket on to a cylinder. For the compound cylinder, the outer and inner radii are 100 mm and 60 mm, and the radius at the junction is 80 mm. Before the fluid pressure of 40 N/mm^2 is applied, the radial pressure at the junction is 10 N/mm^2. Determine the final stresses in the cylinder. Also calculate the difference in the diameters of tubes before the jacket is shrunk onto the cylinder. Take E = 200 GPa. 8 M

UNIT-III

5. a) An element in plane stress is subjected to stresses as shown in fig. Determine i) The magnitude of the principal stresses and the orientation of principal planes
ii) Find the magnitude of maximum shear stress. 4 M



b) For the stress system in 5 (a) determine the stresses acting on an element rotated by an angle 45^0 in a counterclockwise direction 8 M

(OR)

6. At a point in an elastic material under strain, there are normal tensile stresses of 50 N/mm^2 and 30 N/mm^2 respectively at right angles to each other with a shearing stress of 25 N/mm^2. Find the principle planes and principle stresses. Also calculate maximum shear stress. Use Mohr's circle (or) graphical approach. 12 M

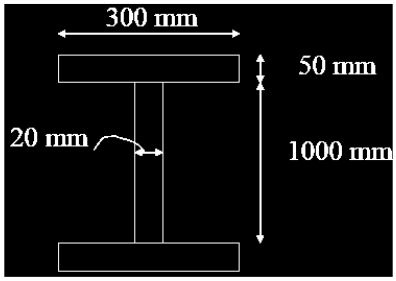
UNIT-IV

7. a) Define the following terms i) Effective length ii) Slenderness ratio iii) Short and long column 4 M

b) Derive Euler's theory for long column when both ends are fixed. Mention the assumptions made in Euler's theory. 8 M

(OR)

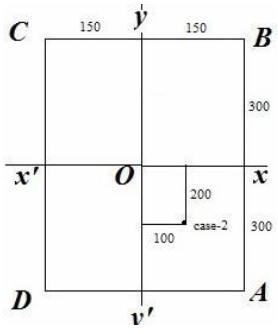
8. A built up beam shown in the figure is simply supported at its ends. Compute its length, given that when it subjected to a load of 40 kN per metre length. It deflects by 1cm. Find the safe load if this beam is used as a column with both ends fixed. Assume a factor of safety of 4. Use Euler's formula. Take E = 210 GN/m^2. 12 M



UNIT-V

9. a) Sketch the profiles of core/ kernel for the following cross sections. i) Rectangular ii) Hollow circular 4 M

b) Calculate the combined stresses at the corners of the rectangular section ABCD (AB = CD = 600 mm, BC = AD = 300 mm), when a load of 100 kN is acting at eccentricity (e_x =100 mm & e_y =200 mm) in XOY' region as shown in figure. 8 M



(OR)

10. a) What is the significance of middle third rule in case of structures exposed lateral and vertical forces? 4 M

b) Estimate the maximum and minimum stresses at the base of a hollow circular chimney of height 20 m with external diameter 4 m and internal diameter 2 m. The chimney is subjected to a horizontal wind pressure of intensity of 1 kN/mm^2. The specific weight of the material of chimney is 22 kN/mm^3. 8 M

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AR18

CODE: 18CST208 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech II Semester Supplementary Examinations, August, 2023

Design & Analysis of Algorithms

(Common to CSE and IT Branches)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Define Omega, Big-Oh, Theta notations. Explain the terms involved in it. Give examples.	6M
	b)	What are the features of an efficient algorithm? Explain with an example.	6M
		(OR)	
2.	a)	Differentiate algorithm and pseudo-code	6M
	b)	What is Amortized analysis? Explain.	6M

UNIT-II

3.	a)	Explain the strassen's matrix multiplication.	6M
	b)	Explain in detail merge sort. Illustrate the algorithm with a numeric example. Provide complete analysis of the same.	6M
		(Or)	
4.	a)	Write a greedy algorithm to the job sequencing with deadlines.	6M
	b)	Write about single source shortest path problem	6M

UNIT-III

5.	a)	Solve the following 0/1 knapsack problems using dynamic programming. Using P=(1,2,4) , w=(2,3,2), m=6 and n=3.	6M
	b)	Explain the methodology of Dynamic programming. List the applications of Dynamic programming	6M
		(OR)	
6.		Use function OBST to compute w(i,j) , r(i,j) and c(i,j), 0<=I<j<= 4, for the identifier set (a1,a2,a3,a4) =(count, float, if, while) with p(1) =1/20, p(2) = 1/5, p(3)=1/10 , p(4) =1/20, q(0) = 1/5, q(1) =1/10, q(2) = 1/5, q(3) =1/20 and q(4) = 1/20. Using the r(i,j)'s, construct the OBST.	12M

UNIT-IV

7.		Write an algorithm for BFS and DFS? Trace with an example?	12M
		(OR)	
8.	a)	Explain the graph coloring problem with an example.	6M
	b)	Write an algorithm to determine the Hamiltonian cycle in a give graph using backtracking.	6M

UNIT-V

9.	a)	Write about branch-and-bound problem solving technique with an example.	6M
	b)	Solve the travelling salesman problem using branch and bound algorithms	6M
		(Or)	
10.	a)	Differentiate NP-hard and NP-complete	6M
	b)	Discuss non-deterministic algorithms	6M

AR18

CODE: 18EET208 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech II Semester Supplementary Examinations, August, 2023

POWER SYSTEMS-I

(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1.	a)	Explain the factors to be considered for the selection of the site for a thermal power station.	6M
	b)	Explain briefly about ash handling mechanism in a thermal plant.	6M

(OR)

2.	a)	Discuss the types of fuels used in thermal power plants?	6M
	b)	Explain in detail about the functioning of feed water and steam flow circuit for a boiler – turbine unit of a thermal power plant with a neat layout connection diagram.	6M

UNIT-II

3.	a)	Brief on Solar Power generation and its significance.	6M
	b)	Explain Point Focussing Collector with neat diagram.	6M

(OR)

4.	a)	List the functions of moderator and control rods in a nuclear power plants.	6M
	b)	Distinguish between thermal and fast reactors. Classify each according to moderator, coolant and fuel utilized.	6M

UNIT-III

5.	a)	Explain different types of distribution systems with the help of neat sketches.	6M
	b)	A 2 wire DC distributor cable PQ 1.5km long have a total resistance of 0.15W. The ends P and Q are fed at 230 V. The cable is uniformly loaded at 1 A/m length and concentrated loads of 100 A, 75 A, 125 A and 30 A at points distant of 300m,500m,800m and 1200m respectively from the end P. Determine the following: i) The point of minimum potential ii) Currents supplied from ends P & Q	6M

(OR)

6.	a)	Compare AC distribution system and DC distribution systems.	6M
	b)	A 2-wire d.c. distributor AB is 300 metres long. It is fed at point A. The various loads and their positions are given below : At point distance from concentrated load A in metres in amperes C 40 30 D 100 40 E 150 100 F 250 50 If the maximum permissible voltage drop is not to exceed 10 V, find the cross-sectional area of the distributor. Take $\rho = 1{\cdot}78 \times 10{-}8$ Ωm.	6M

UNIT-IV

7.	a)	What is a sub-station ? List the factors that should be taken care of while designing and erecting a substation.	6M
	b)	Draw the key diagram of a typical 33/11 kV sub-station	6M

(OR)

8.	a)	Explain in detail about constructional aspects of gas insulated substation.	6M
	b)	Explain the single Bus - bar with Bus sectionalizer scheme with a neat connection diagram.	6M

UNIT-V

9.	a)	Define the terms load factor and diversity factor. Explain how these factors influence the cost of generation?	6M
	b)	A 100 MW power station delivers 100 MW for 2 hours, 50 MW for 6 hours and is shut down for the rest of each day. It is also shut down for maintenance for 45 days each year. Calculate its annual load factor	6M

(OR)

10.	a)	A generating station supplied the following loads: 175MW, 100MW, 80MW, 50MW and 4 MW. The station has a maximum demand of 225MW. The annual load factor of the station is 45%, Calculate (i) the number of units supplied annually (ii) the diversity factor and (iii) the demand factor.	6M
	b)	Elaborate the following types of tariff in electrical system. i) Two part tariff ii) Power factor tariff iii) Block rate part tariff	6M

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CODE: 18MET207 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech II Semester Supplementary Examinations, August, 2023

INSTRUMENTATION AND CONTROL

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Briefly explain the generalized measurement system with the help of neat block-diagram.	6M
	b)	Explain various types of static performance characteristics.	6M
		(OR)	
2.	a)	Explain the principle and operation of variable induction type accelerometer.	6M
	b)	With a neat diagram explain how the Capacitive transducer can be used for the measurement of displacement?	6M

UNIT-II

3.	a)	Explain the working principle of hydraulic and pneumatic load cells for the measurement of the force.	6M
	b)	Why bridge circuit is necessary for a strain gauge? Explain how the bridge circuit is used with a strain gauge?	6M
		(OR)	
4.	a)	Explain the working principle of strain gauge load cell.	6M
	b)	Describe the tension measurement using strain gauge with neat sketch.	6M

UNIT-III

5.	a)	Explain how pressure is measured using Bourdon tubes.	6M
	b)	What is an RTD? How are they constructed? Discuss their resistance-temperature Characteristics.	6M
		(OR)	
6.	a)	Explain the principle and operation of optical pyrometer with a neat sketch.	6M
	b)	Explain in detail about the Diaphragm Gauges.	6M

UNIT-IV

7.	a)	Explain the principle and operation of ultrasonic flow meter.	6M
	b)	Explain in detail about the Sling Psychrometer with a neat sketch.	6M
		(OR)	
8.	a)	Explain the principle and operation of Electromagnetic flow meter with the help of neat sketches.	6M
	b)	Explain the principle and operation of rotameter with the help of neat sketche.	6M

UNIT-V

9.	a)	What is a servo mechanism? Explain in detail with the help of a block diagram	6M
	b)	Explain PID control algorithm and write their advantages and disadvantages?	6M
		(OR)	
10.	a)	Explain with a block diagram generalized feedback control system used in practice.	6M
	b)	Differentiate between open loop and closed loop control systems	6M