AR20

CODE: 20IET211 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, September, 2022

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 $L[e^{-2t} + 6t^4 + 3sin5t + 4cos6t]$	5M	1	K2
	b	Evaluate $L[\int_0^t e^{2t} sin3t]$	5M	1	K2
		(OR)			
2.	a	Evaluate $L[e^{-t}t\ cosht]$	5M	1	K2
	b	Evaluate $L\left[\frac{e^{-at}-e^{-bt}}{t}\right]$	5M	1	K2
		UNIT-II			
3.	a	Evaluate $L^{-1}\left[\frac{s^2+2s-4}{(s^2+9)(s-5)}\right]$	5M	2	K2
	b	Using Convolution Theorem, evaluate $L^{-1}\left[\frac{1}{(s+a)(s+b)}\right]$	5M	2	K3
		(OR)			
4.		Using Laplace transform solve the following differential equation $(D^2 - 4D - 12)y = e^{3t}$, given that $y(0) = 1$ & $y'(0) = -2$.	10M	2	K3
		UNIT-III			
5.		Using Fourier Integral Show that $e^{-ax} = \frac{2a}{\pi}\int_0^{\infty} \frac{cos(\lambda x)}{(\lambda^2+a^2)} d\lambda \ , \ a > 0$	10M	3	K3
		(OR)			
6.	a	Find the Fourier Transform of $e^{-a\|x\|} (a > 0)$	5M	3	K2
	b	Find the Fourier cosine Transform of $f(x)$ defined by $f(x) = \begin{cases} cosx, & 0 < x < a \\ 0, & x \geq a \end{cases}$	5M		K2
		UNIT-IV			
7.		If $F(p) = \frac{2sinpa}{p}$ is the Fourier Transform of $f(x)$ defined by $f(x) = \begin{cases} 1, \|x\| < a \\ 0, \|x\| > 0 \end{cases}$, then evaluate $\int_0^{\infty} \frac{sinp}{p} dp$ and $\int_{-\infty}^{\infty} \frac{sinap\ cospx}{p} dp$	10M	4	K2

(OR)

8.		Find the Fourier transform of $f(x)$ defined by $f(x) = \begin{cases} 1-x^2, & if\ \|x\| < 1 \\ 0, & if\ \|x\| > 1 \end{cases}$ and hence prove that $\int_0^\infty \left(\frac{x\cos x - \sin x}{x^3}\right)^2 dx = \frac{\pi}{15}$.	10M	4	K2

UNIT-V

9.	a	Evaluate $Z(\sin n\theta)$	5M	5	K2
	b	Evaluate $Z(a^n n^2)$	5M		K2

(OR)

10.		If $Z(u_n) = \frac{5z^2+3z+12}{(z-1)^4}$, find the values of u_2 & u_3.	10M	5	K2

UNIT-VI

11.	a	Evaluate by using Convolution theorem $Z^{-1}\left[\left(\frac{z}{z-a}\right)^2\right]$	5M	6	K3
	b	Evaluate $Z^{-1}\left[\frac{z^2+3z}{(z-5)(z+2)}\right]$	5M	6	K2

(OR)

12.		Solve the difference equation $u_{n+2} - 4u_{n+1} + 3u_n = 0$, given that $u_0 = 2$ & $u_1 = 4$ by using Z-transform	10M	6	K3

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CODE: 20IET213 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, September, 2022

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.	Obtain gcd of 275 and 200 also express in the form of m.275 + n.200	10	CO1	L3
	(OR)			
2.	Prove that $3^{2n+1} + 2^{n+2}$ is divisible by 7	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 $342x \equiv 5\ \ (Mod\ 13)$	10	CO2	L3
	UNIT-III			
5.	Define Euler-Fermate theorm and Show that $n^{12} - a^{12}$ is divisible by 13	10	CO3	L3
	(OR)			
6.	Obtain all integers that leave remainders 1 or 2when they are divided by each of 3, 4 and 5 by using Chainese remainder theorem	10	CO3	L3
	UNIT-IV			
7.	Determine the number of divisors and sum divisors of 360	10	CO4	L3
	(OR)			
8.	Define Euler Totient Function Φ. Determine $\Phi(180),\ \Phi(345)\ \ \Phi(515),\ \Phi(100)$	10	CO4	L3
	UNIT-V			
9.	Evaluate (3/383) , (5/223) , (2/3) and (2/17)	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 " WKLVL VKRZZ HGHFL SKHU " by using transformation $P \equiv C - 3(mod 26)$	10	CO6	L3
	(OR)			
12.	To encrypt the plaintext message "HERMIT " using Stream Auto Key Cipher with Seed "X".	10	CO6	L3

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CODE: 20IET214 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, September, 2022

ELEMENTS OF BUILDING PLANNING

(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)	What are conventional building plans ?	5M
	b)	What are the different types of the cement and role of the cement?	5M
		(OR)	
2.	a)	Explain the manufacturing of bricks	5M
	b)	Explain the use of different types aggregates	5M
		UNIT-II	
3.	a)	Explain building bylaws	5M
	b)	Write the principles and applications of the building bylaws?	5M
		(OR)	
4.	a)	Explain minimum standard dimensions of building elements	10M
		UNIT-III	
5.	a)	What are the factors to be considered by planner prior to planning of a residential building?	5M
	b)	Given standard dimensions for the following rooms of a residential building 1)Bed room 2)Kitchen 3)Garage 4)Verandah 5)Sick room	5M
		(OR)	
6.	a)	What are the usual requirements of a normal residential building ?	5M
	b)	what are the requirements for the following rooms in planning of residential building 1) Dinning room 2) drawing room 3) kitchen	5M
		UNIT-IV	
7.		A revenue office is to be built at a site of 20mx15m. The shorter dimention is along E-W facing the road. Draw a line diagram of the building to accommodate a). Two office rooms b). Record room c). One varandah	10M
		(OR)	
8.		A primary health centre is to be constructed in a village, the site measured 15mx10m. Drew the line diagram of the building to accommodate 1) waiting room 2) Doctors room 3) Examination room 4) Varandah	10M
		UNIT-V	
9.	a)	State the merit and demerit of English and Flemish bond.	5M
	b)	What is sun path diagram? Give CBRI recommendation for obtaining optimum orientation of a building	5M
		(OR)	
10.	a)	What is meant by orientation of a building ?	5M
	b)	Discuss the orientation criteria for residential building of India with reference to climate zones?	5M
		UNIT-VI	
11.	a)	Draw the single roomed residential building plan and elevation with suitable dimensions	5M
	b)	Draw the single roomed office building section and elevation with suitable dimensions	5M
		(OR)	
12.	a)	Draw the double roomed residential building plan and section with suitable dimensions	5M
	b)	Draw the double roomed residential building plan and elevation with suitable dimensions	5M

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CODE: 20IET218 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, September, 2022

INTRODUCTION TO ELECTRONIC MEASUREMENTS

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	Explain the types of static errors that could occur in measurements.	6M		Understanding
	b	The expected value of the voltage across a resistor is 80V. However, the measurement gives a value of 79V. Calculate (i) Absolute Error and (ii) percentage accuracy	4M	CO1	Applying
		(OR)			
2.	a	List and explain the dynamic characteristics	6M	CO1	Understanding
	b	What are the sources of errors?	4M		
		UNIT-II	Marks	CO	Blooms Level
3.	a	Explain the principle of DC ammeter with necessary diagram	6M		Understanding
	b	A 1mA meter movement with an internal resistance of 100 Ω is to be converted into a 0 – 100 mA. Calculate the value of shunt resistance required?	4M	CO2	Applying
		(OR)			
4.	a	What are the general requirements of a shunt resistor used in DC ammeters?	5M	CO2	Understanding
	b	Explain the shunt type of ohmmeter and its calibration	5M		
		UNIT-III	Marks	CO	Blooms Level
5.		Describe the function generator with necessary block diagram	10M	CO3	Understanding
		(OR)			
6.		Explain harmonic distortion analyzer using(i) Resonance Bridge and (ii) Bridged T-Network	10M	CO3	Understanding
		UNIT-IV	Marks	CO	Blooms Level
7.		Draw the block diagram of CRO and explain in detail.	10M	CO4	Understanding
		(OR)			
8.		Mention the specifications and applications of CRO	10M	CO4	Understanding
		UNIT-V	Marks	CO	Blooms Level
9.	a	Explain Maxwell's bridge with necessary circuit diagram.	6M	CO5	Understanding
	b	List DC and AC bridges used in measurement.	4M		Remembering
		(OR)			
10.		Describe about Schering's Bridge for measurement of capacitance	10M	CO5	Understanding
		UNIT-VI	Marks	CO	Blooms Level
11.	a	What is a transducer? Explain its classification	5M		Understanding
	b	Explain about potentiometer. What are its advantages and disadvantages?	5M	CO6	
		(OR)			
12.		Describe about thermistors in detail	10M	CO6	Understanding

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CODE: 20IET21A **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, September, 2022

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.	a	Define data structure. Discuss different types of data structure with suitable examples.	5	CO-1	K1
	b	Define algorithm and explain the properties	5		K1
		(OR)			
2.	a	Demonstrate Time and Space complexity with suitable example.	5	CO-1	K2
	b	Explain about Asymptotic Notations.	5		K2
		UNIT-II			
3.	a	Write an algorithm for linear search and explain it with example ,give its time complexity.	5	CO-2	K1
	b	Arrange the following list of elements in ascending order using Bubble sort: 9, 3, 5, 27, 4, 67, 18, 31, 13, 20, 39, 21. Clearly show the sorting process at each step and write bubble sort algorithm.	5		K3
		(OR)			
4.	a	Write an algorithm for binary search and explain it with example ,give its time complexity.	5	CO-2	K1
	b	Sort the elements using Merge Sort: 52, 38, 81, 22, 48, 13, 69, 93, 14, 45, 58, 79, 72.	5		K3
		UNIT-III			
5.	a	Define stack principle and write operations of stack with algorithm and suitable example.	5	CO-3	K1
	b	Give the algorithm for converting an Infix Expression to Postfix Expression (A+B)*C+(D-E)/F+G	5		K3
		(OR)			
6.	a	Explain the operations of queue with suitable algorithms and examples	5	CO-3	K2
	b	Distinguish between Stacks and Queues	5		K4
		UNIT-IV			
7.	a	Write an algorithm to insert new node at the beginning, at middle position and at the end of a Singly Linked List.	10	CO-4	K2
		(OR)			
8.	a	Distinguish between Single Linked List and Double Linked List.	5	CO-4	K4
	b	Write an algorithm for single linked list to delete node at beginning and deletion of node at ending	5		K2
		UNIT-V			
9.	a	Explain, in detail, deletion of a node from a binary search tree with one suitable example.	5	CO-5	K2
	b	What operations can be performed on binary trees? Discuss.	5		K1
		(OR)			
10.	a	What are the different tree traversals? Explain with example.	5	CO-5	K1
	b	Explain Binary Search Tree and Create binary search tree for the following elements (23, 12, 45, 36, 5, 15, 39, 2, 19)	5		K2
		UNIT-VI			
11.	a	Explain the representation of graph using singly linked list.	5	CO-6	K2
	b	Define a Graph and Explain different types of graphs with suitable examples.	5		K1
		(OR)			
12.	a	What is Minimum spanning tree? Explain the Prim's algorithm for generating a minimum spanning tree.	5	CO-6	K1
	b	Explain Depth First Search with example.	5		K2

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CODE: 20IET21B **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, September, 2022

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	How dynamic memory allocation and freeing the memory performed with the help of new and delete operators? Explain with suitable examples?	5	CO1	K2
	b	Given an integer array nums, find three numbers whose product is maximum and return the maximum product? Input: 4 1 2 3 4 Output: 24	5	CO1	K3
		(OR)			
2.	a	Explain about selection control statements and iterative statements with examples?	5	CO1	K1
	b	Given an integer array nums sorted in non-decreasing order, remove the duplicates in-place such that each unique element appears only once. The relative order of the elements should be kept the same. Input: 10 0 0 1 1 1 2 2 3 3 4 Output: 0 1 2 3 4	5	CO1	K3
		UNIT-II			
3.	a	What are the access specifiers? How many access Specifiers are used in C++? Explain With Examples.	5	CO2	K2
	b	Design a Class name Vehicle as parent class and child classes as Four_Wheeler and Two_Wheeler and assign no_of_weels , tank_capacity as public members and cost_of_the vehicle as private member.	5	CO2	K3
		(OR)			
4.	a	What is inheritance? Explain the different types of inheritance with the help of examples?	5	CO2	K1
	b	Write a program to print the area of a rectangle by creating a class named 'Area' having two functions. First function named as 'setDim' takes the length and breadth of the rectangle as parameters and the second function named as 'getArea' returns the area of the rectangle. Length and breadth of the rectangle are entered through keyboard.	5	CO2	K3
		UNIT-III			
5.	a	List out the characteristics of algorithms and explain in detail?	5	CO3	K1
	b	Find the complexity of the below recurrence relation $T(n) = 2T(n-1)-1$ if $n>0$; 1 other wise	5	CO3	K2
		(OR)			
6.	a	What do you mean by asymptotic analysis explain different notations we use for representing the time complexity?	5	CO3	K1
	b	Find the complexity of the below recurrence relation $T(n) = 3T(n-1)$ if $n>0$; 1 other wise	5	CO3	K2

UNIT-IV

7.	a	Explain about the Container vectors and list out the different methods used for insertion, deletion and traversal with Examples?	5	CO4	K1
	b	Given an integer array nums, compute the second distinct maximum number in this array. If the Third maximum does not exist, compute the maximum number? Solve this with the help of containers. Input: 3 3 2 1 Output: 2 Explanation: The first distinct maximum is 3. The second distinct maximum is 2.	5	CO4	K3

(OR)

8.	a	Explain about sequential containers and associative containers with examples?	5	CO4	K1
	b	Given an array of distinct integers arr, print all pairs of elements with the minimum absolute difference of any two elements. Solve this problem with the help of containers? Input: 4 4 2 1 3 Output: 1 2 2 3 3 4	5	CO4	K3

UNIT-V

9.	a	Given an array of distinct integers candidates and a target integer target, return a list of all unique combinations of candidates where the chosen numbers sum to target. You may return the combinations in any order. The same number may be chosen from candidates an unlimited number of times. Two combinations are unique if the frequency of at least one of the chosen numbers is different Input: Candidates = [2,3,6,7], Target = 7 Output: [[2,2,3],[7]]	5	CO5	K3
	b	Implement int sqrt(int x). Compute and return the square root of *x*, where *x* is guaranteed to be a non-negative integer. Since the return type is an integer, the decimal digits are truncated and only the integer part of the result is returned. Input: 4 Output: 2	5	CO5	K2

(OR)

10.	a	Given an integer array nums of unique elements, return all possible subsets (the power set). The solution set must not contain duplicate subsets. Compute the solution in any order?	5	CO5	K2
	b	Given a sorted array and a target value, compute the index if the target is found. If not, compute the index where it would be if it were inserted in order. You may assume no duplicates in the array. Input: [1,3,5,6], 5 Output: 2	5	CO5	K3

UNIT-VI

11.	a	Explain Extended Euclidean algorithm?	5	CO6	K1
	b	Given a number **N**, calculate the prime numbers up to N using Sieve of Eratosthenes. Input: N = 10 Output: 2 3 5 7	5	CO6	K3

(OR)

12.	a	Explain about modular multiplicative inverse algorithm?	5	CO6	K1
	b	Given an integer array nums, compute the greatest common divisor of the smallest number and largest number in nums.The greatest common divisor of two numbers is the largest positive integer that evenly divides both numbers. Input: nums = [2,5,6,9,10] Output: 2	5	CO6	K3

AR20

CODE: 20IET21C **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, September, 2022

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.	Define and Compare procedure oriented and object oriented programming language	10	CO1	Understanding
	(OR)			
2.	Given an integer array nums, move all 0's to the end of it while maintaining the relative order of the non-zero elements. Note that you must do this in-place without making a copy of the array. Input: 5 010312 Output:131200	10	CO1	Apply
	UNIT-II	Marks	CO	Blooms Level
3.	What is inheritance? Explain different types of inheritance with suitable syntaxes.	10	CO2	Apply
	(OR)			
4.	Given a binary array nums, return the maximum number of consecutive 1's in the array. Input: 6 110111 Output: 3 Explanation: The first two digits or the last three digits are consecutive 1s. The maximum number of consecutive 1s is 3	10		Apply
	UNIT-III	Marks	CO	Blooms Level
5.	What are asymptotic notations? How to measure Time complexity and space complexity? Explain in detail.	10	CO3	Understand
	(OR)			
6.	Given an array of integers arr, a lucky integer is an integer that has a frequency in the array equal to its value. Print the largest lucky integer in the array. If there is no lucky integer return -1. Input:arr = [2,2,3,4] Output: 2 Explanation: The only lucky number in the array is 2 because frequency[2] == 2.	10	CO3	Apply

		Marks	CO	Blooms Level
	UNIT-IV			
7.	What is stack? Explain the concept of stack and its operations	10	CO4	Understand
	(OR)			
8.	Given an array of integers nums, calculate the pivot index of this array. The pivot index is the index where the sum of all the numbers strictly to the left of the index is equal to the sum of all the numbers strictly to the index's right. If the index is on the left edge of the array, then the left sum is 0 because there are no elements to the left. This also applies to the right edge of the array. Print the leftmost pivot index. If no such index exists, return -1.	10	CO4	Apply
	UNIT-V	Marks	CO	Blooms Level
9.	Explain DDL and DCL commands	10	CO5	Understand
	(OR)			
10.	Given an integer array nums sorted in non-decreasing order, compute an array of the squares of each number sorted in non-decreasing order. Example 1: Input:nums = [-4,-1,0,3,10] Output: [0,1,9,16,100] Explanation: After squaring, the array becomes [16,1,0,9,100]. After sorting, it becomes [0,1,9,16,100].	10	CO5	Apply
	UNIT-VI	Marks	CO	Blooms Level
11.	Define Join. Explain different types of joins with syntaxes in detail.	10	CO6	Remember
	(OR)			
12.	Given the array nums, for each nums[i] find out how many numbers in the array are smaller than it. That is, for each nums[i] you have to count the number of valid j's such that j != i and nums[j] <nums[i].print the answer in an array. Input:nums = [8,1,2,2,3] Output: [4,0,1,1,3] Explanation: For nums[0]=8 there exist four smaller numbers than it (1, 2, 2 and 3). For nums[1]=1 does not exist any smaller number than it. For nums[2]=2 there exist one smaller number than it (1).	10	CO6	Apply

AR18

CODE: 18CET208 SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B. Tech II Semester Supplementary Examinations, September,2022

MECHANICS OF SOLIDS-II
(Civil Engineering)

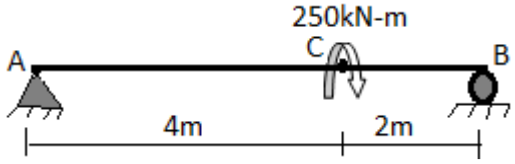
Time: 3 Hours **Max Marks: 60**

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) What is moment area method? Explain the two Mohr's theorems, as applicable to the slope and deflection of a beam. 6M

   b) A simply supported beam is supported and loaded as shown in Figure, Calculate the deflection at the point where couple is acting and also calculate the maximum deflection that occurs in the beam. 6M



(OR)

2. A simply supported beam of 6m span carries a concentrated load of 50kN each at a distance 2m from the ends, Calculate 12M
   a) Maximum slope and deflection for the beam
   b) Slope and deflection under each load
   Take EI = 1.2 x 10^4 kN-m^2

UNIT-II

3. A compound cylinder is made by shrinking a cylindrical of external diameter 300 mm and internal diameter of 250 mm over an another cylindrical of external diameter 250 mm and internal diameter 200 mm. The radial pressure at the junction after shrinking is 10N/mm2. Find the final stresses sent up across the section, when the compound cylinder is subjected an internal fluid pressure of 80 N/mm^2. 12M

(OR)

4. a) Derive the formula for longitudinal and circumferential stresses for a thin cylindrical shell subjected to internal fluid pressure 6M

   b) Compare the values of maximum and minimum hoop stresses for a cast steel cylindrical shell of 600mm external diameter and 400mm internal diameter subjected to a pressure of 50N/mm^2 applied internally and Externally 6M

UNIT-III

5. Write a note on Mohr's circle of stresses how it is developed. Draw the Mohr's circle for the element subjected to pure shear stress on two perpendicular planes 12M

(OR)

6. a) Derive an express for normal stress and tangential stress on an inclined plane at an angle θ with the vertical plane if a bar is subjected to two perpendicular tensile stresses p1 and p2 6M

   b) A rectangular block of material is subjected to a tensile stress of 100N/mm2 on one plane and a compressive stress of 60 N/mm2 on the plane at right angle to the previous one . Draw the Mohr circle for the above stress system 6M

UNIT-IV

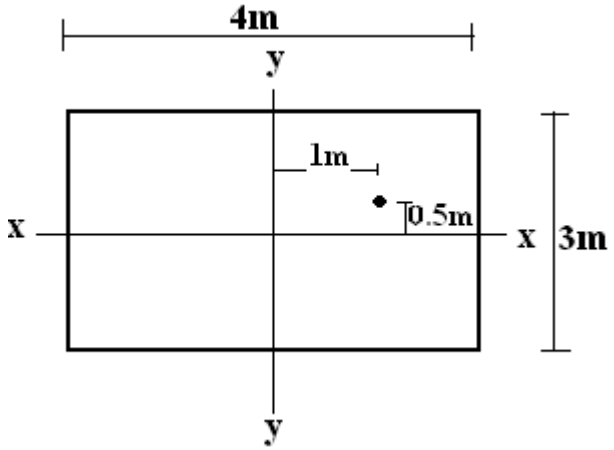
7. a) What are assumptions and the limitations of Euler's theory? 6M
   b) Derive an expression for the Euler's crippling load for the fixed-Hinged ends column. 6M

(OR)

8. A hollow circular cast iron column is 10m long with both ends fixed. Determine the maximum diameter of the column if it is to carry a safe load of 800 kN with a factor of safety 3. Take internal diameter as 0.6 times the external diameter. Take σ_c = 550 Mpa and α = 1/ 1600 12M

UNIT-V

9. A masonry pier of 3m x 4m supports a vertical load of 80 kN as shown in figure below. Find the stresses developed at each corner of the pier. 12M



(OR)

10. A chimney of uniform thickness is 45m high with external diameter tapers from 5m at the base to 3m at the top. The internal diameter at the base is 3m. The chimney is subjected to horizontal wind pressure of 3kN/m^2. The self-weight of the chimney is 2000kN. Determine the maximum and minimum stresses. 12M

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AR18

CODE: 18EET208 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech II Semester Supplementary Examinations, September, 2022

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)	Draw the schematic arrangement of a thermal power station and Explain its operation?	6M
	b)	Explain the factors to be considered for the selection of the site for a thermal power station?	6M

(OR)

2.	a)	Explain the significance of super-heater and economizer in a thermal power station?	6M
	b)	What is the principle of Hydro Power station?	6M

UNIT-II

3.	a)	What are the merits and demerits of a gas power plant?	6M
	b)	Explain the working of a gas power plant with schematic diagram?	6M

(OR)

4.	a)	What are the advantages and disadvantages of nuclear power station?	6M
	b)	What is the function of a moderator and control rods and explain about desirable properties of them?	6M

UNIT-III

5.	a)	Derive an expression for the voltage drop for a uniformly loaded distributor fed at one end?	8M
	b)	A two-wire DC distributor cable 1000mts long is loaded with 0.5A/ meter. Resistance of each conductor is 0.05Ω /Km. Calculate the maximum voltage drop, if the distributor is fed from both ends with equal voltages of 220V. What is the minimum voltage and where it occurs?	4M

(OR)

6.	a)	A uniform 2-wire d.c. distributor 500 metres long is loaded with 0.4 ampere/ metre and is fed at one end. If the maximum permissible voltage drop is not to exceed 10 V, find the cross-sectional area of the distributor conductor. Take $\rho = 1{\cdot}7 \times 10^{-6}$ Ω cm.	6M
	b)	Explain about the AC and DC Distribution?	6M

UNIT-IV

7.	a)	What is substation? Classify the substations according to the service and constructional features?	6M
	b)	Give the Comparison of Indoor and Outdoor Sub-Station in detail?	6M

(OR)

8.	a)	Draw the single diagram of gas insulated substation?	6M
	b)	Compare air insulated substation and gas insulated substation?	6M

UNIT-V

9.	a)	Define the terms: the load factor and diversity factor and discuss their effect on the cost of generation of electrical energy?	6M
	b)	A generating station supplies the following loads: 15000 kW, 12000 kW, 8500 kW, 6000 kW and 450 kW. The station has a maximum demand of 22000 kW. The annual load factor of the station is 48%. Calculate (i) the number of units supplied annually (ii) the diversity factor and (iii) the demand factor	6M

(OR)

10.	a)	Write the short Notes on following (i) flat rate tariff (iii) two part tariff (ii) blocked rate tariff?	6M
	b)	The following two tariffs are offered: (a) Rs 100 plus 15 paise per unit (b) A flat rate of 30 paise per unit At what consumption is first tariff economical?	6M

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AR18

CODE: 18MET207 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech II Semester Supplementary Examinations, September, 2022

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)	Sketch and explain generalized measurement system and it's functional elements?	6M
	b)	List out and explain the different errors involved in measurement process?	6M
		(OR)	
2.	a)	With a neat sketch explain the working of LVDT to measure linear displacement?	6M
	b)	Explain the principle and working of Seismic instrument with a neat sketch?	6M

UNIT-II

3.	a)	Describe the working of Strain gauge load cell?	6M
	b)	How stroboscope is used in measurement of speed? Explain	6M
		(OR)	
4.	a)	How do you measure the tensile and compressive strain using electrical resistance strain gauge?	6M
	b)	Derive an expression for Gauge factor?	6M

UNIT-III

5.	a)	Explain the working of bellow gauge in pressure measurement?	6M
	b)	Describe the working of Ionization type pressure gauge?	6M
		(OR)	
6.	a)	Explain any three principles of themo-couple?	6M
	b)	What is pyrometer? Explain any one type of Pyrometers?	6M

UNIT-IV

7.	a)	Explain the working of Hot-Wire Anemometer in flow measurement?	6M
	b)	Describe the working of Magnetic flow meter?	6M
		(OR)	
8.	a)	Explain the working of Sling Psycho meter?	6M
	b)	Describe the working of Absorption Hygrometer?	6M

UNIT-V

9.	a)	What is the importance of control system?	6M
	b)	Describe the working of closed loop control system with a neat sketch?	6M
		(OR)	
10.	a)	Describe the RH stability criterion in control systems?	12M

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AR18

CODE: 18CST208 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B. Tech II Semester Supplementary Examinations, September, 2022

DESIGN & ANALYSIS OF ALGORITHMS

(Common to CSE & IT)

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) Write the pseudo code conventions for expressing algorithms 5M
   b) Find Big-oh notation and Little-oh notation for f(n) = 7n3 + 50n2 +200. 5M

(OR)

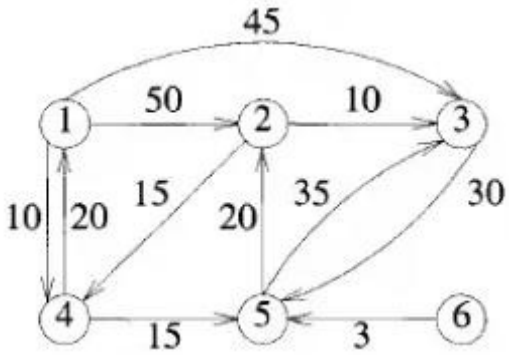
2. a) Write recursive algorithm for towers of Hanoi and analyze its time complexity. 6M
   b) Explain about Amortized Analysis. 4M

UNIT-II

3. a) Write the control abstraction for Divide and conquer. 5M
   b) Write a non-recursive Binary search algorithm. 5M

(OR)

4. a) Use algorithm Single Source Shortest Paths to obtain non-decreasing order of the lengths of the shortest path from vertex 1 to all remaining vertices in the following graph. 5M



   b) Explain differences between Prim's and Kruskal's Minimum spanning Tree algorithm. Derive the time complexity of Kruskal's algorithm. 5M

UNIT-III

5. Construct an Optimal Binary Search Tree for n=4 identifiers (a1,a2,a3,a4) = (do,if, read, while) P(1:4)=(3,3,1,1) and Q(0:4)=(2,3,1,1,1). 10M

(OR)

6. a) Construct an optimal travelling sales person tour for the following distance matrix using Dynamic Programming 6M

$$\begin{pmatrix} 0 & 10 & 9 & 3 \\ 5 & 0 & 6 & 2 \\ 9 & 6 & 0 & 7 \\ 7 & 3 & 5 & 0 \end{pmatrix}$$

   b) Write an algorithm for Matrix Chain Multiplication using Dynamic Programming. 4M

UNIT-IV

7.	a)	Define Articulation point. Illustrate how to find articulation points from a graph. Also discuss how the articulation points are used to determine bi-connected components.	5M
	b)	Differentiate between BFS and DFS.	5M
		(OR)	
8.	a)	Let w=(5,10,10,25) and m=25.Find all possible subsets of W that sum to m using fixed tuple length and variable tuple length.	5M
	b)	Develop an algorithm to determine all the Hamiltonian cycles from a graph.	5M

UNIT-V

9.	a)	Write the control abstraction of LC search.	4M
	b)	Explain the principles of i) FIFO branch and Bound and ii) LC Branch and Bound	6M
		(OR)	
10.	a)	Write about non deterministic algorithms and choice, failure and success functions with search example.	5M
	b)	State and prove Cook's theorem.	5M

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AR16

CODE: 16CE2007 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, September, 2022

HYDRAULICS AND HYDRAULIC MACHINERY

(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

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 the Rayleigh's method of analysis.	7 M
	b)	Find the density of a metallic body which floats at the interface of mercury of sp. Gr 13.6 and water such that 40% of its volume is sub-merged in mercury and 60% in water.	7 M

(OR)

2.	a)	What do you understand by Continuity Equation?	7 M
	b)	Water flows through a pipe AB 1.2m diameter at 3 m/s and then passes through a pipe BC 1.5 m diameter at C, the pipe branches. Branch CD is 0.8m in diameter and carries one third of the flow in AB. The flow velocity in branch CE is 2.5 m/s. find the volume rate of flow in AB, the velocity in BC, the velocity in CD and the diameter of CE	7 M

UNIT-II

3.		An open channel of most economical section, having the form of a half hexagon with horizontal bottom is required to give a maximum discharge of 20.7 m^3 /s of water. The slope of the channel bottom is 1 in 3000.Taking Chezy's constant=50 in Chezy's equation, determine the dimensions of the cross section.	14 M

(OR)

4.	a)	Calculate the specific energy of 12 m^3 /s of water flowing with a velocity of 1.5 m/s in a rectangular channel 7.5 m wide. Find the depth of water in the channel when the specific energy would be minimum. What would be the value of critical velocity as well as minimum specific energy?	7 M
	b)	What do you understand by critical depth of an open channel when the flow is not uniform	7 M

UNIT-III

5.	a)	Derive an expression for the force exerted by a jet of water on stationary inclined plate in the direction of jet.	7 M
	b)	A jet of water from a nozzle is deflected through 60^0 from its original direction by curved plate which it enters tangentially without the shock with a velocity of 30 m/s and leaves with a mean velocity of 25 m/s. If the discharge from the nozzle is 0.8 kg/s, Calculate the magnitude and direction of the resultant force on the vane, if the vane is stationary.	7 M

(OR)

6.	a)	Write an expression for the force exerted by the jet on the stationary plate in the direction of jet (i) When flat plate is held normal to the jet (ii) When the flat plate is held inclined to the je	7 M
	b)	Explain the concepts of velocity triangles by considering a jet striking an unsymmetrical moving curved vane tangentially at one of the tips.	7 M

UNIT-IV

7.	a)	Explain the working of draft tube with neat sketch and how do the losses in the draft tube effect the pressure at runner exit?	7 M
	b)	Draw the characteristic curves for the Francis turbines and also explain the working of Francis turbine with neat sketch.	7 M

(OR)

8.	a)	With the help of neat sketch explain the construction and working of a pelton wheel turbine.	7 M
	b)	What is governing? Explain the governing of reaction turbines with neat sketch.	7 M

UNIT-V

9.	a)	A multistage centrifugal pump has four identical impellers, keyed to the same shaft. The width and diameter of each impeller at outlet are 50 mm and 600 mm respectively. The vanes of each impeller are having outlet angle as 45^0. The speed of the pump is 400 rpm and the total manometric head developed is 40 m. If the discharge through the pump is 0.2 m3 /s. find the manometric efficiency	7 M
	b)	Define the Mechanical efficiency and Overall efficiency of the centrifugal pump?	7 M

(OR)

10.	a)	Enumerate the losses which occur when a centrifugal pump operates	7 M
	b)	Define the specific speed of the turbine and also derive the expression for the specific speed of the centrifugal pump	7 M

AR16

CODE: 16EE2011 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, September, 2022

POWER SYSTEMS – II

(Electrical & Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

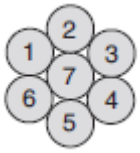
Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Brief about composite conductors? 7M
   b) Derive the equation for the inductance of composite conductors. 7M

(OR)

2. a) What are ACSR conductors? Explain the advantages of ACSR conductors when used for overhead lines 7M
   b) A conductor consists of seven identical strands each having a radius of 'r'. Determine the factor by which 'r' should be multiplied to find the self GMD of the conductor 7M



UNIT-II

3. a) Obtain the ABCD constants for medium transmission line with Nominal - Π configuration. Also draw the phasor diagrams for the lagging power factor loads. 7M
   b) A 100 km long, 3-phase, 50 Hz transmission line has the following line constants. Resistance/phase/km = 0.1 Ω, reactance/phase/km = 0.5 Ω and susceptance/phase/km = 10 x 10^{-6} S. If the line supplies load of 20 MW at 0.9 pf lagging at 66 kV at the receiving end. Calculate by nominal Π method (1) sending end power factor, (2) regulation and (3) transmission efficiency. 7M

(OR)

4. a) Discuss the performance of single phase short transmission lines with a neat phasor diagram. 7M
   b) An overhead 3-phase transmission line delivers 5000 kW at 22 kV at 0.8 pf lagging. The resistance and reactance of each conductor is 4 Ω and 6 Ω respectively. Determine (1) sending end voltage (2) percentage regulation and (3) transmission efficiency. 7M

UNIT-III

5. a) Evaluate the equations for sending voltage and sending current for the long transmission lines (use rigorous calculations) 14M

(OR)

6. a) Discuss the equivalent T - network of a long transmission line and obtain the ABCD constants in that case. 7M
   b) A 132kV, 3-phase, 50Hz 200km long transmission line has the following distributed parameters: 7M
   l = 1.3*10^{-3}H/km; c = 9 *10^{-9} F/km; r = 0.2 Ω/km; g=0
   find the sending end voltage, current and power factor.

UNIT-IV

7. a) Derive reflected and refracted coefficient of voltages and currents when line is terminated with Resistance. 7M

   b) A 500KV, 2μs rectangular surge travels along the line terminated by a capacitor of 2,500PF. Determine the voltage across the capacitance and reflected voltage wave if the surge impedance loading of lie is 400 Ω. 7M

(OR)

8. a) Discuss in detail about the following (a) skin effect and (b) proximity effect? 7M

   b) A 132KV line with 1.956 cm diameter is built so that corona takes place if the line voltage exceeds 210 KV (rms). If the value of potential gradient at which ionisation occurs can be taken as 30 km per cm, find the spacing between the conductors. 7M

UNIT-V

9. a) Explain the various methods of improving the string efficiency. 7M

   b) A 3-phase transmission line is being supported by three-disc insulators. The potentials across top unit (i.e., near to the tower) and middle unit are 8 kV and 11 kV respectively. Calculate (i) the ratio of capacitance between pin and earth to the self-capacitance of each unit (ii) the line voltage and (iii) string efficiency. 7M

(OR)

10. a) Deduce an approximate expression for sag in overhead lines when supports are at unequal levels. 7M

    b) A transmission line has a span of 150 m between level supports. The conductor has a cross-sectional area of 2 cm^2. The tension in the conductor is 2000 kg. If the specific gravity of the conductor material is 9·9 gm/cm3 and wind pressure is 1·5 kg/m length, calculate the sag. What is the vertical sag? 7M

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AR16

CODE: 16CS2010 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, September, 2022

PRINCIPLES OF PROGRAMMING LANGUAGES

(Common to CSE & IT)

Time: 3 Hours **Max Marks: 70**

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)	What is the significance of language generators and language recognizers? Explain	7M
	b)	Demonstrate the Evolution of Programming languages	7M
		(OR)	
2.	a)	Demonstrate the functionality of lexical analysis.	7M
	b)	Differentiate Syntax and Semantics	7M
		UNIT-II	
3.	a)	Explain in detail about an object lifetime and storage management by three principal storage allocation mechanisms.	7M
	b)	Demonstrate the functionality of Semantic Analyzer	7M
		(OR)	
4.	a)	Explain the scope and lifetime of variables. Illustrate when they would coincide and when they don't.	7M
	b)	What is macro? Explain in detail about macro expansion.	7M
		UNIT-III	
5.	a)	Discuss various primitive data types with suitable examples	7M
	b)	Define Coercion, Type error, Type checking and Strong Typing. Explain the usage of these with an example.	7M
		(OR)	
6.	a)	Explain about Control structures	7M
	b)	Discuss the following term: i) Dangling pointers, ii) Tail recursion elimination	7M
		UNIT-IV	
7.	a)	Demonstrate the need of Co-Routines with an example.	7M
	b)	Define sub program. What are the distinct categories of Subprograms	7M
		(OR)	
8.	a)	Explain how subprograms names are passed as parameters	7M
	b)	Discuss the reasons for using exception handlers in a programming language	7M
		UNIT-V	
9.	a)	What is Polymorphism? Explain with suitable example	7M
	b)	State the important features of object oriented programming. Compare object oriented programming with procedure oriented programming.	7M
		(OR)	
10.	a)	What is Single inheritance? Explain in detail with an example	7M
	b)	Demonstrate encapsulation and polymorphism.	7M