QP Code: R264G002 | Reg. No | | | | | | | | | | | AY 24

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET UNIVERSITY)

M.Sc. (Fourth Semester – Regular/ Supplementary) Examinations, April – 2026

24MPEMA24011 - Design and Analysis of Algorithm
(Mathematics)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

	Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a.	Arrange the following class of functions in increasing Order: 7, n^3, nlogn, 2^n, n!, n^n, $\sqrt{n}$	CO1	K2
b.	Solve the Activity Selection problem by using algorithm.	CO2	K2

Av	a_1	a_2	a_3	a_4	a_5	a_6
S_i	1	2	3	4	7	7
F_i	3	5	4	7	10	9

c.	Define minimum spanning tree.	CO3	K1
d.	What is difference between Dijkstra's Algorithm and Bellman–Ford Algorithm	CO4	K2
e.	What is NP-Hard problem	CO5	K2

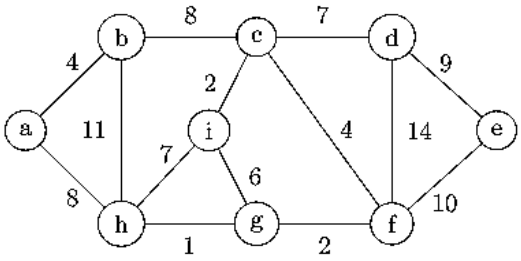
PART – B **(10 x 5 = 50 Marks)**

	Answer ***ALL*** the questions	Marks	CO #	Blooms Level
2. a.	Explain different type of asymptotic notations briefly with example	5	CO1	K3
b.	Sove the recurrence relation by substitution method Where $T(n) = \begin{cases} 1, & at \ \ n = 1 \\ T(n-1)+n, & at\ n > 1 \end{cases}$	5	CO1	K3
	(OR)			
c.	Solve the recurrence relation by iteration method of $T(n) = 2T(\frac{n}{2}) + n\ at\ n > 1\ and\ T(n) = 1\ where\ n = 1$	5	CO1	K3
d.	i. Prove that $n! = \boldsymbol{\omega}(2^n)$ by striling formula			
	ii. Solve $T(n) = 16T(\frac{n}{2}) + nlogn)$ by Mater Method	5	CO1	K3
3.a.	Let $A[5,9,17,23,25,31,41\ 45,59,63,71,82,88,95,99]$ Search for $k = 82$ by using Binary search method.	5	CO2	K3
b.	What is the optimal Huffman code for the following set of frequence based on first eight Fibonacci number	5	CO2	K3

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*
1	*1*	*2*	*3*	*5*	*8*	*13*	*21*

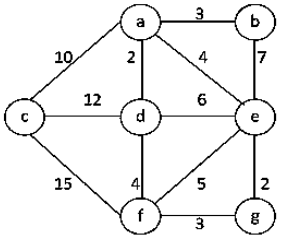
(OR)

c.	Find the order of Parenthesization for the optimal chain multiplication of the dimension $P == \{5,4,6,2,7\}$	10	CO2	K3
4.a.	Explain difference between BFS and DFS	5	CO3	K3
b.	Compute the Minimum-cost Spanning Tree for the Graph given below using Kruskal's Algorithm.	5	CO3	K3



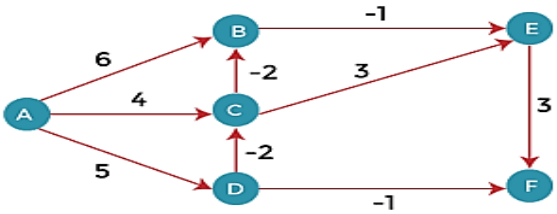
(OR)

c. Compute the Minimum-cost Spanning Tree for b y using Prims's Algorithm



10 CO3 K3

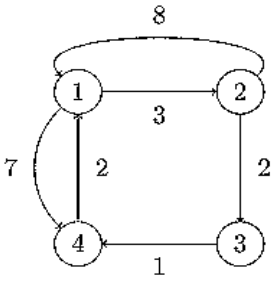
5.a. Find the shortest path of all the vertices from source vertex *A* using Bellman-Ford algorithm



10 CO4 K3

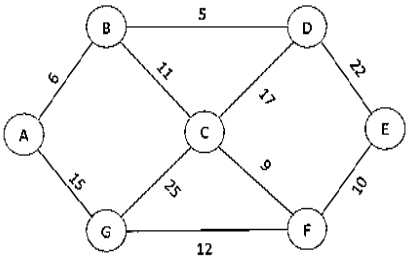
(OR)

b. Find the shortest distance and shortest path between all pairs of vertices in the following graph using Floyd-Warshall Algorithm



10 CO4 K3

6.a. Find the shortest distance and shortest path between all pairs of vertices in the following graph using Dijkstra's Algorithm



10 CO5 K3

(OR)

b. Explain P, NP, problems. Give examples of each 5 CO5 K3

c. Explain NP complete and NP-Hard problems. Give examples of each 5 CO5 K3

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