(An Autonomous Institute under UGC Act 1956)

Department of Computer Science & Engg.

TAE-III: Problem Solving	Subject: Design and Analysis of Algorithms					
Time: 60 min	Subject Teacher: Prof. Dipti Theng	M	ax Marks: 04			
Name of Student:	Roll No.:	Class:				

Q. 1. Solve following problems:

A. Find the optimal solution to the knapsack instances n=7, m=15,

Profit <P1, P2, P3, P4, P5, P6, P7> = <10, 5, 15, 7, 6, 18, 3> and

Weight <W1, W2, W3, W4, W5, W6, W7>=<2, 3, 5, 7, 1, 4, 1>

B. In the following table, 7 activities are given with their respective start and finish times. Select the maximum number of activities that can be performed by a single person, assuming that a person can work only on a single activity at a time.

Activity	A1	A2	A3	A4	A5	A6
Start Time	0	3	1	5	5	8
Finish Time	6	4	2	9	7	9

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TAE-III: Problem Solving
Time: 60 min
Subject: Design and Analysis of Algorithms
Subject Teacher: Prof. Dipti Theng
Max Marks: 04

Name of Student:	Roll No.:	_ Class:

Q. 1. Solve following problems:

A. Create a Huffman code for the following set of data and also find the length of encode file

Character	А	В	С	D	E	F
probability	48	11	9	14	7	3

B. Find the optimal solution using knapsack greedy method n=7,m=15,

Object	1	2	3	4	5	6	7
Profit	10	5	15	7	6	18	3
Weight	2	3	5	7	1	4	1

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Department of Computer Science & Engg.

TAE-III: Problem Solving				Subject: Design and Analysis of Algorithm							
Time: 60 n	nin			Subjec	t Teacher: P		Max Marks: 04				
Name of Stu	dent:					Roll No.:	Class:				
Q. 1. Solve fo	llowing	problem	ıs:								
A. Consider	the follo	owing 5	jobs ar	nd their	associated de	eadline and profit.					
Job Index	1	2	3	4	5						
Job		J2	J3	J4	J5						
Deadline	2	1 100	3	2	1						
Profit	60	100	20	40	20						

Select jobs that will give a higher profit?

B. A networking company uses a compression technique to encode the message before transmitting over the network. Suppose the message contains the following characters with their frequency: a:15 b:7 c:6 d:6 e:5 .If the compression technique used is Huffman Coding, how many bits will be saved in the message?

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TAE-III: Problem Solving	Subject: Design	and Analysis of Algorithms
Time: 60 min	Subject Teacher: Prof. Dipti Theng	Max Marks: 04
Name of Student:	Roll No.:	_ Class:
Q. 1. Solve following problems:		
A. Create a Huffman code for the f	ollowing set of data and also find the length of encod	de file

Character	А	В	С	D	E	F	G
Probability	2	3	3	4	6	10	13

B. Which is optimal value in the case of fractional knapsack problem, capacity of knapsack is 60.

Item	A	В	C	D
Profit	280	100	120	120
Weight	40	10	20	24
Ratio (piwi)(piwi)	7	10	6	5

S5

G. H. RAISONI COLLEGE OF ENGG. NAGPUR

(An Autonomous Institute under UGC Act 1956)

Department of Computer Science & Engg.

TAE-III: Problem Solving Time: 60 min	Subject Teacher: Pr	Subject: Design and Anal Subject Teacher: Prof. Dipti Theng					
Name of Student:		Roll No.:	Class:				
Q. 1. Solve following problems:							
A. Find the optimal solution to the	knapsack instances N=5,M	I=60kg,					
profit <p1,p2,p3,p4,p5>=<30,40,4</p1,p2,p3,p4,p5>	45,77,99>, and						
weight <w1,w2,w3,w4,w5>=<5</w1,w2,w3,w4,w5>	5,10,15,22,25>						

B. What is Optimal Huffman code for the following set of data?

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

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Department of Computer Science & Engg.

TAE-III: Problem Solving Time: 60 min	Subject: Design and Analysis of Algo Subject Teacher: Prof. Dipti Theng Max Mar				
Name of Student:	Roll No.: Class:				

Q. 1. Solve following problems:

A. Consider the following set of activities with start and finish times. Select the maximum number of activities that can be performed by a single person, taking only one activity at a time.

Activity	A1	A2	A3	A4	A5	A6
Start Time	0	3	1	5	5	8
Finish Time	6	4	2	9	7	9

B. Fractional Knapsack Problem: Fill the knapsack with objects so that the profit is maximum. It is given that the capacity of knapsack is 15.

OBJECTS	1	2	3	4	5	6	7
PROFITS	10	5	15	7	6	18	3
WEIGHTS	2	3	5	7	1	4	1

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Department of Computer Science & Engg.

TAE-III: P Time: 60 r		Solving	•	Subject	alysis of Algorithm Max Marks: 04			
111116. 00 1	11111			Subjec	t Teacher. I	rof. Dipti Theng		WIAX WIAIKS. U-
Name of Stu	dent:					Roll No.:	Class:	
Q. 1. Solve fo	ollowing	problem	s:					
A. What is O	otimal H	uffman c	ode for	the follo	owing set of da	ata?		
e:3, d:2, u:2,	l·2 snac	o·2 k·1 l	n·1 v·1	i·1 c·1				
c.5, u.2, u.2,	1.2, spac	C.2, K.1, I	J.1, V.1	, 1.1, 3.1				
p Ci1	41 C-11	: <i>-</i>	: -1	. 1 41 :	:-4-1 1-	- 41: 4 C.4		
B. Consider	tne ion	owing 5	jobs ar	ia their	associated de	adline and profit.		
Job Index	1	2	3	4	5			
Job Deadline Profit	J1 2 60	J2 1		J4 2	J5 1 20			

S8

G. H. RAISONI COLLEGE OF ENGG. NAGPUR

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Department of Computer Science & Engg.

TAE-III: Time: 6	: Problem Sol 0 min	0	ubject Teach	analysis of Al Max M	gorithms arks: 04			
Name of Student:					Roll No.:	Class:		
Q. 1. Solve	e following pro	blems:						
A. Create	a Huffman code	e for the follow	ving set of data	and also find t	the length of e	ncode file		
	Character	А	В	С	D	E	F	
	probability	45	13	12	16	9	5	

B. Find the optimal solution to the knapsack instances n=7, m=15,

 $profit \!\!<\!\! P1,\!P2,\!P3,\!P4,\!P5,\!P6,\!P7 \!\!> = \!\!<\! 10,\!5,\!15,\!7,\!6,\!18,\!3 \!\!> and$

 $weight <\!\!W1,\!W2,\!W3,\!W4,\!W5,\!W6,\!W7\!\!>=<\!\!2,\!3,\!5,\!7,\!1,\!4,\!1\!\!>$

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Department of Computer Science & Engg.

Subject: Design and Analysis of Algorithms						
Subject Teacher: Prof. Dipti Theng	Max Marks: 04					
Roll No.: Class:						
	Subject Teacher: Prof. Dipti Theng					

Q. 1. Solve following problems:

A. What is Optimal Huffman code for the following set of data?

38, 42, 22, 15, 94, 63, 101, 43, 13, 21

B. Which is optimal value in the case of fractional knapsack problem, capacity of knapsack is 15

Object	1	2	3	4	5	6	7
Profit	11	5	14	7	6	20	3
Weight	2	3	5	7	1	4	1

S10

G. H. RAISONI COLLEGE OF ENGG. NAGPUR

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Department of Computer Science & Engg.

TAE-III: Probl	em Solving	Sub	Subject: Design and Analy Subject Teacher: Prof. Dipti Theng							
Name of Student	<u>:</u>				Roll	No.:	Clas	ss:		
Q. 1. Solve follow	ing problems:									
A. Create a Huffm	an code for the	following	g set of dat	a and also	find the le	ength of e	ncode file			
	Character	А	В	С	D	E	F	G		

C. Huffman coding:

How many bits may be required for encoding the message

Count

29

14

'mississippi'?

17

45

11

5