BRAC University (Department of Computer Science and Engineering)
CSE 221 (Algorithms) for Summer 2025 Semester
(NO EXTRA PAGE IS ALLOWED)
Makeup Quiz

Student ID:
Section:
Name:
Makeup Quiz No:

Full Marks: 20
Duration: 20 minutes

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1. A student has 6 hours/week available for extra courses. There are 5 courses available. Each course takes some weekly workload (hours/week) and grants some credit hours. The student can either take a course or skip it. Pick courses to maximize total credits without exceeding the 6-hour limit. Simulate and find the maximum total credits without exceeding 6 hours/week constraints **(10)**

Course Number	Course Name	Workload (hours/week)	Credit hours
1	Algorithms	3	4
2	Database	2	3
3	Data Structure	4	5
4	AI	1	1
5	ML	2	2

course \ credit (work)	0	1	2	3	4	5	6
0	0	0	0	0	0	0	0
1	0	0	0	4	4	4	4
2	0	0	3	4	4	7	7
3	0	0	3	4	5	7	8
4	0	1	3	4	5	7	8
5	0	1	3	4	5	7	8

Ans

2. You have a knapsack that can carry 15 kg. There are 4 kinds of commodity items available. For each item you are given only two columns: available weight (kg) and total value. You are allowed to take fractions of any item. You must pick items to maximize total value, keeping total taken weight under 15 kg. Write down the sequence that you would pick items into the knapsack.**(4)**

Item	Available (kg)	Total value
A	10	100
B	5	60
C	2	30
D	8	76

per unit price

100/10 = 10

60/5 = 12

30/2 = 15

76/8 = 9.5

Ans

C → B → A → D

3. You are given the following text. Which letter will get the shortest code in Huffman coding and why? **(3)**

abacaabaaabcddeb

Higher the freq, lower ~~# of~~ bits.

Ans = a

4. Suppose you are given a Huffman coding tree. You receive a long stream of bits like 010110....
Can there ever be any ambiguity while decoding this stream into characters? If yes, how? If not, why not? Explain your reasoning. **(3)**

clearly No.

given tree, getting a 0 → going left

" " 1 → " right

No Ambiguity possible.