

CHUKA



UNIVERSITY

**SUPPLEMENTARY/ SPECIAL EXAMINATIONS**

**EXAMINATION FOR THE AWARD OF DEGREE OF  
BACHELOR OF SCIENCE IN COMPUTER SCIENCE, BACHELOR OF SCIENCE IN  
APPLIED COMPUTER SCIENCE**

**COSC 333: DESIGN AND ANALYSIS OF ALGORITHMS**

**STREAMS: BSC (COSC, ACSC) Y3S2**

**TIME: 2 HOURS**

**DAY/DATE: WEDNESDAY 03/02/2021**

**8.30 AM – 10.30 AM**

**INSTRUCTIONS:**

- Answer Question **ONE** and any other **TWO** questions.
- Diagrams should be used whenever they are relevant to support an answer.
- Sketch maps and diagrams may be used whenever they help to illustrate your answer
- Do not write anything on the question paper
- This is a **closed book exam**, No reference materials are allowed in the examination room
- There will be **No** use of mobile phones or any other unauthorized materials
- Write your answers legibly and use your time wisely
- Electronic, non-programmable calculators may be used

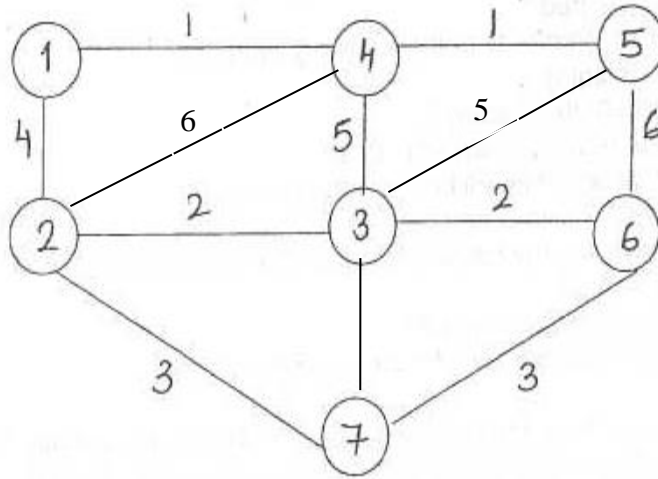
**SECTION A: COMPULSORY**

**QUESTION ONE [30marks]**

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- a. Do as directed.
1. Explain Asymptotic Notation. **[3mks]**
  2. Explain limit rules. **[2mks]**
  3. What is maximum rule? Give One Example. **[1mk]**
- b. Explain Divide and Conquer Technic for multiplying two large intergers. **[3mks]**
- c. Explain quick sort algorithm with example. **[3mks]**
- d. Explain Binary search algorithm and derive it's time complexity. **[3mks]**
- e. Explain sequential Exponential algorithm(exposeq()) and Exponatial with divide and conquer technic(expoDC()). Also derive it's time complexity. **[6mks]**

f. Find the minimum spanning tree for the graph shown below using prim's algorithm

[6mks]

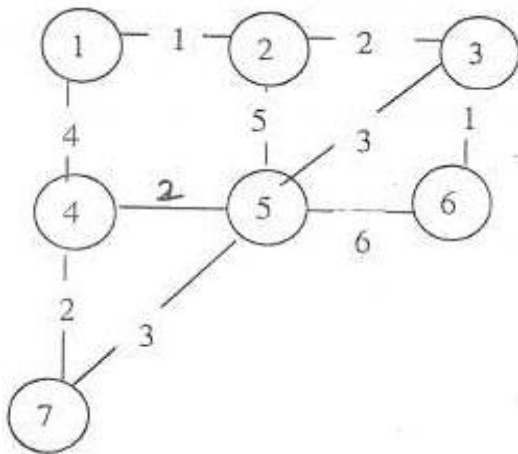


	g. Explain characteristics of Greedy algorithm	[3mks]

**SECTION B: (CHOOSE ONLY TWO QUESTIONS FROM THIS SECTION)**

**QUESTION TWO:**

a. Find the minimum spanning tree for graph shown bellow using Kruskal's and Prim's algorithm [10mks]



b. Solve the following knapsack problem using the Greedy algorithm  
[10 mks]

w	10	20	30	40	50
v	20	30	66	40	60

Weighting carrying capacity of the knapsack(W) is 100  
Number of object (n) is 5.

### QUESTION THREE 20 MKS

- a. What is back tracking? Explain with example. [6mks]
- b. Explain scheduling with deadline. [4mks]
- c. Explain: Depth first search algorithm with undirected graph [4mks]
- d. Explain Merge sort algorithm and describe its time complexity.[6mks]

### QUESTION FOUR 20 MKS

- a. Explain the following terms [6mks]
  - 1) P class
  - 2) NP Class
  - 3) NPC Class
- b. What is the basic difference between divide and conquer and dynamic programming? What is the basic approach in solving the problem using Dynamic programming? [10mks]
- c. Write down the characteristics of greedy algorithms. [4mks]

**QUESTION 5 [20 MKS]**

With the use of dynamic programming, find the Longest common subsequence for the sequences  $X = \{BACDB\}$  and  $Y = \{BCDB\}$ , Use tables to illustrate your workings and how you achieve the final answer[20mks]

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