**BSC-INFORMATION TECHNOLOGY YEAR 3 SEM I**

**CIT 3106- DESIGN AND ANALYSIS OF ALGORITHMS-PRACTICE QUESTIONS**

1. Define the following terms as used in design and analysis of algorithms.
2. Optimal substructure
3. Greedy choice property
4. Base case
5. Construct a Huffman tree and find the Huffman codes for the alphabet below (6 marks)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Symbol | A | B | C | D | E | F |
| Frequency | 15 | 20 | 12 | 28 | 19 | 6 |

1. Encode AFBDEECA using the codes in c
2. 001000011011
3. Solve the following instance of the knapsack fractional problem algorithm Knapsack capacity.

Weight= 10 kg. (6 marks)

|  |  |  |
| --- | --- | --- |
| **Item** | **weight** | **Value** |
| 1 | 4 | $60 |
| 2 | 5 | $50 |
| 3 | 3 | $18 |
| 4 | 7 | $21 |

1. Find the longest common subsequence of string Y and X below and give its time complexity. (6 marks)

Y: CCABDMFGNH

X: ABCVDEFGH

1. Find the fastest way through the assembly line below clearly showing the for step of solving dynamic programming problems (6 marks)

4 4

**1 6 4**

**3 7 2**

9 3

1. Search the graph below by applying the breadth first search.

**2**

**4 3 6 5**

**6 8**

**5 7 9**