

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SIXTH SEMESTER EXAMINATION, MAY 2024

THIRD YEAR [BATCH 2021-24]

COMPUTER SCIENCE [Honours]

Date : 10/05/2024

Time : 11 am – 1 pm

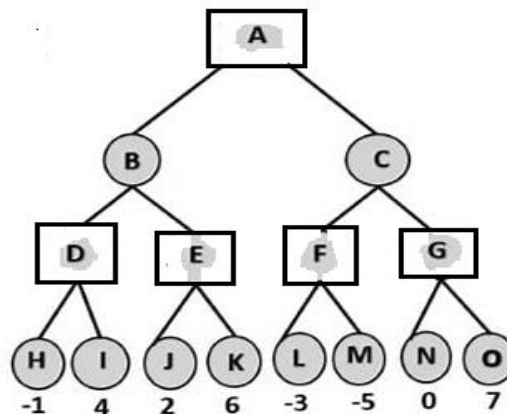
Paper : CC13

Full Marks : 50

Answer **any five** questions:

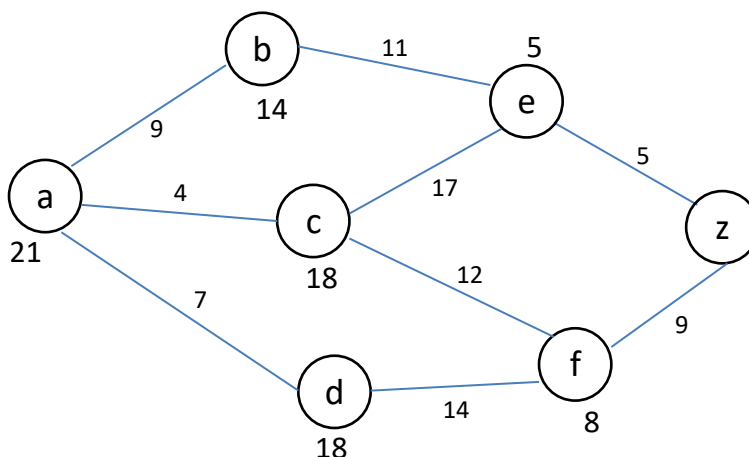
[5×10]

1. a) Explain Artificial Intelligence in the context of 'acting humanly' and 'acting rationally'.
b) What do you mean by Rational Agent and Intelligent Agent?
c) "BFS is a special case of uniform cost search" – justify. (3+3+4)
2. We have three jugs of capacities 3, 5 and 8 litres respectively. There is no scale on the jugs, so it's only their capacities that we certainly know. Initially, the 8-litre jug is full of water, the other two are empty. Now answer the following questions:–
a) Formulate this problem as state-space search problem by clearly representing the initial state, set of goal states and possible operators.
b) Draw the state-space graph for the problem.
c) Show any one solution to the problem by specifying the sequence of operators. (3+3+4)
3. a) Write a short note on Simulated Annealing.
b) Perform α - β pruning on the given tree. Make necessary assumptions:



(5+5)

4. Apply A* algorithm to find out the shortest path from the start node (a) a goal node (z) for the following graph. (10)



5. a) Explain Skolemization and Modus Ponens with example.
 b) Write down the following sentences in terms of p, q, r and logical connectives where p: I will study AI; q: I will go to a movie; r: I am in a good mood:
 i) I will go to a movie if and only if I will not study AI.
 ii) If I will not study AI, then I am not in a good mood. [6+(2+2)]
6. a) Express the statement using quantifiers and predicates: "There is a building on the campus of some college in India in which every room is painted white".
 b) Prove that the following sentence is valid "If price fall then sell increases. If sell increases then Mukesh makes the whole money. But Mukesh does not make the whole money. Therefore, price does not fall. (4+6)
7. a) We want to compare the strength of two types of concrete. Four concrete masonry units (CMUs) from each type of concrete are stressed until they fail. The lowest stress at failure of a CMU is denoted 1, and the highest stress at failure is denoted 4, so the CMUs are rank ordered by failure stress, that is, $X = \{1, 2, 3, 4\}$. Since "failure" of CMUs is fuzzy, the membership value for a specific CMU represents the judgment that the CMU really failed. The following fuzzy sets represent the failure estimates for the two different concrete types: $A = \{0.15/1 + 0.25/2 + 0.6/3 + 0.9/4\}$ and types $B = \{0.2/1 + 0.3/2 + 0.5/3 + 0.8/4\}$. Calculate the union, intersection, and the difference for the two concrete types.
 b) State the difference between crisp set and fuzzy set. (8+2)

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