Question Paper

Exam Date & Time: 19-Jan-2024 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
END SEMESTER THEORY EXAMINATION - NOVEMBER/DECEMBER 2023
III SEMESTER B.Sc. (APPLIED SCIENCES) IN ENGG.
ARTIFICIAL INTELLIGENCE [ICS 236]

Marks: 50 **Duration: 180 mins.**

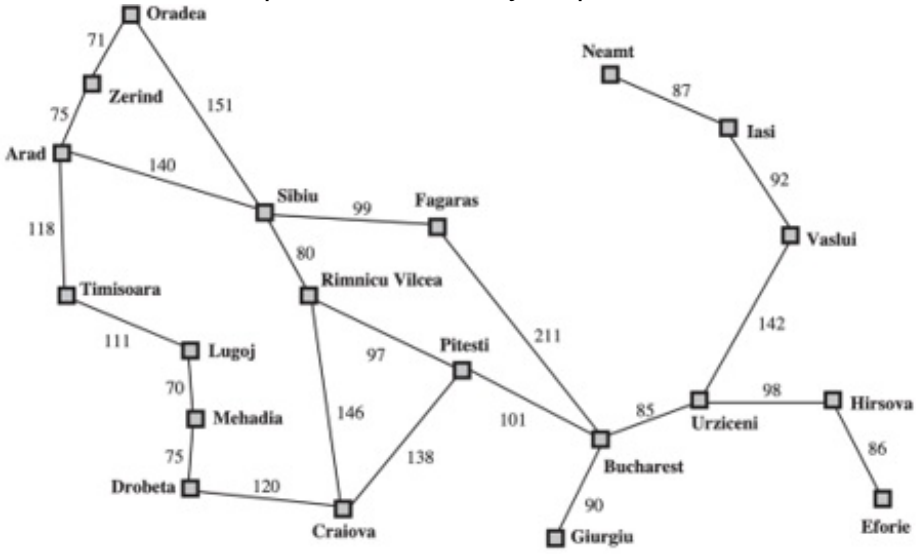
Answer all the questions.

Missing data, if any, may be suitably assumed

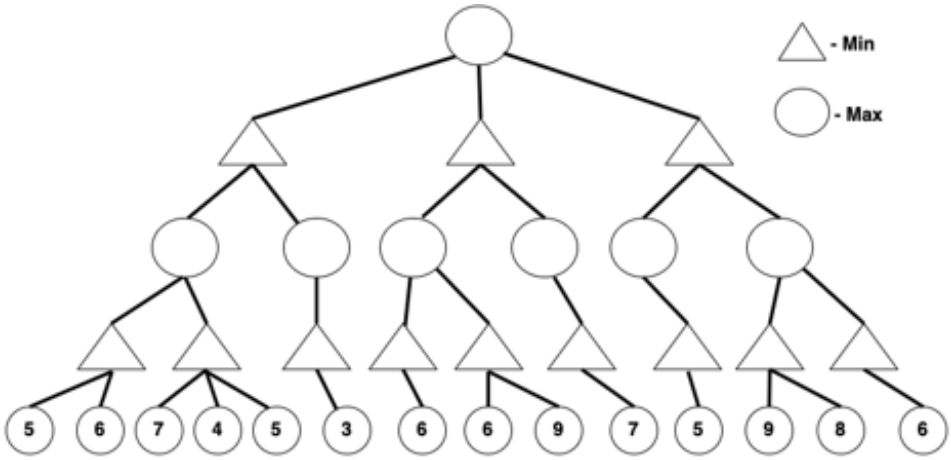
1) A) Compare and contrast the following four approaches to define Artificial Intelligence: (5)
"Thinking Humanly"
"Thinking Rationally"
"Acting Humanly"
"Acting Rationally"

B) Write neat diagram and Explain Turing Test method? (5)

2) A) Consider the following map of "Romania". Find the city "Bucharest" while you are at "Arad" using Breadth First Search and Depth First Search algorithms. Show the tree generation steps along with the queue and visited nodes list updations for every step. (5)



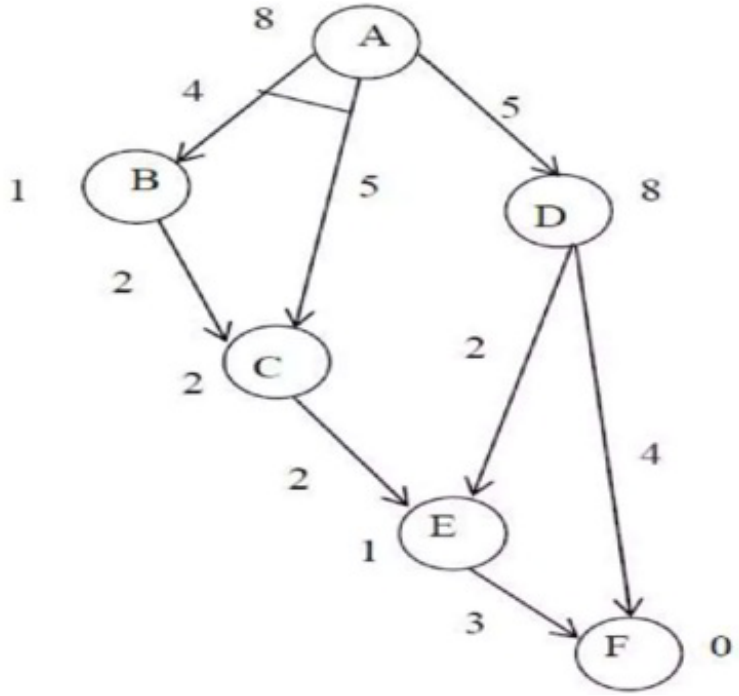
B) Solve the following using Min-Max algorithm? (5)



3) Solve the following cryptarithmetic problem using Constraint Satisfaction Problem logic. BASE+ BALL = GAMES. (5)

A) Constraints:
1. Each Letter, Symbol represents only one digit throughout the problem.
2. The values for each letter is ranging between (0 to 9)

B) For given graph compute optimal path along with cost using AO* search method? Where A is start node and F is the goal node. (5)

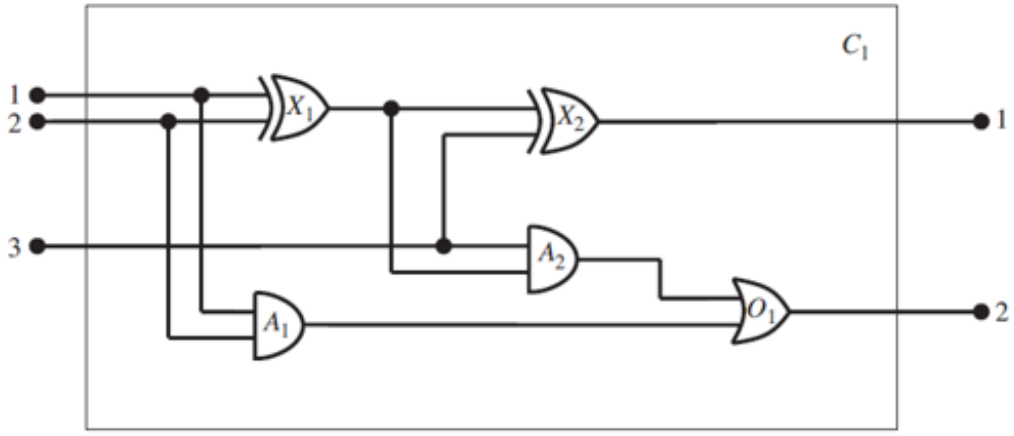


4) Using Resolution proof proves that "Angle B is equal to angle C" by considering the below set of literals. (5)

A) a) If a triangle is equilateral then it is isosceles.
b) If a triangle is isosceles then sides AB and AC are equal.
c) If AB and AC are equal then angle B and angle C are equal.
d) ABC is an equilateral triangle.

B) The diagram describes digital circuit C1, purporting to be a one-bit full adder. The first two inputs are the two bits to be added, and the third input is a carry bit. The first output is the sum, and the second output is a carry bit for the next adder. The circuit contains two XOR gates(X1,X2), two (5)

AND gates (A1,A2), and one OR gate(O1). For a given digital circuit, analyze the seven-step process for knowledge engineering with appropriate predicates.



5) Write predicates for the following. (5)

A) i) The best score in Greek is always higher than the best score in French
ii) Every person who buys a policy is smart.
iii) No person buys an expensive policy
iv) There is a barber who shaves all men in the town who do not shave
v) Politicians can fool some of the people all of the time, and they can fool all of the people some of the time, but they can't fool all of the people all of the time

B) Below is an example of a full joint distribution for the toothache, cavity, and catch worlds, and it describes the presence or absence of cavities in a patient with a toothache. The probabilities in the table represent the likelihood of each possible combination of the variables. Computer conditional probabilities P(cavity | toothache) and P(¬cavity | toothache) using Bayes Thorem. (5)

	toothache		¬toothache	
	Catch	¬ Catch	Catch	¬ Catch
Cavity	0.20	0.10	0.5	0.25
¬Cavity	0.30	0.15	0.10	0.35

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