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KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
THIRD YEAR, FIRST SEMESTER EXAMINATION
FOR THE BACHELOR OF SCIENCE IN COMPUTER SCIENCE
KCS 309 – ARTIFICIAL INTELLIGENCE

Date: 15TH AUGUST 2023
Time: 11:30AM – 1:30PM

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS
QUESTION ONE (30 MARKS)

a) Consider the following rule: "Every cow has horns".
Further, assume the following facts.
"Tony is a cow".
"Tim has horns"
"Jay has no horns"
"Leli is not a cow".
"Either Suzy is a cow or Suzy has horns"

Required: State whether the following conclusions are **True** or **False** according to the rules of propositional logic. (6 Marks)

i) " Tony has horns"
ii) "Tim is a cow"
iii) "Jay is not a cow"
iv) "Leli has no horns"
v) "Suzy has horns"
vi) "One cannot have horns and fail to be a cow"

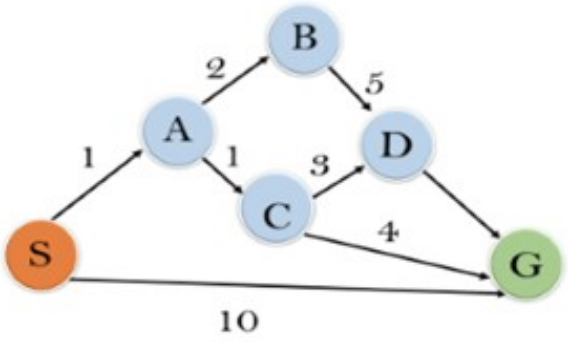
b) Define the terms as used in AI.
i) Inference (2 Marks)
ii) An Agent? (2 Marks)

c) The Disjunctive syllogism rule state that if $P \vee Q$ is true, and $\neg P$ is true, then Q will be true. Represent the notation for the rule. (4 Marks)

d) Write the following sentence using a conjunction as used in AI.
"Benson is intelligent and hardworking." (4 Marks)

e) Describe the PEAS Representation as used in AI (6 Marks)

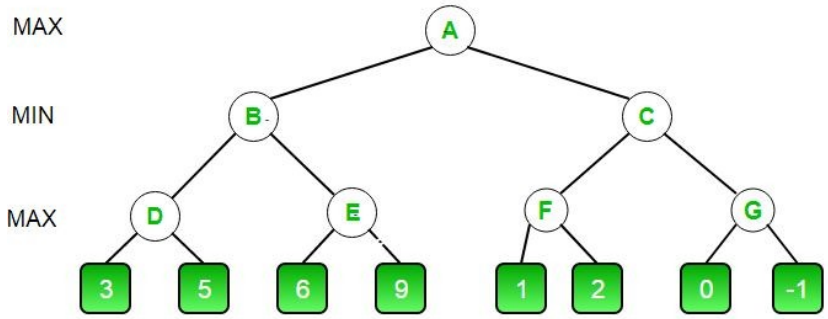
f) Traverse the given graph using the A* algorithm showing the process and your final solution. (6 Marks)



QUESTION TWO (20 MARKS)

a) Differentiate between Breadth First algorithm and Depth First Algorithm using examples (6 Marks)

b) Using the Alpha Beta Pruning algorithm, show your operation and find the optimal value as output. (6 Marks)



c) The syntax of propositional logic defines the allowable sentences for the knowledge representation. Explain the two types of propositions in use with examples. (8 Marks)

QUESTION THREE (20 MARKS)

a) The Modus Tollens rule state that if P→ Q is true and ¬ **Q is true, then** ¬ **P** will also true.

i) Represent the rules notation (3 Marks)

ii) Use an example to show how the rule works hence proof your answer with a truth table. (7 Marks)

b) Explain the five types of knowledge (10 Marks)

QUESTION FOUR (20 MARKS)

a) Explain the working of a Min-Max Algorithm (6 Marks)

b) State the main goals of Artificial Intelligence (5 Marks)

c) Represent the following sentences in First Order Logic using quantifier.

i) All birds fly. (2 Marks)

ii) Every man respects his parent (2 Marks)

iii) Some boys play cricket (2 Marks)

iv) Not all students like both Mathematics and Science (3 Marks)

QUESTION FIVE (20 MARKS)

a) Demonstrate the properties of operators as used in intelligence. (12 Marks)

b) Discuss the properties of search algorithms (8 Marks)