

----- **CLO 1:**
Articulate how artificial intelligence enables the capabilities of a computer, machine, or system to mimic human Brain -----

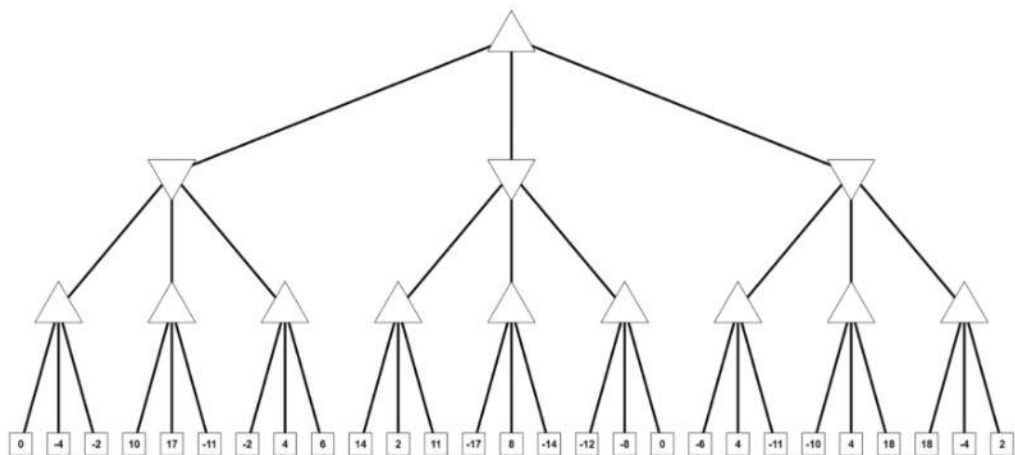
Question 01: **(5 marks)**

- a) What is the difference between a rational and an intelligent agent. Properly define and differentiate between the two agent types. **(2.5 + 2.5 = 05 marks)**

----- **CLO 2:**
Apply various AI problem solving and searching techniques to a real-world problem. -----

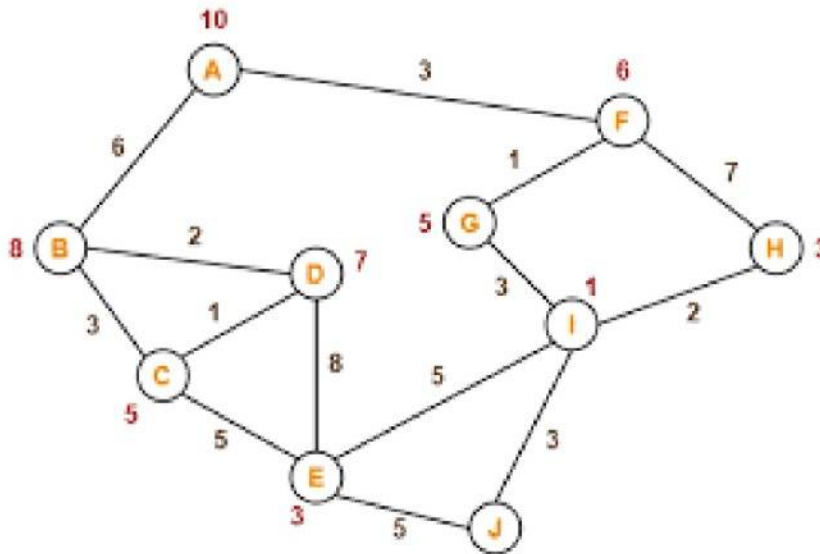
Question 02: **(10 marks)**

- a) Perform min-max along with alpha-beta pruning on the given tree (assuming MAX on top) **(1 + 4 = 05 marks)**



NOTE: The values in sequence from Left-to-Right are: 0, -4, -2, 10, 17, -11, -2, 4, 6, 14, 2, 11, -17, 8, -14, -12, -8, 0, -6, 4, -11, -10, 4, 18, 18, -4, 2

- b) Apply A* Search to the following graph. Node 'A' is your initial node and your goal is to reach node 'J'. The values of cost/heuristic function are also mentioned for the edges as well as the nodes. Show the final path and cost **(5 marks)**.

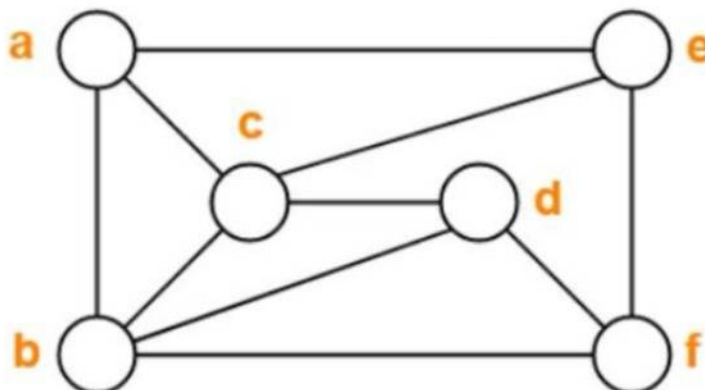


----- CLO 3:

Formulate a problem specified in natural language as a constraint satisfaction problem. -----

Question 03: (9 marks)

- a) Solve the given graph using CSP (graph coloring). Listing the variables, domains, constraints, total number of colors needed to solve this problem, and the final solution (05 marks)



- b) Consider the timetable problem of your university. While making the timetable of **one section**, some considerations needs to be catered for such as instructor availability, room capacity, no-time-conflicts. Identify the variables, their domains, and list the constraints as they map with the variables. (04 marks)

----- CLO 4:

Apply resolution to a set of logic statements to answer a query. -----

Question 04: (10 marks)

- a) Convert the following statements to their equivalent FOL (First Order Logic) (05 marks)
- a. Everyone knows that there are people who don't respect their elder
 - b. Not all students like both Mathematics and Science.
 - c. All birds fly.
 - d. Some boys play cricket
 - e. Lilly is tall
- b) Respond to the following (2.5 + 2.5 = 05 marks)
- a. What does CNF and DNF stands for? Define the usage of CNF and DNF along with a valid example (one or two statements)

----- CLO 5:

Compare different planning strategies for different applications under uncertainty -----

Question 05: (16 marks)

- a) Considering the given data set, **predict if the given fruit is a “banana”, “orange” or “other” when only three features (long, sweet and yellow) are known.** HINT: Given a fruit that is long, sweet and yellow: Can you predict which fruit it is? (10 marks)

Type	Long	Not Long	Sweet	Not Sweet	Yellow	Not Yellow	Total
Banana	400	100	350	150	450	50	500
Orange	0	300	150	150	300	0	300
Other	100	100	150	50	50	150	200
Total	500	500	650	350	800	200	1000

- b) Considering the given conditions, write at least **Three** classical Planning paths: (2 + 2 + 2 = 06 marks)

Initial State (I) = 5

Goal State (G) = 11

Operators (O) = {Increment, Decrement, Double, Half}