Indian Institute of Information Technology, Sri City, Chittoor

Name of the Exam: **AI** Duration: 1.5 hours Max Marks: 25

Read the Instructions before proceeding:

1. This is a **closed book exam**. You can use **a calculator** if necessary.
2. **Please Write/Draw legibly**! If we can't understand what you have written, we can't grade it.
3. **Don't use Pencils** for answering/drawing. The final answer **must** be in blue or black ink.
4. Clearly mention the question number before the answer.

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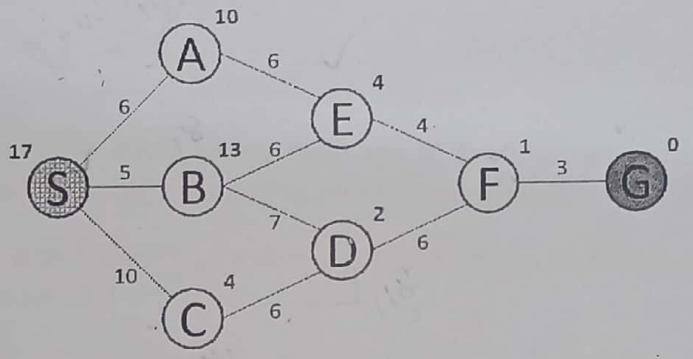
1. a)What is PEAS for Vaccum cleaner ? **(4 Marks)**
   b) Draw Goal-based reflex agents and explain with an example **(5 Marks)**

2. Write down the evaluation function for A* search algorithm. For the graph given below, find the optimal path from S to G using A* algorithm. In this graph, the nodes S and G represent the source and goal states respectively. The cost (g) between two adjacent nodes is given on the edge (e.g. g(A, E) = g(E, A) = 6). The heuristic value (h) to reach the goal state from a node is given outside the node (e.g., h(S) =17). Write your answer stating the tree diagram, selected node for expansion, evaluation score for each successor node, visited nodes in each step. **(8 Marks)**



3. a) Write the steps of Genetic Algorithm. **(2 Marks)**
   b) Solve the following Knapsack problem using Genetic Algorithm to fill the Knapscak with maximizing the benefit according to the instructions given below. **(6 Marks)**
   a) Knapsack holds the maximum weight of 22 pounds.
   b) Choose the initial seeds as 1101011, 1100100, 0100011.
   c) Perform the Cross-Over after 3rd bit from the left side.
   d) Mutate the leftmost bit in the first child and rightmost bit in the second child after the crossover.
   e) Perform the optimization for 2 iterations. Write the Decimal Value of weight and benefit for each offspring produced at the end of the iterations. **(Note: Each iteration carries 3 Marks)**

Item	1	2	3	4	5	6	7
Benefit	5	8	3	2	7	9	4
Weight	7	8	4	10	4	6	4