

الإسم الرقم

ورقة الإمتحان تشتمل على 7 صفحات
أجب عن جميع الأسئلة في الأماكن المخصصة للإجابة

Q1	Q2	Q3	Q4	Q5	Total

Question (1): (15 Marks)

1- Define the following terms: (6 Marks)

A. Artificial intelligence (AI) as a system that :

1) Acting Rationally.

.....
.....
.....

2) Thinking Humanly.

.....
.....
.....

B. Intelligent System

.....
.....

2- What are the difference between **Strong** AI and **Weak** AI?

(3 Marks)

.....
.....
.....
.....
.....

3- Mention any six applications of the Artificial Intelligence.

(3 Marks)

.....
.....
.....

4- List the capabilities that a computer should possess for conducting a Turing Test?

(3 Marks)

.....
.....
.....

Question (2): (15 Marks)

A- Match list (B) with (A) by writing the number from (A) into (C)

(15 Marks)

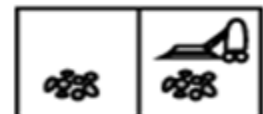
(A)	(B)	(C)
1. Search Strategy	Any path with minimum cost	
2. Turing Test	Program's inputs/output and timing behavior matched with the human behavior.	
3. Intelligence	Possible states of a system	
4. Neural Networks	Agent acts upon a purely computational environment	
5. Optical Character Recognition (OCR)	Software applications to become more accurate in predicting outcomes without being explicitly programmed	
6. Optimal solution	Produce by human art or effort	
7. State Space Graph	System that converts the knowledge of an expert in a specific subject into a software code.	
8. State Space Tree	Agent's sensors give it full access to the complete state.	
9. Software Agent	Brain Modeling	
10. Fully observable environment	Modeling how the world changes , how it's actions change the world	
11. Expert Systems	The inability to distinguish computer response from human response	
12. Thinking Humanly	Tree is a special case of a graph	
13. Artificial	Software reads the text written on paper by a pen or on screen by a stylus and recognize the shapes of the letters and convert it into editable text	
14. Machine Learning	systematic examination of states to find path from the start/root state to the goal state	
15. Model-based Reflex Agents	Is the ability to acquire knowledge and use it	

Question (3): Mark with circle the correct answer (only one):

(15 Marks)

-is the inability to distinguish computer responses from human responses.
 - Search technique
 - Turing Test
 - Intelligent Agent
 - Cognitive modeling
- Which of the following is a component of an expert system?
 - Inference engine
 - Knowledge base
 - User interface
 - All of the above
- Which instruments are used for perceiving and acting upon the environment?
 - Sensors and Actuators
 - Sensors
 - Perceiver
 - None of the mentioned
- Basic Agent structure it can be represented by:
 - Agent = Structure + program
 - Agent = Architecture + program
 - Agent = Architecture + function
 - Agent = program + function

5. **Intelligent systems that are capable of hearing and comprehending the language in terms of sentences and their meanings while a human talks to it is called:**
- A. Natural Language Processing (NLP) B. Speech Recognition
C. OCR D. Handwriting Recognition
6. **A search strategy that extends the current path as far as possible before backtracking to the last choice point and trying the next alternative path is called:**
- A. A* B. DFS
C. BFS D. CSP
7. _____ **is a search that has no information about its domain.**
- A. Informed Search B. Uninformed Search
C. Blined Search D. Both (B) and (C)
8. **Which agent deals with happy and unhappy states?**
- A. Simple reflex agent B. Learning agent
C. Utility based agent D. Model based agent
9. **A Search strategy, in which the highest layer of a decision tree is searched completely before proceeding to the next layer is called:**
- A. DFS B. BFS
C. Best-First Search D. Hill climbing
10. **Laws of Thought mean systems that :**
- A. Acting rationally B. Thinking humanly
C. Thinking rationally D. Acting humanly
11. **Rational behavior means :**
- A. Doing the right thing B. Maximize goal achievement
C. Rational thinking D. All mentioned answers are true
12. **Which of the following AI application represent a system acts rationally**
- A. Robots B. Internet Search engine
C. Game of Chess D. Vacuum cleaner
13. **What is the rule of simple reflex agent?**
- A. Simple-action rule B. Condition-action rule
C. Simple & Condition-action rule D. None of the mentioned
14. **Fuzzy logic is:**
- A. Generalization of predicate logic B. Special form mathematical logic
C. Both (A) and (B) D. None of the mentioned
15. **Consider the vacuum cleaner in the state shown in the figure below, what is the optimal solution?**
- A. Suck, Right ,Suck , Left
B. Left , Suck , Right ,Suck
C. Suck , Left , Suck ,NOOP
D. Suck , Right ,Suck ,NOOP



Question (4): (25 Marks)

1- Define the Intelligent Agent

(2 Marks)

.....

.....

2- What are the factors that a rational agent should depend on at any given time?

(3Marks)

.....

.....

.....

3- List the various types of agent programs.

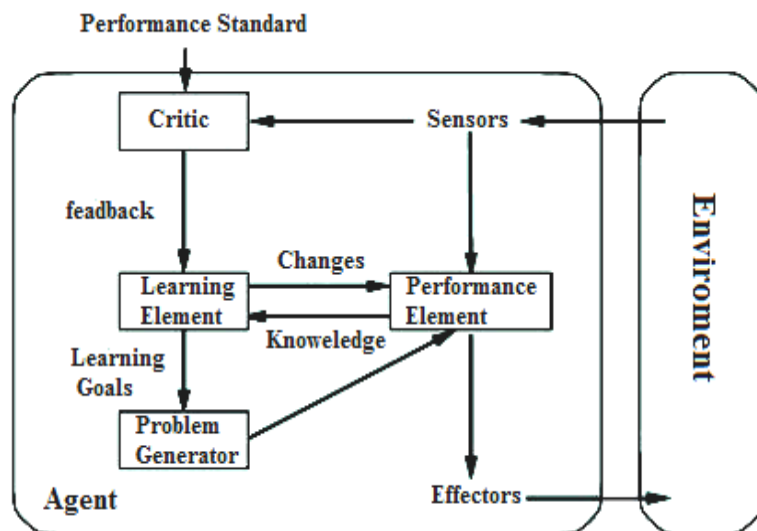
(3 Marks)

.....

.....

.....

4- The figure below shown an intelligent agent type, try to answer the following questions :



(A) What is the name of this type of intelligent agent?

(1 Mark)

.....

(B) Match the following parts of the agent with their functions.

(2 Marks)

Critic	Learning element	Problem generator	Performance Element
--------	------------------	-------------------	---------------------

Agent Part	Function
	Responsible for selecting external actions. In previous parts, this was the entire agent.
	Gives feedback on how agent is going and determines how performance element should be modified to do better in the future.
	Suggests actions for new and informative experiences
	Responsible for making improvements (on whatever aspect is being learned)

5- Describe the major problems of the simple reflex agent.

(3 Marks)

.....

.....

.....

6- Mention the basic algorithm for a rational agent

(3 Marks)

.....

.....

.....

.....

.....

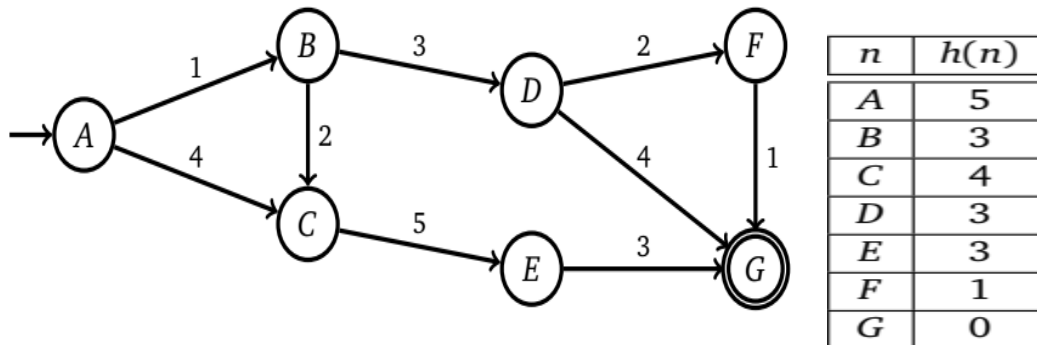
7- Complete the following table

(8 Marks)

PEAS	Intelligent Agent	
	Medical Diagnosis System	Automatic Car
Performance
Environment
Actuators
Sensors

Question (5): (30 Marks)

1- The following is a representation of a search problem, where A is the start node and G is the goal. Each edge is labeled by the cost to traverse that edge. There is also a heuristics $h(n)$ which is defined in the table. Answer the following questions :



(A) Define the problem formulation. (2Marks)

.....
.....

(B) List any six (6) components of a search problem. (3Marks)

1-	2-	3-
4-	5-	6-

(C) Convert the above space state graph into space state tree. (5 Marks)

Hint: Let the node Names (A, B... etc) ordered in alphabet from left to right at each row or level in the tree)

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

(D) From your answer in (C) find the path from **A** to G if we use : (2 Marks)

i. Breadth First Search (BFS):

.....

ii. Depth First Search (DFS):

.....

2- Complete the following table to find the shortest path from node **A** to node **G** if we use Best-First-Search(BFS) : (10 Marks)

Hint: $f(n) = h(n) + d(n)$

Step	Node expanded	Cost to expanded nodes
0		$f(A) = h(A) + d(A) = 5 + 0 = 5$
1	A	$f(B) = 3 + 1 = 4$, $f(C) = \dots + \dots = 8$
2	B	$f(C) = \dots + \dots = \dots$, $f(D) = \dots + \dots = \dots$
3	D	$f(F) = \dots + \dots = 8$, $f(G) = \dots + \dots = \dots$
4	$f(\dots) = \dots + \dots = \dots$, $f(\dots) = \dots + \dots = \dots$
5	G	$f(\dots) = \dots + \dots = \dots$, $f(\dots) = \dots + \dots = \dots$

3- What is the difference between uninformed and informed search strategies? (3 Marks)

.....

4- Consider the following map. The task is to color the map using the four colors **Red**, **Blue**, **Yellow**, and **Green**, such that no two adjacent regions take the same color. Convert the problem into Constraint Satisfaction Problem (CSP) and write a PROLOG program for this task. (5 Marks)

