

AI UNIT TEST-1

Students are requested to submit the exam by 10:30

*** Required**

1. Email address *

2. Full Name *

3. Roll Number *

4. Department *

Mark only one oval.

☐ IT

☐ CSE

5. Semester *

Mark only one oval.

☐ 5th

☐ 7th

Unit Test-1

6. Untitled Question *

1 point

Weak AI is

- A. A set of computer programs that produce output that would be considered to reflect intelligence if it were generated by humans.
- B. The study of mental faculties through the use of mental models implemented on a computer.
- C. The embodiment of human intellectual capabilities within a computer.
- D. All of the above

Mark only one oval.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

7. *

1 point

AI Technique is a manner to organize and use the knowledge efficiently in such a way that _____.

- A. It should be perceivable by the people who provide it.
- B. It should be easily modifiable to correct errors.
- C. Both A and B
- D. None of the Above

Mark only one oval.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

8. *

1 point

State whether the following condition is true or false?

"Artificial Intelligence means to mimic a human. Hence, if a robot can move from one place to another like a human, then it comes under Artificial Intelligence."

- A. True
- B. False

Mark only one oval.

- ☐ A
- ☐ B

9. *

1 point

Consider the following statements related to AND-OR Search algorithm. S1: A solution is a subtree that has a goal node at every leaf. S2: OR nodes are analogous to the branching in a deterministic environment. S3: AND nodes are analogous to the branching in a non-deterministic environment. Which of the following is true referencing the above statements? Choose the correct answer from the code given below:

- A. S1 – False, S2 – True, S3 – True
- B. S1 – True, S2 – True, S3 – False
- C. S1 – True, S2 – True, S3 – True
- D. S1 – False, S2 – True, S3 – False

Mark only one oval.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

10. *

1 point

A* algorithm uses $f' = g + h'$ to estimate the cost of getting from the initial state to the goal state, where g is a measure of the cost of getting from initial state to the current node and the function h' is an estimate of the cost of getting from the current node to the goal state. To find a path involving the fewest number of steps, we should set

- A. $g = 1$
- B. $g = 0$
- C. $h' = 0$
- D. $h' = 1$

Mark only one oval.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

11. *

1 point

Consider following sentences regarding A*, an informed search strategy in Artificial Intelligence (AI). (a) A* expands all nodes with $f(n) < C^*$. (b) A* expands no nodes with $f(n) \geq C^*$. (c) Pruning is integral to A*. Here, C^* is the cost of the optimal solution path. Which of the following is correct with respect to the above statements?

- A. Both statement (a) and statement (b) are true.
- B. Both statement (a) and statement (c) are true.
- C. Both statement (b) and statement (c) are true.
- D. All the statements (a), (b) and (c) are true.

Mark only one oval.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

12. *

1 point

Consider the following bachelor Prolog program. What would it be the "INCORRECT" result of the following query? bachelor(P) :- male(P), not married(P). male(henry). male(tom). married(tom).

A. ?- bachelor (henry).

yes

B. ?- bachelor (tom).

No

C. ?- bachelor (Who).

Who=henry

D. ?- married(X).

X=tom

E. ?- male (P).

no

Mark only one oval.

☐ A

☐ B

☐ C

☐ D

☐ E

13. *

1 point

Which of the mentioned options are a part of 'planning' while solving a problem by an AI agent?

- A. Deciding which data Structure to choose
- B. Forming the control strategy
- C. Inferring for similar problems in the knowledge base
- D. All of the above

Mark only one oval.

☐ A☐ B☐ C☐ D

14.

1 point

Consider the following statement:

"The search first begins from the root node and the first one of the child node's sub-tree is completely traversed. That is, first all the one-sided nodes are checked, and then the other sided nodes are checked."

Which search algorithm is described in the above definition?

- A. The Breadth First Search (BFS)
- B. The Depth First Search (DFS)
- C. The A* search
- D. None of the above

Mark only one oval.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

15. *

1 point

How many types of entities are there in knowledge representation?

- A. Facts
- B. Symbols
- C. Both A and B
- D. None

Mark only one oval.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

16. *

1 point

Which is not a property of representation of knowledge?

- A. Representational Verification
- B. Representational Adequacy
- C. Inferential Adequacy
- D. Inferential Efficiency
- E. Acquisitional Efficiency.

Mark only one oval.

- ☐ A
- ☐ B
- ☐ C
- ☐ D
- ☐ E

17. *

1 point

Consider the following statement,

"After all the gathering of knowledge and planning the strategies, the knowledge should be applied and the plans should be executed systematically to reach the goal state most efficiently and fruitfully."

What does the above definition refer to?

- A. Knowledge gathering strategy
- B. Final step of solving the AI problem, which is applying the strategies
- C. State space deciding
- D. None of the above

Mark only one oval.

☐ A

☐ B

☐ C

☐ D

18. *

1 point

In AI, the Logic is classified into two types: deductive and inductive. Which of the following approaches is followed up by the Inductive logic?

- a) Top-down approach
- b) Bottom-up approach
- c) No specific approach
- d) According to precedence

Mark only one oval.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

19. *

1 point

Which one of the following is the most appropriate logical formula to represent the statement? "Gold and silver ornaments are precious". The following notations are used:
G(x): x is a gold ornament S(x): x is a silver ornament P(x): x is precious

- A. $\forall x(P(x) \rightarrow (G(x) \wedge S(x)))$
- B. $\forall x((G(x) \wedge S(x)) \rightarrow P(x))$
- C. $\exists x((G(x) \wedge S(x)) \rightarrow P(x))$
- D. $\forall x((G(x) \vee S(x)) \rightarrow P(x))$

Mark only one oval.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

20. *

1 point

When the resolution is called as refutation-complete?

- A. Sentence is satisfiable
- B. Sentence is unsatisfiable
- C. Sentence remains the same
- D. None of the mentioned.

Mark only one oval.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

21. *

1 point

"Translate the following statement into FOL. "For every a, if a is a philosopher, then a is a scholar""

- A. $\forall a \text{ philosopher}(a) \text{ scholar}(a)$
- B. $\exists a \text{ philosopher}(a) \text{ scholar}(a)$
- C. All of the mentioned
- D. None of the mentioned

Mark only one oval.

- ☐ A
- ☐ B
- ☐ C
- ☐ D

22. *

1 point

Consider the following statement:

"In the reasoning by resolution, we are given the goal condition and available facts and statements. Using these facts and statements, we have to decide whether the goal condition is true or not."

By reading the above statement, state whether it is true or false?

- a) True
- b) False

Mark only one oval.

☐ A

☐ B

23. *

1 point

What is the logical translation of the following statement?

"None of my friends are perfect."

(A) $\exists x(F(x) \wedge \neg P(x))$

(B) $\exists x(\neg F(x) \wedge P(x))$

(C) $\exists x(\neg F(x) \wedge \neg P(x))$

(D) $\neg \exists x(F(x) \wedge P(x))$

Mark only one oval.

☐ A

☐ B

☐ C

☐ D

24.

2 points

Which one of the following is **NOT** logically equivalent to $\neg \exists x(\forall y(\alpha) \wedge \forall z(\beta))$?

(A) $\forall x(\exists z(\neg \beta) \rightarrow \forall y(\alpha))$

(B) $\forall x(\forall z(\beta) \rightarrow \exists y(\neg \alpha))$

(C) $\forall x(\forall y(\alpha) \rightarrow \exists z(\neg \beta))$

(D) $\forall x(\exists y(\neg \alpha) \rightarrow \exists z(\neg \beta))$

Check all that apply.

☐ A☐ B☐ C☐ D

25. *

1 point

Let fsa and pda be two predicates such that $\text{fsa}(x)$ means x is a finite state automaton, and $\text{pda}(y)$ means that y is a pushdown automaton. Let equivalent be another predicate such that $\text{equivalent}(a, b)$ means a and b are equivalent. Which of the following first order logic statements represents the following: Each finite state automaton has an equivalent pushdown automaton.

(A) $(\forall x \text{fsa}(x)) \Rightarrow (\exists y \text{pda}(y) \wedge \text{equivalent}(x, y))$

(B) $\sim \forall y (\exists x \text{fsa}(x) \Rightarrow \text{pda}(y) \wedge \text{equivalent}(x, y))$

(C) $\forall x \exists y (\text{fsa}(x) \wedge \text{pda}(y) \wedge \text{equivalent}(x, y))$

(D) $\forall x \neg y (\text{fsa}(y) \wedge \text{pda}(x) \wedge \text{equivalent}(x, y))$

Mark only one oval.

☐ A☐ B☐ C☐ D

26. *

1 point

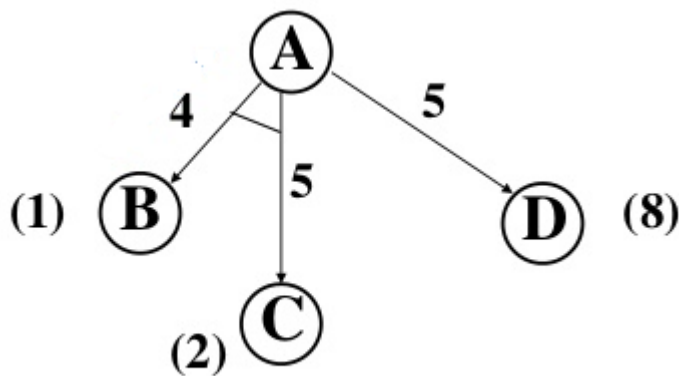
Let $\text{Graph}(x)$ be a predicate, which denotes that x is a graph. Let $\text{Connected}(x)$ be a predicate, which denotes that x is connected. Which of the following first order logic sentences DOES NOT represent the statement: "Not every graph is connected"?

- (A) $\neg \forall x (\text{Graph}(x) \Rightarrow \text{Connected}(x))$ (B) $\exists x (\text{Graph}(x) \wedge \neg \text{Connected}(x))$
 (C) $\neg \forall x (\neg \text{Graph}(x) \vee \text{Connected}(x))$ (D) $\forall x (\text{Graph}(x) \Rightarrow \neg \text{Connected}(x))$

Mark only one oval.

- ☐ A
☐ B
☐ C
☐ D

27. Consider the following AO graph: Which is the best node to expand next by AO* algorithm? Consider the Edge cost given in the figure and perform calculations accordingly. The values with brackets "()" are heuristic values. *

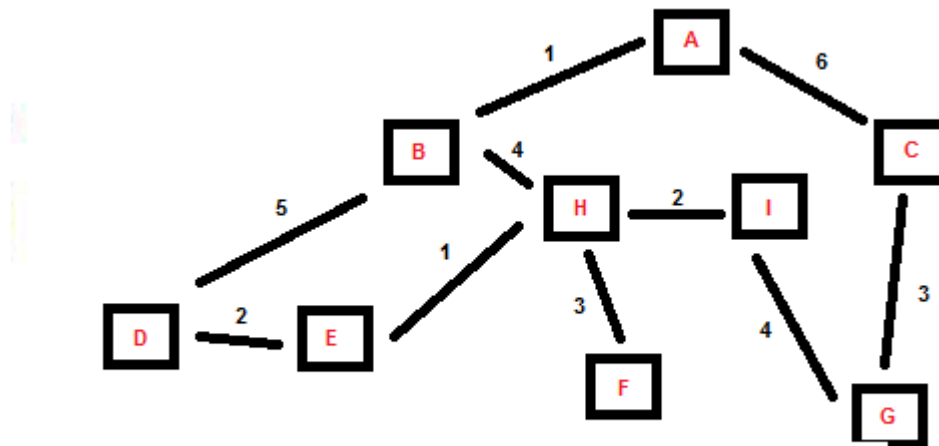


Mark only one oval.

- ☐ B
☐ C
☐ D

28. Find the path from D to G using Best First Search Algorithm *

2 points



Mark only one oval.

☐ D-B-A-C-G

☐ D-B-H-I-G

☐ D-E-H-I-G

29. *

1 point

Which one from the options would return true/yes for given prolog program?

boy (john, 123).

girl (jane, 234).

student (john, 123).

A)? - girl (jane, x).

B) ?- boy ('john', 123).

C) All of above.

D) None of above.

Mark only one oval.

☐ A

☐ B

☐ C

☐ D

30. *

1 point

Which one of the following is not a variable in PROLOG?

A) X_yz

B) g_23A

C) '_Xyz'

D) B & C both

Mark only one oval.

☐ A

☐ B

☐ C

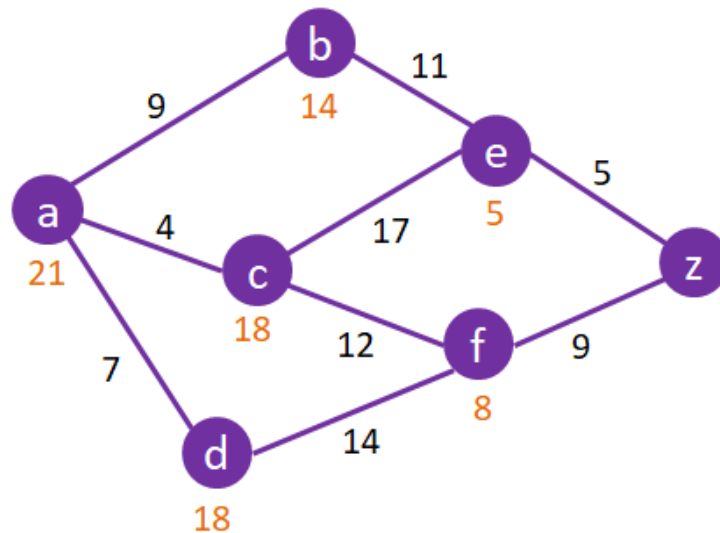
☐ D

31. Use A* Algorithm *

2 points

What is the shortest path to travel from A to Z?

Numbers in orange are the heuristic values, distances in a straight line (as the crow flies) from a node to node Z.



Mark only one oval.

- ☐ a-b-e-z
- ☐ a-d-f-z
- ☐ a-c-f-z
- ☐ a-c-e-z

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