



**UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA**  
**FIRST SEMESTER EXAMINATIONS, NOV. – DEC. 2019**

**COURSE NO: CE/EL 465**

**COURSE NAME: ARTIFICIAL INTELLIGENCE**

**CLASS: CE/EL IV**

**TIME: 3 HRS**

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Name: \_\_\_\_\_ Index Number: \_\_\_\_\_

*Circle the correct answer from the choices provided for each of the following questions*

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1. Which function will select the lowest expansion node at first for evaluation?
  - a. Greedy best-first search
  - b. Depth-first search
  - c. Breadth-first search
  - d. Both A and B
2. Which search uses problem-specific knowledge beyond the definition of the problem?
  - a. Informed search
  - b. Depth-first search
  - c. Best-first search
  - d. Uninformed
3. A\* algorithm is based on
  - a. Breadth-first search
  - b. Depth-first search
  - c. Bulkworld problem
  - d. Best-first search
4. Which is not a property of knowledge representation?
  - a. Representational verification
  - b. Representational adequacy
  - c. Acquisitional efficiency
  - d. Inferential efficiency
5. A bi-directional feedback loop links computer modelling with
  - a. Artificial science
  - b. Heuristic processing
  - c. Human intelligence
  - d. Cognitive science
6. A process that is repeated, evaluated and re-defined is called
  - a. diagnostic
  - b. descriptive
  - c. interpretative
  - d. iterative
7. Which of the following is not done by a Goal-based agent?
  - a. Conclusion
  - b. Planning
  - c. Searching
  - d. Inference
8. Neural Networks are complex ..... with many parameters.

- a. Linear Functions
  - b. Exponential Functions
  - c. Nonlinear Functions
  - d. Discrete Functions
9. A perceptron is a .....
- a. Feed-forward neural network
  - b. Feed Forward-backward algorithm
  - c. Back-propagation algorithm
  - d. Back-tracking algorithm
10. An algorithm is complete if
- a. It starts with a solution
  - b. It does not terminate with a solution
  - c. It terminates with a solution when one exists
  - d. It has a loop
11. The action 'STACK(A, B)' of a robot arm specify to
- a. Place block B on Block A
  - b. Place blocks A, B on the table in that order
  - c. Place blocks B, A on the table in that order
  - d. Place block A on block B
12. Which of the following, is a component of an expert system?
- a. inference engine
  - b. user interface
  - c. knowledge base
  - d. all of the mentioned
13. The following task/tasks Artificial Intelligence could not do yet
- a. Understand natural language robustly
  - b. Web mining
  - c. Construction of plans in real time dynamic systems
  - d. All of the mentioned
14. Which particular generation of computers is associated with artificial intelligence?
- a. Second
  - b. Fourth
  - c. Fifth
  - d. Third
15. In which of the following situations might a blind search be acceptable?
- a. real-life situation
  - b. complex game
  - c. small search space
  - d. all of the mentioned
16. Computers normally solve problem by breaking them down into a series of yes-or-no decisions represented by 1s and 0s. What is the name of the logic that allows computers to assign numerical values that fall somewhere between 0 and 1?
- a. Human logic
  - b. Boolean logic
  - c. Fuzzy logic
  - d. Operational logic
17. In language understanding, the levels of knowledge that does not include
- a. Empirical
  - b. Phonological

- c. Syntactic
  - d. Semantic
18. In Baye's theorem, what is the meant by  $P(H_i|E)$ ?
- a. The probability that hypotheses  $H_i$  is true given evidence  $E$
  - b. The probability that hypotheses  $H_i$  is false given evidence  $E$
  - c. The probability that hypotheses  $H_i$  is true given false evidence  $E$
  - d. The probability that hypotheses  $H_i$  is false given false evidence  $E$
19. Which search strategy among the following makes the most efficient use for memory
- a. Depth-first search
  - b. Breadth-first search
  - c. Linear search
  - d. Optimal search
20. What is state space?
- a. The whole problem
  - b. Your definition to the problem
  - c. A space where you know the solution
  - d. Representation your problem with variable and parameter
21. Face recognition system is based on
- a. applied AI
  - b. parallel AI
  - c. serial AI
  - d. strong AI
22. The performance of an agent can be improved by
- a. Learning
  - b. Observing
  - c. Perceiving
  - d. None of the mentioned
23. External actions of the agent are selected by
- a. Perceive
  - b. Performance
  - c. Learning
  - d. Actuator
24. A completely automated chess engine (Learn from previous games) is based on
- a. Strong Artificial Intelligence approach
  - b. Weak Artificial Intelligence approach
  - c. Cognitive Artificial Intelligence approach
  - d. Applied Artificial Intelligence approach
25. What kind of environment is strategic in artificial intelligence?
- a. Deterministic
  - b. Rational
  - c. Partial
  - d. Stochastic
26. Agents behavior can be best described by
- a. Perception sequence
  - b. Agent function
  - c. Sensors and Actuators

- d. Environment in which agent is performing
27. Which search is implemented with an empty first-in-first-out queue?
- Depth-first search
  - Breadth-first search
  - Bidirectional search
  - None of the mentioned
28. Strategies that know whether one non-goal state is “more promising” than another are called
- Informed & Unformed Search
  - Unformed Search
  - Heuristic & Unformed Search
  - Informed & Heuristic Search
29. LIFO is ..... whereas FIFO is .....
- Stack, Queue
  - Queue, Stack
  - Priority Queue, Stack
  - Stack, Priority Queue
30. What is the heuristic function of greedy best-first search?
- $f(n) \neq h(n)$
  - $f(n) < h(n)$
  - $f(n) = h(n)$
  - $f(n) > h(n)$
31. Which search is complete and optimal when  $h(n)$  is consistent?
- Depth-first search
  - Best-first search
  - Both Best-first & Depth-first search
  - A\* search
32. Which search method will expand the node that is closest to the goal?
- Best-first search
  - A\* search
  - Greedy best-first search
  - None of the mentioned
33. In A\* approach evaluation function is
- Heuristic function
  - Path cost from start node to current node
  - Path cost from start node to current node + Heuristic cost
  - Average of Path cost from start node to current node and Heuristic cost
34. In generic graph search, a set of nodes generated and yet to be explored during a search is known as the
- Child nodes
  - Parent nodes
  - Frontier
  - None of the mentioned
35. In AI problem definition, the property that describes the result of each actions taken in a particular state is known as
- Transition model
  - Percept sequence

c. Goal Test

d. Initial state

What is perceptron?

A 4-input neuron has weights 1, 2, 3 and 4. The transfer function is linear with the constant of proportionality being equal to 2. The inputs are 4, 10, 5 and 20 respectively. What will be the output?

What is back propagation?

Who among the following is regarded as the “father” of modern artificial intelligence?

***Fill the blank spaces provided in the questions below with the most appropriate answers***

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36. .... is a proposed means of testing the intelligence of a machine by .....

36. .... find solution for a program by trying different sequences of actions/operators until a solution is found.

38. In AI, the representation of a problem in terms of states and operators that change states in known as .....

39. ....implements stack operation for searching .....

40. Two other names of the uninformed search strategy are ..... and .....

41. The area of AI that investigates methods of facilitating communications between humans and computers is called .....

42. .... is a field that investigates the mechanics of human intelligence.

43. The Professor at the Stanford University that coined the word 'artificial intelligence' in 1956 at a conference held at Dartmouth college is .....

44. The embodiment of human intellectual capabilities within a computer is the category AI called .....

45. The FIFO queue strategy is often employed to implement .....
46. Natural language processing is divided into two sub-fields namely .....  
and .....
47. The conference that launched the AI revolution in 1956 was held at  
.....is the autonomous acquisition of knowledge through the use of  
computer programs.
48. The conference that launched the AI revolution in 1956 was held at .....
49. ....is a term is used for describing the judgmental or common-sense part  
of problem solving.
50. The action of the Simple reflex agent completely depends upon .....
51. In terms of observability, the crossword puzzle can be classified as .....
52. An agent consists of architecture and .....
53. A search algorithm takes ..... as an input and returns  
..... as an output.
54. The ..... is a touring problem in which each city must be visited exactly  
once. The aim is to find the shortest tour.
55. The best strategy to solve a game playing problem is by .....
56. Uniform-cost search expands the node n with the .....
57. The informed search strategy is also known as .....
58. The ..... is a special tree structure in which each node branches into  
exactly two paths below it.
59. In the tree structure, the ..... of a node is the length of the path from the  
root to the node.

**Using T or F respectively, indicate whether the following statements are True or False. Note:  
Wrong guesses shall be penalized, take the 5th if you are not sure**

60. Artificial intelligence is the study of how to make computers do things which, at the  
moment, people can do better.
61. Artificial intelligence does not necessarily imply understanding.
62. A heuristic is a way of trying to discover something or an idea embedded in a problem.
63. Natural languages are context-oriented free.
64. In an Unsupervised learning specific output values are not given.
65. If a hypothesis says it should be positive, but in fact it is negative, we call it true negative  
hypothesis.
66. A statement is satisfiable if there is some interpretation for which it is true.
67. The intersection two context-free languages is context-free.
68. The entire tree so far been generated must be stored in BFS.
69. Good data structures are likely to affect the performance of learner system.

70. Perception involves sights, sounds, smell, touch and acting.
71. A natural language generation program must decide what to say.
72. The action of the Simple reflex agent completely depends upon perception history.
73. A basic line following robot is based on is based on weak artificial intelligence approach.
74. Humans are examples of the intelligent agent/agents.
75. Performance Measures are fixed for all agents.
76. An omniscient agent knows the actual outcome of its actions and can act accordingly; but omniscience is impossible in reality. Rational Agent always does the right thing; but Rationality is possible in reality.
77. The game of Poker is a single agent.
78. A problem in a search space is defined by initial state.
79. Solution quality is measured by the path cost function, and an optimal solution has the highest path cost among all solutions.
80. There is always a recursive breadth-first search equivalent to the depth-first search strategy.
81. Depth-first search guarantees optimal solution because no viable solution is omitted.
82. Both stacks and queues can be implemented as linked list.
83. Forward chaining is query driven while backward chaining is data driven.
84. The run time of an algorithm is the time taken for the algorithm to solve a decision problem.

### **THEORY**

***You are trained to be an Engineer not a writer, answer Question 1 any other ONE of the remaining questions precisely***

#### **1. The Monkey and the Banana Problem**

A hungry monkey finds itself in a room in which a bunch of bananas is hanging from the ceiling. The monkey unfortunately cannot reach the bananas. However, in the room there are also a chair and a stick. The ceiling is just the right height so that a monkey standing on a chair could knock the bananas down with the stick. The

monkey knows how to move around, carry things around and wave a stick in the air. The monkey needs the best sequence of steps to take in order to acquire its lunch.

- a) Describe the PEAS
  - b) Formulate the problem in terms of state space.
2. a) Distinguish between strong artificial intelligence and weak artificial intelligence giving one example in each case
- b) Define an expert system and give one example.
  - c) What is uniform cost search?
3. a) How is an uninformed search method different from an informed search method?
- b) Mention ten application areas in AI.
  - c) State and explain the three Artificial Intelligence problem domains.

**Course Instructor**

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