

Marks Obtained:

KATHMANDU UNIVERSITY
End Semester Examination [C]
July, 2017

Level : B. E.	Course : COMP 472	
Year : IV	Semester : I	
Exam Roll No. :	Time: 30 mins.	F. M. : 10
Registration No.:	Date : JUL 09 2017	

SECTION "A"
[20 Q. × 0.5 = 10 marks]

Pick the correct answer(s).

1. What is the term used for describing the judgmental or commonsense part of problem solving?
 Heuristics Brute force Analytical Admissible
2. The _____ algorithm computes the same optimal moves as minimax, but achieves much greater efficiency by eliminating sub trees that are probably irrelevant.
 alpha-beta pruning alpha Pruning
 minimax algorithm constraint satisfaction
3. _____ is the general term for propagating the implications of a constraint on one variable onto to other variable.
 Constraint propagation Backtracking
 Backward chaining Back propagation
4. In Constraint Satisfaction problem, the term _____ is used for a depth-first search that chooses values for one variable at a time and backtracks when a variable has no legal values left to assign.
 backtracking backward chaining
 back propagation constraint propagation
5. _____ search calls depth-limited search with increasing limits until a goal is found.
 Iterative deepening search Depth limited Search
 Depth first Search Greedy search
6. Local search algorithm is useful for solving pure optimization problems, in which the aim is to find the best state according to an _____.
 objective function heuristic function
 agent architecture function admissible function
7. The sentence, $(p \Rightarrow (q \Rightarrow r)) \Rightarrow ((p \wedge q) \Rightarrow r)$ is:
 Satisfiable Valid Unsatisfiable None
8. A predicate with two or more arguments expresses a
 relation between objects property of an object
 value of an object none of the above
9. What is another name for an expert system?
 Neural network Intelligent agent
 Knowledge-based system None of the above.

10. Minesweeper is a famous one-player computer game. The player has to find all the mines in a given minefield without detonating any one of them. Which of the PEAS descriptions below is actuator for this game?
 Minefield Time spent Score gained Mouse
11. The sentence, $p \wedge (p \Rightarrow \neg q) \wedge q$ is:
 satisfiable valid unsatisfiable none
12. Which of the following describes an intelligent agent?
 Assists you
 Acts on your behalf
 Performs repetitive computer-related tasks
 All of the above
13. If the agent's sensor gives it access to the complete state of the environment at each point in time, then we say that the environment is _____.
 discrete environment semidynamic environment
 deterministic environment fully observable environment
14. Agent that tries to maximize their own expected happiness is called _____.
 reflex agent model based agents
 goal based agents utility-based agents
15. Which AI system generates increasingly better solutions to problems by generating many solutions?
 Expert systems Genetic algorithms
 Neural networks Intelligent agents
16. Which of the following is a proposed means of testing the intelligence of a machine?
 Semantic analysis Production system
 Syntactic analysis Turing test
17. Which of the following is an example of informed search?
 Breadth first search Depth first search
 Best first search Depth limited search
18. Depth first cost search is:
 Complete but not optimal. Optimal but not complete
 Neither complete nor optimal. Both complete and optimal
19. Which of the following is not a syntactically legal sentence of Propositional Logic?
 $p \wedge \neg p$ $(p \Rightarrow (q \Rightarrow r)) \Leftrightarrow (s \Leftarrow t)$
 $\neg(q \vee r) \neg q \Rightarrow \neg p$ $p \vee \neg q \wedge \neg p \vee \neg q \Rightarrow p \vee q$
20. In CSP, fail-first heuristic is also called:
 minimum remaining values heuristic least-constraining-value heuristic
 degree heuristic none of the above.

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Level : B. E.
Year : IV
Time : 2 hrs. 30 mins.

Course : COMP 472
Semester : I
F. M. : 40

SECTION "B"

[2Q × 8 = 16 marks]

Attempt *ANY TWO* questions.

1. Imagine that Metrological department hires you to design software to predict the weather. You studied several prediction models and finally decided to use the artificial neural network. Explain what type of neural network you would use with a neat and clear diagram. Discuss characteristics of your model works and explain how it works.
2. How do you define a problem? Formulate the state space for the water jug problem as defined below. Develop the tree structure and traverse it using suitable searching algorithm.
You are given two jug of a capacity 4-gallon and a 3-gallon and a pump which has unlimited **water supply** and you can use to fill the **jug**. Neither **jug** has any measuring marks on it. Your task is to get exactly 2 gallon water on the 4-gallon jug.
3. What is the key concept for genetic algorithm? Explain with an example for approximating the value of x for the function $f(x) = \{\text{MAX}(x^2) : 0 \leq x \leq 32\}$. Assume your own initial population for the function and show the solution up to second step.

SECTION "C"

[6Q × 4 = 24 marks]

Attempt *ANY SIX* questions.

4. Explain with examples how an agent and an environment are related in AI system?
5. Discuss the different characteristics of hill climbing searching algorithm.
6. State the factors on which the rationality of an agent depends. What is autonomous agent?
7. Represent the following sentences in First Order Predicate Logic and prove by using contraction that **Fido will die**.
 - a. Fido is a dog.
 - b. All dogs are animals.
 - c. All plants and animals are mortal.
 - d. All plants and animals will die.
8. You are asked to replace each letter by a different digit from 0 to 9. When each letter is replaced by the appropriate number, this cryptogram should represents a correct addition Problem:
HERE+SHE=COMES
9. What do you understand by Knowledge Base? How can you represent it in computer tractable form?
10. Define intelligence. Is a machine which thinks like human intelligent? Explain.

