Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2020

Course: Artificial Intelligence **Semester: VIII**
Program: B. Tech. (EE, EE-BCT, Mechatronics Engineering) **Time 03 hrs.**
Course Code: ELEG 442 **Max. Marks: 100**

Instructions: Attempt all the questions

SECTION A

S. No.		**Marks**
Q 1	**Objective questions** (1) What was originally called the "imitation game" by its creator? (i) The Turing Test (ii) LISP (iii) The Logic Theorist (iv) Cybernetics (2) Which scientist first coined the term artificial intelligence in Dartmouth conference? (i) Alan Turing (ii) John McCarthy (iii) Carl Linnaeus (iv) None of these (3) What is Artificial intelligence? (i) Putting your intelligence into Computer (ii) Programming with your own intelligence (iii) Making a Machine intelligent (iv) Putting more memory into Computer (4) Which is the commonly used programming language for AI? (i) PROLOG (ii) LISP (iii) Python (iv) All of the mentioned (5) A* algorithm is based on (i) Depth-first search (ii) Breadth-first search (iii) Best first search (iv) None of these (6) Which is the best way to go for Game playing problem? (i) Linear approach (ii) Heuristic approach (iii) Random approach (iv) None of these (7) Which theorem defines that no metaheuristic algorithm can be best suited for solving all optimization problems?	**(20X1.5= 30)**

	(i) No free lunch theorem (ii) Free lunch theorem (iii) No problem solving theorem (iv) None of these (8) Breadth-first search is not optimal when all step costs are equal, because it always expands the shallowest unexpanded node. (i) True (ii) False (9) Which search method will expand the node that is closest to the goal? (i) Best first search (ii) Greedy best first search (iii) A* search (iv) None of these (10) When will Hill-Climbing algorithm terminate? (i) Stopping criterion met (ii) Global Min/Max is achieved (iii) No neighbor has higher value (iv) All of the mentioned (11) What is the consequence between a node and its predecessors while creating Bayesian network? (i) Functionally dependent (ii) Dependent (iii) Conditionally independent (iv) Both Conditionally Dependent & Dependent (12) What does the Bayesian network provides? (i) Complete description of the domain (ii) Partial description of the domain (iii) Complete description of the problem (iv) None of these (13) What are Semantic Networks? (i) A way of representing knowledge (ii) Data Structure (iii) Data Type (iv) None of these (14) Which primitive represents the transfer of mental information? (i) ATRANS (ii) PTRANS (iii) MTRANS (iv) MBUILD (15) Which of the following represents the first order logic form of the following statement? "**Suresh lives in yellow house"** (i) lives (Suresh, house) ∧ colour (house, yellow) (ii) lives (Suresh, house) V colour (house, yellow) (iii) lives (house, Suresh) V colour (house, yellow) (iv) lives (house, Suresh) ∧ colour (house, yellow) (16) Which of the following are the components of scripts? (i) Props (ii) Roles (iii) Tracks (iv) All of these	

	(17) First order predicate logic is an extension of propositional logic. (i) True (ii) False (18) Conjunctive normal form is also known as_____ (19) Which of the following identify and analyze structure of words in Natural Language Processing? (i) Discourse Analysis (ii) Pragmatic Analysis (iii) Lexical Analysis (iv) Syntactic Analysis (20) Which of the following is the virtual assistant application of Apple gadgets. (i) Google Duplex (ii) Google Assistant (iii) Siri (iv) None of these	
SECTION B		
Q 2	What is meant by metaheuristic approaches? Explain genetic algorithm and write it's pseudo-code.	**10**
Q 3	What are the difficulties in natural language processing? Explain the following terms: (a) Morphological Analysis (b) Syntactic Analysis (c) Semantic Analysis (d) Pragmatic Analysis (e) Disclosure Integration	**10**
Q 4	Explain Bayes' Theorem and list the advantages and disadvantages of Bayesian method. The probability of the statement **'John has a viral'** is 0.20, probability of John being observed sneezing when he had viral is 0.8, and probability of John being observed sneezing when he did not have viral is 0.2. Find the probabilities of the following statement: (a) John having viral if he is seen sneezing (b) John having viral if he is not seen sneezing	**10**
Q 5	What do you understand by heuristic search techniques? Explain the following techniques: (a) Greedy Method (b) Best first search (c) MIN-MAX algorithm (d) Alpha-Beta pruning algorithm	**10**
Q 6	What is a script? List the components of scripts. Write a script for enrolling as a student for an examination.	**10**

SECTION-C

Q 7

(a) Consider the tree shown in figure 1. The numbers on the arcs are the arc length; the heuristic estimates of B = 2, C = 4 and D = 3; all other states have a heuristic estimate of 0.

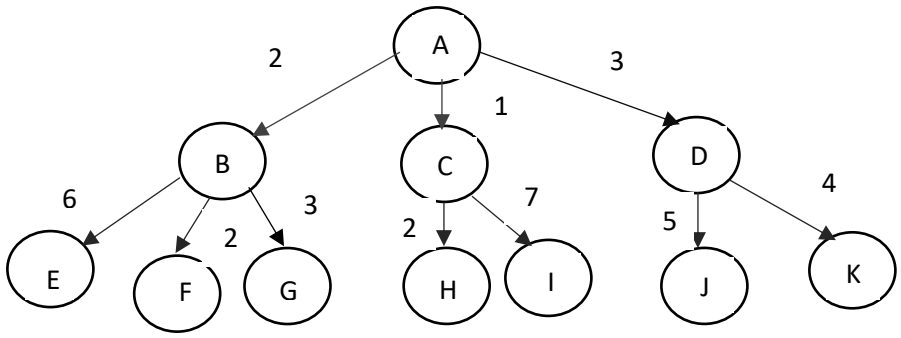

Figure 1

Assume that the children of a node are explained in alphabetical order when no other order is specified by the search and that the goal is state J. No visited or expanded lists are used. In what order would the states be expanded by each type of search (DFS, BFS, best-first search and A*). Write only the sequence of states expanded by each search.

(b) The Bayesian network and the corresponding table is given in figure 2 and table 1, generate the conditional probability table.

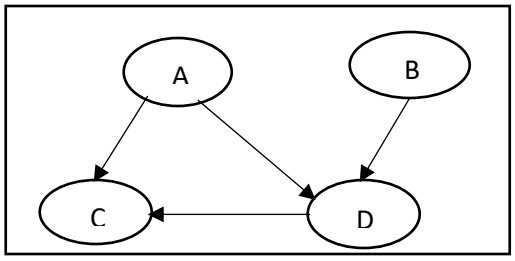

Figure 2

Table 1

P(A)	0.4
P(B|A)	0.5
P(B|~A)	0.2
P(C|A)	0.5
P(C|~A)	0.4
P(D|A,B)	0.6
P(D|A,~B)	0.4
P(D|~A,B)	0.2
P(D|~A,~B)	0.04

Compute the following probabilities
(i) Joint probability P(A, B, C, D)
(ii) P(A|C)

(10+10 =20)