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) Which search is implemented with an empty first-in-first-out queue? (i) Depth-first search (ii) Breadth-first search (iii) Bidirectional search (iv) None of these (2) Which search is similar to minimax search? (i) Hill-climbing search (ii) Depth-first search (iii) Breadth-first search (iv) All of the mentioned (3) How many arguments do a single LISP program has? (i) One (ii) Two (iii) Any number of arguments (iv) Three (4) What is the main challenge/s of NLP? (i) Handling Ambiguity of Sentences (ii) Handling Tokenization (iii) Handling POS-Tagging (iv) All of the mentioned (5) Which search is implemented with an empty first-in-first-out queue? (i) Depth-first search (ii) Breadth-first search (iii) Bidirectional search (iv) None of these (6) When is breadth-first search technique is optimal? (i) When there is less number of nodes (ii) When all step costs are equal	**(20X1.5= 30)**

(iii) When all step costs are unequal (iv) Both (i) & (iii)

(7) Language/Languages used for programming Constraint Programming includes _____

(i) Prolog (ii) C# (iii) C (iv) Fortran

(8) Particle Swarm optimization algorithm comes under which category of metaheuristic algorithm

(i) Evolutionary (ii) Swarm Intelligence (iii) Physics based (iv) Human based

(9) Which of the following is the example of PTRANS?

(i) Listen (ii) Tell (iii) Go (iv) Decide

(10) Which of the following primitive defines the statement "Building of new Information from old".

(i) ATRANS (ii) MTRANS (iii) PROPEL (iv) MBUILD

(11) Conjunctive Normal Form is known as

(i) Propositional Logic (ii) First Order Logic Form (iii) Clausal Form (iv) None of these

(12) Measure of disbelief is complement of measure of belief.

(i) True (ii) false

(13) Where does the Bayes' rule can be used?
(i) Solving queries (ii) Increasing complexity (iii) Decreasing complexity
(iv) Answering probabilistic query

(14) Which knowledge representation describes sequence of events?
(i) Frames (ii) Scripts (iii) Semantic Network (iv) First-order Logic

(15) Which of the following represents the first order logic form of the following statement?
"**Ram lives in red house"**

(i) lives (Ram, house) ∧ colour (house, red)

(ii) lives (Ram, house) V colour (house, red)

(iii) lives (house, Ram) V colour (house, red)
(iv) lives (house, Ram) ∧ colour (house, red)

	(16) Lexical Analysis in NLP is also known as_____ (17) Which of the following are the example of Natural Language Processing? (i) Google Assistant (ii) Siri (iii) Google Duplex (iv) All of these (18) Which of the following built the structural description of the sentence based on grammatical rules in Natural Language Processing? (i) Discourse Analysis (ii) Pragmatic Analysis (iii) Lexical Analysis (iv) Syntactic Analysis (19) General algorithm applied on game tree for making decision of win/lose is (i) DFS/BFS Search Algorithms (ii) Heuristic Search Algorithms (iii) Greedy Search Algorithms (iv) MIN/MAX Algorithms (20) Previous probabilities in Bayes Theorem that are changed with help of new available information are classified as (i) independent probabilities (ii) posterior probabilities (iii) interior probabilities (iv) dependent probabilities	
SECTION B		
Q 2	What is meant by swarm intelligence? Explain particle swarm optimization algorithm.	**10**
Q 3	What is a script? List the components of scripts. Develop a railway ticket reservation script. The following scenes can be considered for the script. (a) Entering the railway station (b) Reserving the ticket (c) Checking the ticket (d) Leaving the station	**10**
Q 4	What is the difference between joint probability and conditional probability? The probability of Mike has a cold is 0.35, the probability of Mike was observed sneezing when he had cold in the past is 0.8 and the probability of Mike was observed sneezing when he did not have cold is 0.20. Find the probability of Mike having a cold given that he sneezes.	**10**
Q 5	Differentiate the following (i) A* algorithm and AO* algorithm. (ii) Constraint satisfaction and Mean end analysis algorithm. (iii) Generate-and-Test and Hill Climbing algorithm (iv) Depth first search and Breadth first search algorithm	**10**

Q 6	What do you understand by natural language processing? Explain it with suitable example. Write down the steps of natural language processing.	**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 = 3, C = 5 and D = 2; all other states have a heuristic estimate of 0.	**(10+10 =20)**

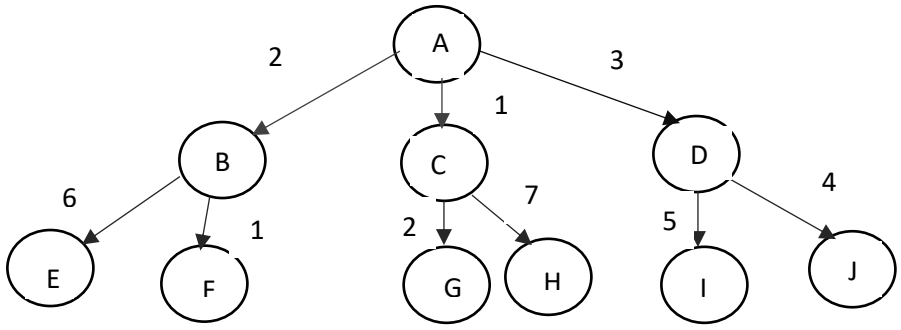

Figure 1

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.

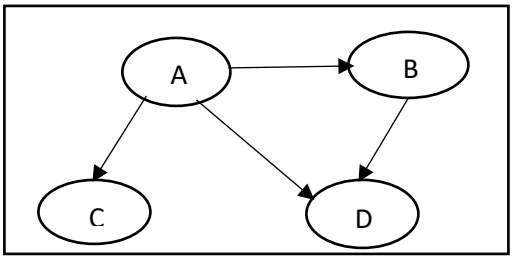

Figure 2

Table 1

P(A)	0.4
P(B|A)	0.5
P(B|~A)	0.1
P(C|A)	0.6
P(C|~A)	0.3
P(D|A,B)	0.8
P(D|A,~B)	0.3
P(D|~A,B)	0.3
P(D|~A,~B)	0.05

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