UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, May 2021

Programme Name: B. Tech. /Mechatronics   **Semester**   : VIII
Course Name   : Artificial Intelligence   **Time**   : 03 hrs
Course Code   : ELEG442   **Max. Marks: 100**
Instructions: Attempt all the questions

SECTION A		(6 X 5 = 30 Marks)

S. No.		Marks	CO
Q 1	(a) Which of the following are the sub-areas of Artificial Intelligence (i) Soft computing (ii) Natural language processing (iii) Game Playing (iv) All of these (b) Genetic algorithm comes under which category of metaheuristic algorithm (i) Evolutionary (ii) Swarm Intelligence (iii) Physics based (iv) Human based (c) Which scientist first coined the term artificial intelligence? (i) Alan Turing (ii) Marie Curie (iii) John McCarthy (iv) None of these (d) Which company uses artificial intelligence to build MANI app to empower the visually impaired people. (i) Daffodil Software (ii) AWS (iii) IBM (iv) Microsoft (e) How the new states are generated in genetic algorithm? (i) Composition (ii) Mutation (iii) Cross-over (iv) Both Mutation & Cross-over	5 M	CO1
Q 2	(a) Which heuristic algorithm solves the AND-OR problem. (i) Best first search (ii) Depth first search (iii) A* algorithm (iv) AO* algorithm (b) Which search is similar to minimax search? (i) Hill-climbing search (ii) Depth-first search (iii) Breadth-first search (iv) All of the mentioned (c) The term _____ is used for a depth-first search that chooses values for one variable at a time and returns when a variable has no legal values left to assign. (i) Forward search (ii) Backtrack search (iii) Hill algorithm (iv) Reverse-Down-Hill search (d) Which search is equal to minimax search but eliminates the branches that can't influence the final decision? (i) Depth-first search (ii) Breadth-first search (iii) Alpha-beta pruning (iv) None of these (e) A* algorithm is based on _____ (i) Breadth-First-Search (ii) Depth-First –Search (iii) Best-First-Search (iv) Hill climbing	5 M	CO2

Q 3	(a) How many arguments do a single LISP program has? (i) One (ii) Two (iii) Any number of arguments (iv) Three (b) Language/Languages used for programming Constraint Programming includes _____ (i) Prolog (ii) C# (iii) C (iv) Fortran (c) Which of the following represents the first order logic form of the following statement? **"Aditya lives in yellow house"** (i) lives (Aditya, house) ∧ colour (house, yellow) (ii) lives (Aditya, house) V colour (house, yellow) (iii) lives (house, Aditya) V colour (house, yellow) (iv) lives (house, Aditya) ∧ colour (house, yellow) (d) Conjunctive Normal Form is known as (i) Propositional Logic (ii) First Order Logic Form (iii) Clausal Form (iv) None of these (e) What are the limitations of the semantic networks? (i) Intractability (ii) Lack in expressing some of the properties (iii) Incomplete (iv) Has memory constraints	**5 M**	**CO3**
Q 4	(a) 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 (b) Which of the following are the example of Natural Language Processing? (i) Google Assistant (ii) Siri (iii) Google Duplex (iv) All of these (c) 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 (d) 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 (e) Lexical Analysis in NLP is also known as_____	**5 M**	**CO4**
Q 5	List the subareas and application of Artificial Intelligence in engineering.	**5 M**	**CO1**
Q 6	Differentiate data, information and knowledge with suitable example.	**5 M**	**CO3**
	SECTION B **(5 X 10 = 50 Marks)**	
Q 7	What is meant by swarm intelligence? Explain particle swarm optimization algorithm.	**10 M**	**CO1**

Q 8	Explain the following with suitable examples: (a) Augmented Transition Network (b) Recursive Transition Network	**10 M**	**CO4**
Q 9	Why knowledge representation is required in Artificial Intelligence. Briefly explain all categories of knowledge representation with a suitable example.	**10 M**	**CO3**
Q 10	What do you understand by natural language processing? Explain it with suitable example. Write down and explain the steps of natural language processing.	**10 M**	**CO4**
Q 11	Differentiate the term heuristic and metaheuristic. Explain the following heuristic search and game playing technique with suitable example. (a) Best first search (b) A* (c) MIN-MAX (d) Alpha-beta pruning	**10 M**	**CO2**
SECTION C		**(1 X 20 = 20 Marks)**	
Q 12	(a) 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. (b) What do you understand by semantic network? Express the following statements as semantic network in short form. (i) A house is a (kind of) building (ii) A house has at least one storey (the number of storeys of a house is one or more) (iii) A house is used for living in (iv) A single-storey dwelling is a (kind of) house (v) A single-storey dwelling has one storey (vi) My house is an instance of a single-storey dwelling (vii) My house has its roof colour red. (viii) My house has its walls made of brick	**20 M**	**CO3**