Name: Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2022

Course: Artificial Intelligence & Expert Systems — **Semester: I**
Program: M.Tech CSE — **Time : 03 hrs.**
Course Code: CSAI 7003P — **Max. Marks: 100**

Instructions: All questions are compulsory. Question no. 9 of Section B and Question no. 11 of Section C have internal choice.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Is goal state required in uninformed search? Explain.	**4**	**CO1**
Q 2	Check whether this expression is tautology: $(p \rightarrow q) \leftrightarrow (q \rightarrow p)$	**4**	**CO2**
Q 3	Write predicate for "Some numbers are not real"	**4**	**CO2**
Q 4	Classification is supervised learning technique. Justify.	**4**	**CO3**
Q 5	In which type of chaining in expert system, inference rules are added to the conclusion after known facts?	**4**	**CO4**
	SECTION B **(4Qx10M= 40 Marks)**		
Q 6	Discuss the reason of forward checking use in constraint satisfaction? Explain by the use of example.	**10**	**CO1**
Q 7	Which of these formulas are well formed. Write reasons. (i) $\neg (A \cup B)$ (ii) $(A \rightarrow (A \cup B))$ (iii) $(P \rightarrow Q) \rightarrow (\cap Q)$ (iv) $(P \rightarrow Q$ (v) $((P \cap Q) \rightarrow Q)$	**10**	**CO2**
Q 8	Write detailed explanation of this code snippet: from keras.models import Sequential from keras.layers import Flatten,Activation,Dense import numpy as np from keras.datasets import mnist Complete this code to train and test the model for digit recognition.	**10**	**CO3**

Q 9	Describe rule-based and Fuzzy expert system or Discuss the architecture of Expert systems in detail.	**10**	**CO4**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	Write truth table for conjunction, disjunction, not, unidirectional. What are clausal form of following expressions: (i) A (ii) $A \cap (B \cup \sim C) \cap D$ (iii) $A \cap (B \rightarrow C)$ (iv) $\sim (A \cup (B \rightarrow C))$ Explain clausal form of these expressions in detail.	**20**	**CO2**
Q 11	Given values for objects are: X1=(2,5), X2=(1,7), X3=(1,5), X4=(5,7), X5=(7,7), X6=(1,1), X7=(2,2) Using k=2, assign these objects into clusters using k-means clustering technique. Explain in detail. or Differentiate linear and logistic regression. If house price is to be predicted, which technique should be used and discuss the reason. How intercept and coefficient are calculated in linear regression. Write code to train the model using linear regression.	**20**	**CO3**