Name:

Enrolment No:

UPES End Semester Examination, May 2024

Course: Data Analytics in Upstream **Semester : II**

Program: M Tech Petroleum Engineering **Time : 03 hrs.**

Course Code: PEAU7020 **Max. Marks: 100**

Instructions: Attempt all questions. There is internal choice in Q8 and Q10.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q1	Define data warehouse and explain in brief its utility in client server architecture.	4	CO1
Q2	Illustrate the mean and standard deviation of a dataset.	4	CO1
Q3	Draw a suitable diagram to illustrate the relation between data science, computer science, machine learning and artificial intelligence.	4	CO1
Q4	Define 4 Vs of big data? Give an example of four big data platforms widely used in industry.	4	CO1
Q5	Define in brief kurtosis and skewness of a dataset.	4	CO1
	SECTION B **(4Qx10M= 40 Marks)**		
Q6	Explain the differences between time series and depth series data generated in upstream operations. Illustrate a case where time series data is needed to optimize drilling operations and depth series data is required to understand subsurface geology.	10	CO2
Q7	Discuss artificial intelligence and explain its three subtypes. Discuss how AI can enable automation of operations in upstream industry.	10	CO2
Q8	Explain the least square method of establishing trend in a large volume of two-dimensional data. **OR** Draw the architecture of perceptron and explain its different components?	10	CO3
Q9	Explain the difference between prescriptive, descriptive, and predictive data analytics with suitable examples from upstream data?	10	CO3
	SECTION-C **(2Qx20M=40 Marks)**		
Q10	Describe machine learning and discuss its four sub types. Elaborate the subtle differences between random forest and reinforcement learning.	20	CO4

	Describe value ads generated by machine learning in forecast and prediction of drilling hazards. **OR** Evaluate all aspects of efficiency brought by transformation of conventional oil field to a digital oil field?		
Q11	Elaborate in detail different types of data generated in oil and gas upstream operations. Evaluate the optimization and collaboration opportunities created by these data.	**20**	**CO5**