Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2021

Course: Petroleum Geology **Semester: I**

Programme: M. Sc Petroleum Geoscience Course code: **PEGS7004**

Time: 03 hrs. **Max. Marks: 100**

Instructions:

SECTION A [5X4=20 marks]

S. No.		Marks	CO
Q 1	List different types of structural and stratigraphic reservoir traps	**4**	CO1
Q 2	Mention the geological factors that cause petroleum migration.	**4**	CO2
Q 3	Explain about the characteristics of depositional systems in Marine environment.	**4**	CO2
Q 4	Answer whether true or false a) Crevasse Splay is Formed when river breaks natural levees and deposits sediments on floodplain b) Open ocean basin accepts more water input, which means there is potential for greater wave energy in wave dominated delta. c) Thermal maturity > 1% is indicative of biogenic gas zone. d) When the TOC in shale greater than 2%, It is excellent source rock. e) Kerogen IV type highly potential for oil.	**4**	CO2, 3,4
Q 5	Explain the difference between primary and secondary porosity	**4**	CO2

SECTION B [10x4=40 marks]

Q 6	Describe the diagenesis, catagenesis and metagenesis processes of petroleum generation.	**10**	CO2
Q 7	(a) Explain the role of diffusion in petroleum migration from source rock to reservoir rocks. (b) Discuss the processes of secondary migration.	**10**	CO3
Q8	Draw a process work flow diagram illustrating the geological and geochemical techniques of petroleum exploration. Elaborate each step.	**10**	C04
Q9	Discuss in detail about the elements of petroleum system.	**10**	CO5
	OR		

	Describe a tertiary sedimentary basin of India with respect to geological setting and petroleum system.	**10**	CO5
SECTION-C [20X2=40 marks]			
Q 10	(a) Classify the kerogens based on its source. (b) Discuss the microstructure of different types of kerogens and mention how they can control the hydrocarbon generation mechanism in source rocks. (c) Explain the hydrogen, carbon and oxygen elemental ratios variation in different types of kerogen and its significance for oil/gas generation.	**5+5+10=20**	CO5, 6
	OR		
Q10	(a) Estimate the source rock potential, kerogen type and maturity of a shale rock with 2 wt % of TOC releases 0.15mgHC/g Rock free gases, 2.3mgHC/g Rock HC gases and 0.45 mg CO_2/g Rock CO_2 gases at 427ºC, 477ºC and 560ºC temperature respectively. (b) Explain the significance of biomarkers in petroleum source rock characterization.	**10+10=20**	CO5, 6
Q11	Discuss how do you recognized the palaeo depositional environment. Elaborate the characteristics of following depositional environment, in terms of sediment texture, fossil content, reservoir and source rock deposition.	**5+15=20**	CO5