Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

Online End Semester Examination, May 2021

Course: **Sedimentary and Petroleum Geology** **Semester: IV**
Program: **B.Tech APE-UP** **Time 03 hrs.**
Course Code: PEGS 2002 **Max. Marks: 100**
Instructions: Answers of section A needs to be typed.
Answers of sections B & C are scan and upload type.

SECTION A (Shot answer/ True and False types)

S. N.		Marks	CO
Q1	Define three types of sedimentary facies.	5	CO1
Q2	Describe in brief about the clastic and non-clastic sedimentary rocks. Give two examples of each type.	5	CO2
Q3	Explain five controlling factors of Porosity (ø) and Permeability (k) of the hydrocarbon reservoir rock.	5	CO2
Q4	Describe the role of onlap and downlap patterns in seismic sequence stratigraphy.	5	CO5
Q5	**Identify <u>True or False</u> from the given statements-** a) Oxbow lakes are formed at the young stage of a river valley formation. b) Normal graded bedding is marked as a fining upward sequence in gamma logs. c) TOC means to Total Oil Chemistry. d) Isopach map is a contour map of thickness that illustrates formation thickness. **e)** GRV=NRV * NTG	1x5= 5	CO4
Q6	**Identify <u>True or False</u> from the given statements-** a) The turbidity currents do not contribute to the transportation of coarser clastic sediments into the deep marine environment. b) clastic rock having a grain size between 1/16 cm to 2cm is known as arenaceous rock. c) Maximum flooding surface (MFS) is marked between the TST and HST. d) The reservoir property of Aeolian sandstone will be poorer than the deltaic sandstone. e) The Kerogen type-III are mostly produced gases hydrocarbons.	1x5= 5	CO4
	SECTION B (Scan and Upload)		
Q7	Describe five sedimentary structures produced by mechanical origin and their significance in paleo-environmental analysis. (Draw appropriate diagram)	2x5=10	CO1

<table>
<tr><td>Q8</td><td>Describe in detail about the Lithification and Diagenesis process.</td><td>5+5</td><td>CO2</td></tr>
<tr><td>Q9</td><td>Explain the transitional environment of sediment deposition. Differentiate Alluvial fan, Delta and Submarine fan environment with respect to sedimentary textural maturity and depositional setting. (Draw an appropriate diagram to illustrate your answer)</td><td>5+5</td><td>CO3</td></tr>
<tr><td>Q10</td><td>Illustrate how sea-level changes/ variable sediment supply affects stacking patterns of different parasequences. Explain four stacking patterns supported by appropriate diagrams.</td><td>10</td><td>CO4</td></tr>
<tr><td>Q11</td><td>Explain the composition of carbonate rocks. Illustrate in detail about Limestone rocks classifications given by Dunham.</td><td>10</td><td>CO3</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td></td><td>Illustrate in detail about Dott’s classification of Arenaceous rocks. Explain the basis of classification with an appropriate example.</td><td>5+5</td><td>CO3</td></tr>
<tr><td colspan="4">SECTION-C (Long answer type; Scan and Upload)</td></tr>
<tr><td>Q12</td><td>Petroleum Geology,
a) Explain in detail about six important petroleum system elements and their geometrical relationship (Draw appropriate diagram).

b) Draw and demonstrate the method of Risk matrix preparation, GCoS calculation using given parameters,

<table><tr><td rowspan="2">Prospect Orion-1</td><td>Elements</td><td>RP</td><td>SP</td><td>SC</td><td>A</td><td>T</td><td>RD</td></tr><tr><td>Probability</td><td>0.96</td><td>0.85</td><td>1</td><td>0.90</td><td>0.75</td><td>0.86</td></tr></table>
c) Based on your analysis of Risk Matrix and GCoS (from section b), analyze and explain the probabilities of individual petroleum system elements and highlight the key risk associated with prospect Orion-1.</td><td>10+5+5</td><td>CO5</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td></td><td>Sequence stratigraphy analysis-
a) Explain Walther's law of facies correlation (Transgression and Regression) and its importance in geological interpretation of the depositional environment.

b) Analyze & draw a depositional sequence with one cycle of sea-level change, annotated by system tracts, sequence boundaries and give their definition.

c) Draw & explain the causes of variation in sediment depositional style of different systems tracts (starting from falling stage to high stand systems).</td><td>10+5+5</td><td>CO5</td></tr>
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