Name: **Enrolment No:**	UPES UNIVERSITY OF TOMORROW

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2022

Course: Sedimentary and Petroleum Geology — **Semester: IV**
Program: B.Tech APE-UP — **Time 03 hrs.**
Course Code: PEGS 2002 — **Max. Marks: 100**
Instructions:

SECTION A **(5Q x 4M = 20 Marks)**

S. N.		Marks	CO
Q1	Define five key differences between Sandstone and Limestone rocks.	4	CO1
Q2	Explain Porosity (ø) and Permeability (k).	4	CO1
Q3	Describe the reservoir quality of Aeolian origin sandstone in terms of texture and maturity.	4	CO2
Q4	**Identify True or False from the given statements-** a) If the depth contours of the reservoir top indicate four-way closure, will it be considered a stratigraphic trap? b) In terms of petroleum system elements, the salt and anhydrite layers are considered to be a very good source rock? c) The probable accumulation of hydrocarbons in the basin, that is poorly defined is known as a lead? d) When dipping seismic reflectors make an angular contact with a lower surface, they are referred to as Toplap?	1x4= 4	CO1
Q5	**Identify True or False from the given statements-** a) The maximum flooding surface (MFS) is marked between the TST & HST? b) Is a higher tortuosity means high permeability? c) The charge access models prepared by the basin modeler reveal the reservoir quality? d) Submarine canyons play an important role in marine sediment transportation. They are mostly formed during the Regression?	1x4= 4	CO2

SECTION B **(4Q x 10M = 40 Marks)**

Q6	Describe sedimentary structures and their geological significance for paleoenvironment analysis and reservoir delineation. Draw, annotate and explain 5 sedimentary structures.	10	CO3
Q7	Illustrate the fluvial depositional environment in detail. Draw an appropriate diagram and describe three different stages of the river and associated geomorphic features.	5+5	CO2
Q8	Explain Walther's law of facies correlation (Transgression and Regression) and its importance in geological interpretation of the depositional environment.	5+5	CO4
Q9	Explain the composition of carbonate rocks. Illustrate in detail about Limestone rocks classifications given by Folk.	10	CO3

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<tr><td></td><td>OR
Illustrate a detailed classification of Rudaceous rocks supported by appropriate diagrams.</td><td></td><td></td></tr>
<tr><td colspan="4">SECTION-C (2Q x 20M = 40 Marks)</td></tr>
<tr><td>Q10</td><td>a) Describe the role of petroleum geology in hydrocarbon exploration. Draw and explain six important petroleum system elements and their significance in HC prospactivity analysis.

b) Draw and demonstrate the method of Risk matrix preparation, GCoS calculation using the below given parameters. Also, critically analysed the Risk Matrix and GCoS, and give a short report on probabilities of individual petroleum system elements by highlighting a key risk (detailed reasons) associated with prospect Neon-A.
<table><tr><th colspan="2">Prospect Neon-A</th></tr><tr><th>Elements</th><th>Probability</th></tr><tr><td>RP</td><td>0.90</td></tr><tr><td>SP</td><td>0.92</td></tr><tr><td>SC</td><td>1</td></tr><tr><td>A</td><td>0.89</td></tr><tr><td>T</td><td>0.80</td></tr><tr><td>RD</td><td>0.95</td></tr></table></td><td>10+10</td><td>CO5</td></tr>
<tr><td>Q11</td><td>Sequence stratigraphy analysis-
a) Illustrate how sea-level changes/ variable sediment supply affects stacking patterns of different parasequences. Explain four stacking patterns supported by appropriate diagrams.

b) Draw and explain, one cycle of sea-level change and associated depositional sequence, annotated by system tracts, sequence boundaries with definition. Also, explain the causes of variation in sediment depositional style of different systems tracts (Draw an annotated diagram starting from HST to TST).</td><td>10+10</td><td rowspan="3">CO4</td></tr>
<tr><td></td><td>OR</td><td></td></tr>
<tr><td></td><td>Draw and explain in detail about the below given environments and related processes. Use appropriately labeled diagrams to support your answers.
a) Marginal marine environment
b) Carbonate environments
c) Types of Weathering
d) Lithification and Diagenesis process</td><td>4*5=20</td></tr>
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