


Name:			
Enrolment No:			
UPES End Semester Examination, May 2023			
Course: Sedimentary and Petroleum Geology Program: B.Tech APE-UP Course Code: PEGS 2002 Instructions:		Semester: IV Time 03 hrs. Max. Marks: 100	
SECTION A		(5Q x 4M = 20 Marks)	
S. N.		Marks	CO
Q1	Define arenaceous sedimentary rock and provide two examples.	4	CO1
Q2	Describe Porosity (ϕ) and Permeability (k).	4	CO2
Q3	Describe the formation process of two different types of graded bedding.	4	CO1
Q4	Explain the process of dolomitization.	4	CO3
Q5	Identify <u>True or False</u> from the given statements- a) Three-way closure of depth contours at the reservoir top indicates a stratigraphic trap. b) Herring-bone cross-bedding is formed in the deep marine environment due to the bimodally dipping foresets. c) Lithification is a tendency to segregate sediments based on uniformity. d) Onlap is the termination of seismic reflections in a landward direction against a steeply inclined underlying reflection.	1x4= 4	CO1
SECTION B		(4Q x 10M = 40 Marks)	
Q6	Explain the fluvial depositional environment. Draw a longitudinal river profile, mark three distinct stages of a river and describe/compare the reservoir characters of any three fluvial landforms.	10	CO4
Q7	a) Describe in detail about formation process of Turbidite deposits. b) Isopach and Isochore maps	5+5	CO2
Q8	Illustrate Walther's law of facies correlation and its importance in sequence stratigraphy and petroleum system analysis.	10	CO4
Q9	Explain the composition of carbonate rocks. Illustrate in detail about Limestone rocks classifications given by Folk.	10	CO3
	OR		
	Explain the composition of carbonate rocks. Illustrate in detail about Limestone rocks classifications given by Dunham.		

SECTION-C

(2Q x 20M = 40 Marks)

Q10	<p>a) Explain the significance of petroleum geology in hydrocarbon exploration & production (E&P).</p> <p>b) Draw the Risk matrix and calculate the GCoS of the below given three prospects and rank your prospects for drilling.</p> <p>c) Critically analyzed the Risk Matrix data and provide a short report on comparative analysis, probabilities of individual petroleum system elements, and key risk (detailed reasons) associated with a first drillable prospect (having the highest chance of success).</p> <table border="1"> <thead> <tr> <th></th> <th>Prospect SP-1</th> <th>Prospect SP-2</th> <th>Prospect SP-3</th> </tr> <tr> <th>Elements</th> <th>Probability</th> <th>Probability</th> <th>Probability</th> </tr> </thead> <tbody> <tr> <td><i>RP</i></td> <td>0.90</td> <td>0.95</td> <td>0.89</td> </tr> <tr> <td><i>SP</i></td> <td>0.90</td> <td>0.90</td> <td>0.82</td> </tr> <tr> <td><i>SC</i></td> <td>1</td> <td>0.95</td> <td>0.75</td> </tr> <tr> <td><i>A</i></td> <td>0.89</td> <td>0.83</td> <td>0.89</td> </tr> <tr> <td><i>T</i></td> <td>0.78</td> <td>0.88</td> <td>1</td> </tr> <tr> <td><i>RD</i></td> <td>0.95</td> <td>0.98</td> <td>0.80</td> </tr> </tbody> </table>		Prospect SP-1	Prospect SP-2	Prospect SP-3	Elements	Probability	Probability	Probability	<i>RP</i>	0.90	0.95	0.89	<i>SP</i>	0.90	0.90	0.82	<i>SC</i>	1	0.95	0.75	<i>A</i>	0.89	0.83	0.89	<i>T</i>	0.78	0.88	1	<i>RD</i>	0.95	0.98	0.80	5+5+10	CO6
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Q11	<p>a) Explain the role of sequence stratigraphy to mitigate the risk and uncertainties in hydrocarbon exploration. Illustrate how the stacking patterns of distinct parasequences are impacted by sea level fluctuations and a variable sediment supply.</p> <p>b) Draw and explain in detail about four stacking patterns supported by appropriate diagrams.</p>	10+10																																	
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	<p>c) "During one phase of the relative sea level cycle, erosion often predominates the declining phase and sediment deposition in the basin typically occurs during the rising phase" Justify this statement and provide a brief report on this.</p> <p>d) Draw one cycle of sea-level change and annotate depositional sequence, system tracts, sequence boundaries supported by their definitions.</p> <p>e) Draw an annotated diagram starting from HST to TST and explain the causes of variation in sediment depositional style of different systems tracts.</p>	7+7+6 =20	CO5																																

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