



Name:

Enrolment No:

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

**Course: Basin Analysis**  
**Program: M.Sc. Petroleum Geoscience**  
**Time: 03 hrs.**

**Semester: III**  
**Course Code: PEGS 8008**  
**Max. Marks: 100**

**Instructions:**

- Section A (Short answer type from Q1 to Q5, 4 marks each)
- Section B (Short notes type from Q6 to Q9, 10 marks each)
- Section C (Q10 and Q11, Long answer type)
- An internal option is given in questions 9 & 11.

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

S.N.		Marks	CO
Q 1	Define the Geodynamics.	4	CO1
Q.2	Describe the four primary benefits of a 3D seismic survey over a 2D survey.	4	CO2
Q.3	Explain the stratigraphic forward modeling (SFM) and its two advantage in basin analysis.	4	CO2
Q.4	Define the relationship between porosity and depth of sedimentary burial in a basin.	4	CO1
Q.5	<b>Identify the true and false from given statements,</b> a) The beds lying below and above the surface of erosion are almost parallel formed an angular unconformity. b) The Remnant ocean basin is formed in divergent settings. c) The youngest strata are present at the center of the dome. d) Isopach maps are also referred to as True Stratigraphic Thickness (TST) maps.	4	CO3

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

Q.6	Explain the role of GXT seismic lines in basin analysis. Also, draw a continent to ocean basins cross-section to support your answer.	5+5	CO3
Q.7	Illustrate a brief overview upon which the theory of Isostasy has been based. Explain various assumptions behind this theory.	5+5	CO2
Q.8	Explain five key petroleum system elements required to evaluate the hydrocarbon potential of a basin.	10	CO1
Q.9	Draw and explain the process of the opening (beginning) and the closing (end) of an ocean as a result of plate movements (six stages of the Wilson cycle).	10	CO4

**OR**

	Draw and explain in detail that how the Back-stripping technique may reveal paleogeometries of the rift-type basins.		
<b>SECTION-C</b>			
<b>(Long answer type)</b>		<b>(2Q x 20M = 40 Marks)</b>	
<b>Q.10</b>	<p>a) Draw and explain the modern theory of plate tectonics and three different types of plate boundaries and associated features.</p> <p>b) Illustrate the principle of sedimentary basin classification and describe any five types of basins formed along different margins supported by the annotated diagrams.</p>	<b>(5+15)</b>	<b>CO4</b>
<b>Q11</b>	<p>a) Explain Walther's law of facies correlation and its importance in geological interpretation of the depositional environment.</p> <p>b) Draw a depositional sequence with one cycle of sea-level change, annotated by system tracts, sequence boundaries and give their definition. Draw &amp; explain the causes of variation in sediment depositional style of different systems tracts (starting from FSST to HST)</p>	<b>10+10</b>	<b>CO5</b>
<b>OR</b>			
	<p>a) Explain sequence stratigraphy and three controlling factors on the deposition of sedimentary sequences.</p> <p>b) Draw and explain four stacking patterns supported by appropriate diagrams. Explain how sea-level changes/ variable sediment supply affects stacking patterns of different parasequences.</p>		

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