

Name:	 UPES UNIVERSITY WITH A PURPOSE
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2019

Course: Basin Analysis	Semester: VI
Program: B. Tech [GSE&GIE]	Time 03 hrs.
Course Code: GSEG 303	Max. Marks: 100

Instructions:

SECTION A

S. No.	Question	Marks	CO
Q 1	Define Sequence Stratigraphy, Lithostratigraphy, Chronostratigraphy, and Biostratigraphy.	1X4=4	CO1
Q 2	Draw neat sketch litholog of braided and meander river depositional landforms.	2+2=4	CO2
Q 3	List Five components of basin modelling.	4	CO3
Q 4	Illustrate back stripping techniques for basin analysis.	4	CO4
Q 5	How sedimentation is related to tectonism.	4	CO4

SECTION B

Q 6	Describe the texture and structures in : a- Fluvial b-Tidal depositional landforms	5+5	CO1
Q 7	Write a short notes on: i- Herringbone structures ii- Gilbert type delta iii- Rift Basin	10	CO2
Q 8	Illustrate the Wilson Cycle and Foreland basin. What is relation of sediment load (QS), Water Discharge (Qw), Depositional slope (S) and diffusive coefficient.	4+6	CO3
Q 9	The 100 m thick shale horizon possesses porosity 15% at depth 3 km, and 70% at the surface. Calculate decompacted thickness of the unit. OR Explain the components of integrated basin analysis. How porosity change with respect to depth.?	10	CO4

Section C

Q 10	a- Under the three-dimensional stress environment, discuss the evolution of compressional, extensional, and pull apart basin. b- Discuss the sedimentary basins, related to convergent plate boundary.	10+10	CO3
Q 11	a- In a basin, a sedimentary unit from a borehole is recorded at 4 km depth with thickness of 100m and porosity 20%, the same unit have 50% original porosity at the surface, calculate the original thickness of the sedimentary unit. b- Describe the system tracts, which develop in complete one sea level cycle. <p style="text-align: center;">OR</p> Large area of continent consists of 30 km of crust with density 2.8 Mg/m ³ over 90 km of material with density 3.1 Mg/m ³ . The asthenosphere density is 3.2 Mg/m ³ . This region is covered with a 1.6 km thickness of ice of density 0.9 Mg/m ³ . The ice-covered region is assumed in isostatic equilibrium. Then, the ice melts. By how much will the rock surface of the continent change when the new isostatic equilibrium is re-established?	10+10 20	CO4

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Instructions: i- Attempt the questions from each section.
ii- Sketch the neat diagram with proper labeling.
iii- marks are clearly allotted in each question.

SECTION A

S. No.		Marks	CO
Q 1	Define Diagenesis, Base Level, and facies assemblage.	4	CO1
Q 2	Draw the lithologs of Alluvial fan and Deltaic depositional landform.	4	CO2
Q 3	Write the components of subsidence analysis.	4	CO3
Q 4	Illustrate the types of basins related to divergent plate margin.	4	CO3
Q 5	Differentiate transgression and regression process.	4	CO2

SECTION B

Q 6	Describe the petroleum system, tectonic framework and lithostratigraphy of any one petroliferous basin of India.	10	CO1
Q 7	Write a short notes on any two: iv- Hummocky cross stratification v- Delta Morphology vi- Carbonate platforms	10	CO2
Q 8	Illustrate the Wilson Cycle, Back arch basin and Fore arch basin	4+4+2	CO3
Q 9	The 300 m thick horizon of shale is recorded the porosity 20% at depth 2 km, and 70% at the surface. Calculate decompacted thickness of the unit. OR a- Define the sedimentary cycles. b- Draw the lithologs of each sedimentary cycle.	5+5	CO3

SECTION-C

Q 10	a- Discuss the sediment characteristics and associated structures in Fluvial,	10+10	CO4
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	<p>Deltaic and deep sea fan delta.</p> <p>b- Calculate the height of fluid rise (Density =1.10 gm/cc) in a cylindrical tube having inner radius of 0.5 mm. The air and fluid contact angle is 30° and the fluid interfacial tension is 72 dynes/cm. The density of air is 0.00122gm/cc.</p>		
Q 11	<p>a- In a basin, a sedimentary unit from a borehole is recorded at 4 km depth with thickness of 100m and porosity 20%, the same unit has 50% original porosity at the surface, calculate the original thickness of the sedimentary unit.</p> <p>b- Describe the types of mapping used in basin analysis. Write the principles of contouring.</p> <p style="text-align: center;">OR</p> <p>a- Calculate the original oil in place for the given data recorded from a petroliferous basin and Oil Field: - Area = 26,000 acres, Net productive thickness = 50 ft, Porosity = 15%, Average Sw = 30%, Initial reservoir pressure, $p_i = 3000$ psi, B_o at $p_i = 1.68$ bbl/STB.</p> <p>b- Explain the component of petrography and geochemical analysis for basin analysis.</p>	<p>10+10</p> <p>10+10</p>	<p>CO4</p>