

Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Programme Name: B.TECH APE UP	Semester : VII
Course Name : Coal Bed Methane	Time : 03 hrs
Course Code : PTEG 426	Max. Marks : 100
Nos. of page(s) : 2 (Two Pages)	
Instructions: Assume any missing data.	

SECTION A

S. No.		Marks	CO
Q 1	Indicate True or False i) Coal seam gas (CSG) and Coal bed methane (CBM) is a form of natural gas extracted from coal beds. T/F ii) “Coalification,” is a process of forming dense coal in specific order of High to Low rank. T/F iii) Biogenic natural gas is can be found in sediment bodies at the depths of 100- 300 feet. T/F iv) A good coal bed holds 5 to 6 times more gas than a sandstone reservoir. T/F	4	CO1
Q 2	Fill in the blanks: i) Butt cleats constitute a poorly defined set of _____ orthogonal to face cleats. ii) The mass transport depends upon a _____ across the micro pores. iii) Without hydraulic fracturing, low-permeability coals are commercially _____. iv) CMM is a form of natural gas and called as _____.	4	CO-2
Q 3	Differentiate briefly the following properties of CBM reservoir: i) Permeability and ii) Adsorption capacity	4	CO-3
Q 4	Examine the principle of any one resource estimation techniques of CBM	4	CO4
Q 5	Describe the approach of Development of CBM Field	4	CO1

SECTION B

Q 1	Discuss the production of CBM wells with specific reference to the three phases? Explain Nature of Decline in CBM gas production throughout well life cycle?	4+4	CO4
Q 2	Critically examine importance chemical nature of gas obtained from coal bed?	8	CO-2
Q 3	Differentiate principle of TCD and FID? Explain application of TCD and FID on the compositional aspects of CBM Gas?	8	CO-3
Q 4	“Coal is also a reservoir rock.” Support your arguments in favour/ against? OR Compare the conventional Gas reservoir with Coal bed Methane Gas Reservoir	8	CO-4

Q-5	<p>“Permeability is the most critical parameter for economic viability of a CBM gas.” Discuss the critical Issues/Factors that govern Permeability? OR With supporting arguments, explain of Dynamic Permeability of CBM reservoir.</p>	8	CO-3
SECTION-C			
Q 1	<p>Assuming the residual gas in coal is equal to that of the lost gas, determine the total gas content in 2 kg coal core sample after drilling. <i>The drilling and testing data given in Annexure-1</i> OR Project the energy requirement of India and discuss the role of CBM</p>	20	CO4
Q-2	<p>“CBM could fulfill goals gas production” Discuss the scenario with respect to any two of the following: i) Reservoir Parameters suitable for UCG ii) Issues related to UCG and ii) Selection criteria for UCG in India</p>	20	CO-2

ANNEXURE-1

Table-1. Drilling and testing data for Question -1 Section-C 1

Date	Time	Gas Desorbed (cc)	Date	Time	Gas Desorbed (cc)
24/8/2001	21:33	0	25/8/2014	0:24	188
24/8/2002	22:14	478	25/8/2015	0:34	190
24/8/2003	22:34	342	25/8/2016	0:44	180
24/8/2004	22:44	346	25/8/2017	0:54	150
24/8/2005	22:54	286	25/8/2018	1:04	120
24/8/2006	23:04	309	25/8/2019	1:14	90
24/8/2007	23:14	270	25/8/2020	1:24	80
24/8/2008	23:24	244	25/8/2021	1:34	60
24/8/2009	23:34	244	25/8/2022	1:44	50
24/8/2010	23:44	245	25/8/2023	1:54	40
24/8/2011	23:54	206	25/8/2024	2:04	30
25/8/2012	0:04	211	25/8/2025	2:14	20
25/8/2013	0:14	220			

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**UNIVERSITY OF
PETROLEUM AND ENERGY STUDIES**

Mid Semester Examination, September/ October 2018

Programme Name: B.TECH APE UP	Semester : VII
Course Name : Coal Bed Methane	Time : 02 hrs
Course Code : PTEG 426	Max. Marks : 100
Nos. of page(s) :	
Instructions: Assume any missing data.	

SECTION A

S. No.		Marks	CO
Q 1	Indicate True or False i) The problems associated with CBM project is Darcy Flow in the reservoir. T/F ii) “Coalification,” is a physical transformation from rock materials. T/F iii) CBM is a thermogenic gas. T/F iv) Thermal temperature range for CBM process is 150 to 200 °C.T/F	4	CO1
Q 2	Fill in the blanks: i) _____natural gas originates from fine grain rock formation typically 3000 feet (914 meters) underground. ii) Anthracite is a hard, brittle, and black lustrous coal, often referred to as hard coal, containing a high percentage of fixed carbon and a _____matter. iii) Gas produced from coal beds may be _____than the gas produced from conventional reservoirs. iv) An early high water cut, reduces a time-Period of production to the extent _____.	4	CO-2
Q 3	Describe importance of the following properties of CBM reservoir: i) Gas Flow ii) Gas Content	4	CO-3
Q 4	In order to undertake the CBM Project, explain possible challenges are considered?	4	CO4
Q 5	Describe the approach of Development of CBM Field	4	CO1

SECTION B

Q 1	a) Give the salient features of “Tank Test” used in coal bed methane? b) Explain importance of Step Rate Testing.	3+5	CO4
Q 2	Differentiate between i) Diagnostic Fracture Injection Test (DFIT) and ii) Below Fracture Pressure-Injection Falloff Test (BFP-IFT). Critically examine importance of the G function?	4+4	CO-2
Q 3	What is the principle of TCD and FID?	4+4	CO-3

	Develop your argument on their importance on the composition of CBM Gas?		
Q 4	Do you agree that Klinkenberg effect increases effective permeability? Identify conditions that support your arguments? OR How Gas content behave for deeper coals based on physical properties? List and explain your arguments on the behavior of deeper coals?	2+6	CO-4
Q-5	“Permeability is the most critical parameter for economic viability of a CBM gas.” Explain in detail critical Issues/Factors related to Permeability? OR With supporting arguments, explain of Dynamic Permeability of CBM reservoir?	8	CO-3
SECTION-C			
Q 1	a) Identify various phases of CBM Production? b) Explain role of these vital properties in detail? OR Project the energy requirement of India and discuss the role of CBM	10+10 20	CO4
Q-2	a) What do you understand by the “Development ladder of CBM Production”? b) How Economic development is possible with CBM? c) Differentiate between conventional gas and coalbed methane.	5+5+ 10	CO-2