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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program: B.Tech(APE-GAS) | **Semester – :VII**
Subject (Course): Coal Bed Methane Technology | **Max. Marks : 100**
Course Code : PTEG 426 | **Duration : 3 Hrs**
No. of page/s: 02

Assume appropriate data if missing. Draw neat sketches wherever necessary
Answer all the questions from Section-A

SECTION-A **6×10=60**

1. Draw the phase envelop for the CBM reservoir, mark the necessary reservoir properties with explanation. How the dual porosity works in the phase behavior discuss.

2. How do you perform the drill-stem test and slug test in the CBM wells. Describe with notations and diagrams

3. How do you dispose the produced water from the CBM reservoir? Enlist different techniques. Narrate one feasible technique.

4. What are the parameters to be considered while going for completion of the well? write about one feasible completion technique?

5. Construct a Langmuir isotherm and Freundlich isotherms giving suitable assumptions.

6. Discuss significant factors for an economical CBM project? Discuss

SECTION-B **2×20=40**
Answer any two questions from Section-B

7. Why it is necessary to do hydraulic fracturing for CBM wells? what are the mechanisms will affect the fluid recovery from the hydraulic fracturing?

P.T.O.

8. (a) The well 'A' in the month of July has an average minimum monthly flowrate of 12 cu ft/sec. Inherent background TDS in its waters amounts to 10 mg/L. Government regulations limit raising the TDs to a maximum of 190 mg/L. Coalbed methane wells in the adjacent field produce waters having an average TDS content of 1790 mg/L. what maximum volumetric rate of the produced waters in BWPD could be disposed of in 'A' Creek in July? Justify your answer

(b)Determine if 'well B 'in the area of a planned CBM project will have the capacity to receive expected production waters throughout the first year from the wells without exceeding TDS limits of governmental regulations. Initially, 25 wells will be simultaneously brought on-stream on January 1. One hundred days later, a second group of 50 will be brought on-stream. Thereafter, in 100 days a third group of 25 wells will be brought on-stream. Assume each well follows the production pattern given in the table

Time(Days)	Water produced Group-1, (BWPD)	Water produced Group-2, (BWPD)	Water produced Group-3, (BWPD)
0	5,500	---	---
50	4600	---	---
100	4200	5700	---
150	3400	4600	---
200	2800	4200	5700
250	2700	3400	4600
300	2100	2800	4200
350	1800	2700	3400
400	1500	2100	2800

9. A well is to be drilled to 5,500 ft with a 7 7/8 in. diameter rotary drill bit using air as a circulating fluid at an ROP of 30 ft/hr. The drill string in this well is made up of 500 ft of 6 ¾ in. OD by 2 13/16 in.ID drill collars and 5,000 ft API 4 ½ in. diameter, 16.60 -lb/ft nominal EU-S135, NC 50 drill pipe. Ambient conditions are elevation= 2,000ft, temperature = 45^0F, relative humidity = 0.65, and geo-thermal gradient = 0.01^0F/ft. The dewatering efficiency of the water trap is 85%. The missing water is 4 bbl/hr. Formation water influx is 10 bbl/hr. Blooey line pressure is 14.7 psia. Assuming drilling solids are particles having a specific gravity of 2.70, determine the minimum required volumetric flow rate of actual air for the operation.