

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: M. Sc Petroleum Geoscience

Semester: II

Programme: Introduction to Unconventional Resources

Course code: PEGS7027

Time: 03 hrs.

Max. Marks: 100

SECTION A [4X5=20marks]

S. No.		Mark	CO
Q 1	List five additives used along with hydrofracturing fluid	4	CO2
Q 2	Discuss about shale composition.	4	CO1
Q3	Mention five characteristics of a shale gas Reservoir	4	CO2
Q4	Mentions the phases of coal bed methane formation	4	CO3
Q5	Mention five aspects of CO ₂ enhanced unconventional hydrocarbon recovery	4	CO4

SECTION B [40marks]

Q 6	(a) Describe about gas storage capacity in shale gas reservoirs and their flow patterns inside the reservoir. (b) Discuss the controlling factors of shale gas generation and storage	5+5=10	CO3
Q7	Describe about different well types for enhanced CBM recovery.	10	CO3
Q8	Elaborate the composition and Structures of gas hydrate.	10	CO4
Q9	Discuss about phase diagram of gas hydrates.	10	CO5

OR

Q10	(a) Discuss the gas hydrate extraction techniques. (b) Elaborate how to demarcate the gas hydrate bearing zones using seismic profile.	5+5=10	CO5
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SECTION-C [40 marks]

Q 9	(a) Illustrate about microbial CBM exploitation process. (b) Describe the laboratory techniques of coal characterization.	10+10=20	CO4
Q 10	A shale formation was characterized to assess the gas generation potential using Rock Eval Pyrolysis. Where the free gas released at initial temperature 440degree Celcius, S1 is 2 mg/g HC, pyrolyzed gas released is 3 mg/g HC, S3 is 2.2 mcCO ₂ /g Rock, TOC =4 %, Tmax is 468 degree, (a) Calculate the Hydrogen Index, Oxygen Index and Production Index for that shale. (b) Interpret the thermal maturity zone and kerogen types. (c) Evaluate the gas generation potential.	10+5+5=20	CO5

OR

Q 10	(a) New Albany shale shows HI=26mg/g HC, OI=22mgO ₂ /gHC, evaluate the kerogen type using Van krevalan diagram concept. (b) Discuss generation processes of shale oil, oil shale and shale gas generation and the role of kerogen. (c) Describe about the geopolitics on shale gas extraction and highlight how to mitigate the challenges.	10+5+5=20	CO5
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