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GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

# PRESIDENCY UNIVERSITY
# BENGALURU

## SCHOOL OF ENGINEERING

### TEST - 1

**Even Semester**: 2018-19 | **Date**: 06 March 2019

**Course Code**: PET 318 | **Time**: 1 Hour

**Course Name**: Unconventional Hydrocarbon | **Max Marks**: 40

**Programme & Sem**: B.Tech.(DE) & VI Sem | **Weightage**: 20%

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**Instructions:**

*(i) Read the questions properly and answer accordingly.*
*(ii) Question paper consists of 3 parts.*
*(iii) Scientific and Non-programmable calculators are permitted.*

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### Part A

Answer **all** the Questions. **Each** question carries **three** marks. (5Qx3M=15)

1. Define energy. Describe 'Renewable Energy Sources' and 'Non-Renewable Energy Sources'?
2. Define 'Reservoir Rock'. Name the fundamental properties that help to differentiate between reservoir rock and effective reservoir rock.
3. What are the differences between 'Conventional Reservoir' and 'Unconventional Reservoir'?
4. Name at least 6 unconventional reservoirs that cab be targeted for unconventional energy.
5. What is Natural Gas? What is the difference between "Conventional" and "Unconventional" Natural Gas?

### Part B

Answer **all** the Questions. **Each** question carries **five** marks. (3Qx5M=15)

6. Explain (a) Relationship between Apparent Density and Coal Rank, and (b) Relationship between Compressive Strength and Coal Rank.
7. Describe 'Coalification Process' with neat diagram.
8. Describe the process of "Proximate Analysis of Coal".

### Part C

Answer **both** the Questions. **Each** question carries **five** marks. (2Qx5M=10)

9. Define Cleat. Name the factors that influence cleat formation. Explain relationship between coalbed Permeability and Cleat.
10. List the three key technological advances in Reservoir Engineering produced through GRI Coalbed Methane Research. Discuss the factors that control Production in Coal Reservoirs.

| Roll No. | | | | | | | | | | | | |
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# PRESIDENCY UNIVERSITY
# BENGALURU

## SCHOOL OF ENGINEERING

### TEST - 2

**Even Semester**: 2018-19 | **Date**: 16 April 2019

**Course Code**: PET 318 | **Time**: 1 Hour

**Course Name**: Unconventional Hydrocarbon | **Max Marks**: 40

**Program & Sem**: B.Tech. & VI Sem (DE) | **Weightage**: 15%

**Instructions:**

*(i) Read the questions properly and answer accordingly.*
*(ii) Question paper consists of 3 parts.*
*(iii) Scientific and Non-programmable calculators are permitted.*

### Part A

Answer **all** the Questions. **Each** question carries **four** marks. (3Qx4M=12)

1. Discuss the process of Gas Transport in coalbed with neat diagram.
2. Explain the comparison of Gas-In-Place for a Coal Seam and a Conventional Gas Sand as a function of pressure with neat diagram.
3. Explain the sequence of sub-stages followed for treatment of hydraulically fractured shale gas reservoirs.

### Part B

Answer **both** the Questions. **Each** question carries **six** marks. (2Qx6M=12)

4. Draw and explain the graphs for (a) Sensitivity of Gas Production Rate to Well Drainage Area, and (b) Sensitivity of Gas Production Rate to Permeability.
5. Draw and explain the graphs for (a) Sensitivity of Gas Production Rate to Hydraulic Fracture, and (b) Permeability versus Closure Pressure.

### Part C

Answer **both** the Questions. **Each** question carries **eight** marks. (2Qx8M=16)

6. Explain the Typical Coalbed Methane Production Profiles for Gas and Water Rates with neat diagram.
7. Name at least 8 Data Items and their Primary Sources used for analyzing Coalbed Methane Reservoirs.

| Roll No | | | | | | | | | | | | |
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# PRESIDENCY UNIVERSITY
# BENGALURU

## SCHOOL OF ENGINEERING

### END TERM FINAL EXAMINATION

**Even Semester**: 2018-19 | **Date**: 25 May 2019

**Course Code**: PET 318 | **Time**: 3 Hours

**Course Name**: Unconventional Hydrocarbons (DE) | **Max Marks**: 80

**Program & Sem**: B.Tech. & VI Sem | **Weightage**: 40%

**Instructions:**

*(i) Read the questions properly and answer accordingly.*
*(ii) Question paper consists of 3 parts.*
*(iii) Scientific and Non-programmable calculators are permitted.*

## Part A

Answer **all** the Questions. **Each** question carries **one** mark. (20Qx1M=20M)

1. Fill in the blanks:

(i) Credit for the discovery of hydrates usually given to the famous English chemist, _____.

(ii) The most important application of sulphur is the production of _____.

(iii) Full form of TRR is _____.

(iv) Terrestrial / Coal bed shale is typically associated with _____ Kerogen.

(v) A _____ compound is one in which a molecule of one substance is enclosed in a structure built up from molecules of another substance.

(vi) The hydrate crystals have complex, three-dimensional structures in which the water molecules form a cage and the _____ molecules are entrapped in the cages.

(vii) Gas hydrates are crystalline form of _____ water and _____ methane.

(viii) _____ is only an indication of shale gas potential.

(ix) _____ is a mixture of hydrocarbons (such as methane, ethane, propane) and a few non-hydrocarbons (hydrogen sulfide, carbon dioxide, nitrogen, etc., and water).

(x) In the theoretical map of gas hydrates stability thickness along the Indian margin, at the base of which is observed an anomalous seismic reflector, known as _____ on seismic section in the presence of gas hydrates.

(xi) Geomechanical properties are somewhat influenced by mineralogy / clay content, and the _____ stress history of the basin.

(xii) Mud particles in shale formation may be terrigenous, biogenous, or _____.

(xiii) In the process of _____, coals increase in rank from Lignite, Bituminous, and Anthracite.

(xiv) _____ of coal represents the relative percentage of organic to mineral components.

(xv) _____ represents the level of maturation reached, ranging from peat through anthracite.

(xvi) The composition of coal often is described by Proximate Analysis and _____ Analysis.

(xvii) Coal strength is most commonly determined by the Hardgrove _____ Index (HGI).

(xviii) Lignite is also known as _____ coal.

(xix) _____ is also known as Hard coal.

(xx) _____ is the naturally occurring fractures in coal beds.

## Part B

Answer **all** the Questions. **Each** question carries **eight** marks. (5Qx8M=40M)

2. (a) List the three conditions that required to be fulfilled for formation of hydrates.
   (b) Explain the other phenomena that enhance hydrate formation.
   (c) How is 'Pigging' related with hydrates? (3+3+2M)

3. (a) Define 'Terrigenous Mud' and 'Biogenous Mud'.
   (b) With suitable diagram classify Shale based on Composition. (4+4M)

4. (a) List the key properties of Shale Gas Evaluation.
   (b) Discuss the sequence of Sub-stages followed for treatment of hydraulically fractured shale gas reservoirs. (4+4M)

5. (a) Discuss about 'Liquid Hydrate Formers'.
   (b) Explain different 'Hydrate-Forming Conditions'. (3+5M)

6. (a) What is 'Deuterium'?
   (b) Explain the difference between 'deuterium' and 'normal hydrogen'.
   (c) What do you know about 'heavy water'?
   (d) Does heavy water form a hydrate? Explain. (2+2+2+2M)



## Part C

Answer **both** the Questions. **Each** question carries **ten** marks. (2Qx10M=20M)

7. (a) Explain 'Types of Hydrates' commonly encountered in petroleum business.
   (b) Discuss about Type I and Type II Hydrate Formers. (5+5M)

8. (a) Discuss the issues that may influence significance and future of shale gas.
   (b) Discuss the challenges a shale gas project may face in comparison with conventional gas plays. (5+5M)