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**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
MID TERM EXAMINATION - OCT 2023**

Semester : Semester V - 2021

Course Code : PET2017

Course Name : Sem V - PET2017 - Natural Gas Hydrates

Program : B. TECH

Date : 2-NOV-2023

Time : 9:30AM - 11:00AM

Max Marks : 50

Weightage : 25%

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.
- (iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS

(5 X 1 = 5M)

1. Write down names of any three apparatus used for the study of hydrate formation and dissociation in laboratory.
(CO1) [Knowledge]
2. Define induction time and metastable region.
(CO1) [Knowledge]
3. Mention two basins of India where gas hydrate reserve is discovered.
(CO2) [Knowledge]
4. Write any two examples of gas hydrate inhibitors.
(CO2) [Knowledge]
5. Different types of glycols can be used in a glycol dehydrator unit. Write down the names.
(CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

(3 X 5 = 15M)

6. Implementation of different production techniques of gas from gas hydrate zone causes shifting of the gas hydrate thermodynamic equilibrium curve. Draw the hydrate equilibrium curve and mark the changes in position and situation during different production techniques. Identify and explain whether a hydrate will form for propane at a temperature of 20deg C and 10 MPa?
- (CO1) [Comprehension]
7. Drilling into gas hydrate zone is different from conventional oil and gas well drilling and encounters some threatening situations.
- (a) Mention the two basic types of hydrate-related drilling problems and two techniques to avoid hydrate formation while drilling.
- (b) For the pressure – temperature condition mentioned in the table below, predict whether hydrate formation will take place for methane at a temperature of 15deg C and 30 MPa.
- (CO1) [Comprehension]
8. Gas hydrate is an unconventional source of energy, but also represent a significant hazard. Explain the geohazards that can be caused by gas hydrates.

(CO2) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

(2 X 15 = 30M)

9. Gas hydrates that are present in nature or formed in the laboratory bear different structures, which depends on the type of guest molecule. Make a comparative assessment of different gas hydrate structures based on their geometrical shape, type of guest molecule and types of cages.
- (CO1) [Application]
10. Make an analytical illustration of the process description of glycol dehydration unit with a labelled figure that is used to separate water from natural gas streams.

(CO2) [Application]