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**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING  
END TERM EXAMINATION - JUN 2023**

**Semester :** Semester VI - 2020

**Course Code :** PET2009

**Course Name :** Sem VI - PET2009 - Thermodynamics of Reservoir Fluids

**Program :** PET

**Date :** 21-JUN-2023

**Time :** 9.30AM - 12.30PM

**Max Marks :** 60

**Weightage :** 30%

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**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.
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**PART A**

**ANSWER ALL THE QUESTIONS**

**(5 X 2 = 10M)**

1. Define Critical point in dew point bubble point curve.  
(CO3) [Knowledge]
2. What is throttling device? Write its application.  
(CO2) [Knowledge]
3. Define Cricondenterm and Cricondembar.  
(CO3) [Knowledge]
4. State second law of thermodynamics. Write its mathematical expression.  
(CO1) [Knowledge]
5. List the primary properties sufficient for defining a thermodynamic state.  
(CO1) [Knowledge]

**PART B**

**ANSWER ALL THE QUESTIONS**

**(3 X 10 = 30M)**

6. "Hydrocarbon reservoir can be classified based on initial reservoir pressure and composition of hydrocarbon. Bubble point-dew point curve and liquid shrinkage curve can be used to explain the different classification". Use this statement to classify hydrocarbon reservoir and explain any one with neat diagram.  
(CO3) [Comprehension]

7. Compressibility is an important parameter for natural gas. Write the procedures to find compressibility of natural hydrocarbon gases.  
Non hydrocarbon gases like hydrogen sulfide, carbon di oxide effect the compressibility of gas mixur. How can we correct the effect of non hydrocarbon gases on compressibility factor?  
(CO3) [Comprehension]
8. Compressor are used in many application in oil and gas industries. List out different application. Classify different types compressor based on working principle and application. Briefly explain the working principle of any one type of compressor.  
(CO2) [Comprehension]

### PART C

#### ANSWER THE FOLLOWING QUESTION

(1 X 20 = 20M)

9. Irreversibility of a thermodynamic process can be explained by Entropy concept. Irresvesibility increases with increase in entropy. Derive the entropy relation for isothermal, isobaric and isochoric process.  
7 mol of an ideal gas ( $C_v = 5 \text{ cal}$ ) was initially at 30 degree C and 2 atm. the gas was tranfered to the state when the temperature is 110 degree C and pressure 12 atm. Determine the change in entropy of the process.  
(CO1) [Application]