|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Roll No |  |  |  |  |  |  |  |  |  |  |  |

PRESIDENCY UNIVERSITY BENGALURU

 **SET - A**

SCHOOL OF ENGINEERING

**END TERM EXAMINATION – MAY/JUNE 2024**

**Semester :** Semester VIII - 2020

**Course Code :** PET2020

**Course Name :** Process Pipeline Design

**Program :** B.Tech. Petroleum Engineering

**Date :** May 29, 2024

**Time :** 01.00pm to 04.00pm

**Max Marks :** 100

**Weightage :** 50%

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

**PART A**

**ANSWER ANY FIVE QUESTIONS 5QX2M=10**

* 1. Define Modulus of Elasticity.
	2. State the essential characteristics of pipe coatings.
	3. State the manning equation of pipeline sizing.
	4. Define pipeline sizing.
	5. Define Magnetic inspection used for leak detection.
	6. Define hydrotesting of a pipeline.
	7. Differentiate between CNG and LNG.

(CO3) [Knowledge] (CO3) [Knowledge] (CO3) [Knowledge] (CO3) [Knowledge] (CO4) [Knowledge] (CO4) [Knowledge] (CO4) [Knowledge]

**PART B**

**ANSWER ANY FIVE QUESTIONS 5QX10M=50**

* 1. The importance of inspecting pipelines cannot be overstated. It's a proactive measure that helps to ensure the safe and efficient operation of vital infrastructure while minimizing risks to people, the environment, and the economy**.**

Discuss your understanding of Pipeline Inspection Gauges (PIGs). Explain their mode of operation, design and working in detail.

(CO3) [Comprehension]

* 1. Coating pipelines is essential for protecting them from corrosion, extending their service life, ensuring regulatory compliance, and minimizing environmental impact.

Discuss the importance of coating a pipeline and various types of coatings in detail.

(CO3) [Comprehension]

* 1. Selecting materials with the appropriate mechanical properties is critical for meeting design requirements, minimizing risks, and optimizing performance throughout the lifecycle of the pipeline. Discuss in detail about the important mechanical properties required for the selection of a pipeline material.

(CO3) [Comprehension]

* 1. Implementing comprehensive corrosion prevention and mitigation strategies is critical for pipeline operators to mitigate risks and maintain the integrity of their assets.

Explain your understanding about cathode protection system and its use. Discuss in detail about Impressed Current Cathodic Protection (ICCP) system and Sacrificial anode protection system with clear schematics.

(CO3) [Comprehension]

* 1. Valves are essential components that enable the safe, efficient, and reliable operation of pipeline systems.

Define Valves. Discuss about the various types of valves in detail.

(CO4) [Comprehension]

* 1. The importance of CNG lies in its contributions to environmental sustainability, energy security, economic prosperity, and technological advancement in the transportation sector.

Discuss CNG, its preparation, constituents, benefits, challenges, applications and regulations in detail.

(CO4) [Comprehension]

* 1. Better economic decisions support informed decision-making, capital allocation, and long-term planning, ultimately contributing to the success and sustainability of pipeline investments. Discuss in detail about Net PRESENT VALUE (NPV) and idea of PRESET WORTH OF UNIFORM SERIES in detail with expressions. If $950 is to be received seven years from now, Predict its worth if the time value of money is defined by 8% interest compounded annually.

(CO4) [Comprehension]

**PART C**

**ANSWER ANY TWO QUESTIONS 2QX20M=40**

* 1. Compute the pressure loss in a pipe of 4 inches in diameter carrying water with a flow of 60 m3/h at a temperature of 300 °C through a distance of 200 meters. The pipe material is Cast iron with an absolute roughness of 0.25 mm. by using the Hazen – William Equation.

Take C for cast iron =150.

(CO3) [Application]

* 1. State your understanding of "economic diameter of pipeline" with expression. A pipeline has to transport crude oil from Gandhar filed to Group Gathering Station (GGS). Predict the economic diameter of pipeline (inch) to transport the crude oil having following properties: mass flow rate 0.166 lb/min, density of fluid 0.85 kg/m3, with a viscosity of 4cp.

(CO4) [Application]

* 1. Water is flowing through a pipe having diameters of 20 cm and 10 cm at sections 1 and 2, respectively. The rate of flow through the pipe is 35 liters/s. Section 1 is 6 m above datum, and section 2 is 4 m above datum. If the pressure at section 1 is 39.24 N/cm2, Predict the intensity of pressure at section 2.



(CO1) [Application]