

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Winter 2022 - 23 Examination

Semester: 7
Subject Code: 203120431
Subject Name: Pipeline Engineering

Date: 08/10/2022
Time: 10:30 am to 01:00 pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (Fill in the blanks, one-word answer, MCQ-not more than five in case (15) of MCQ) (All are compulsory) (Each of one mark)

1. Which material is used for pipe manufacturing?
(A) Aluminum (B) Bronze
(C) Carbon steel (D) Copper
2. _____ used for long-distance movement and use for transportation of crude oil, jet fuel, kerosene, chemicals, or coal.
(A) Trunk lines (B) Gathering line
(C) Distribution line (D) Transportation line
3. What is the objective of construction activities?
(A) Installation of production facility (B) Easy and effective production activities
(C) Exploration should be less costly (D) To ensure the installation of high-quality facilities
4. The pressure at different locations in the reservoir is declining linearly as a function of time, i.e., at a constant declining rate is called?
(A) Steady-state flow (B) Unsteady state flow
(C) Pseudo-steady state flow (D) Transient flow
5. _____ are usually used in crude oil pipelines containing microcrystalline wax and paraffin inhibitor.
(A) Soluble spheres (B) Solid sphere
(C) Foam sphere (D) Inflatable sphere
6. The Reynolds number (N_{Re}) is defined as the ratio of _____.
7. The activities to search for oil and gas deposit below the earth's surface is called _____.
8. Rust, dirt, and mill scale _____ the effectiveness of corrosion inhibitor.
9. What is the abbreviation of ANSI?
10. Which mode of transport is the very low frequency of shipments?
11. Which equation is the Reynold number dependent?
12. Which code is used for the Liquid Hydrocarbon Transportation Piping?
13. Which chemicals can be used for drying the gas service pipelines?
14. What do you mean by Production lines?
15. What do you mean by Offshore construction?

Q.2 Answer the following questions. (Attempt any three) (15)

- A) The external diameter of the pipe is 32 cm and the thickness of the pipe is 2.8 cm. Calculate the internal cross-section area of the pipe (in inch²).
- B) A pipe 1.68 m in diameter and 8000 m long transmits water of a velocity of 1.725 m/sec. The moody friction coefficient of the pipe is 0.0426. Calculate the head loss due to friction?
- C) The slip velocity of for a gas-liquid flow in a vertical production is 0.14 m/sec. The superficial velocity of each phase is 0.12 m/sec. Calculate the fractional Hold-up of the gas and liquid phase (round off to two decimal places).
- D) Explain the galvanic corrosion with a neat diagram?

Q.3 A) What are the common features of Pipeline Codes and Standards and also define Floating, production, storage, and Offloading (FPSO)? (07)

- B) Following data are given for a horizontal pipeline: Diameter of the pipeline is 18-inch, length of the pipeline is 225 miles, the average temperature is 220 °F, the specific gravity of a gas is 0.72, Upstream and downstream pressure is 1500 psia and 1050 psia respectively, standard pressure and temperature is 14.7 psia and 60 °F, average compressibility factor is 0.88. Calculate gas flow rate in MMscf/hr using the Weymouth equation? (08)

OR

B) Explain the Rail Transport and Water Transport and also write the advantage of disadvantages of Rail and Water Transport? (08)

Q.4 A) What are the applications of the pigging and also explain the Utility pigs in detail? (07)

OR

A) What is the difference between upstream, downstream and mid-stream industry and also explain the types of offshore structures? (07)

B) Explain Multiphase flow in vertical pipe with vertical multiphase flow map? (08)