

Question Paper

Exam Date & Time: 12-Dec-2023 (02:30 PM - 05:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

7TH SEMESTER B.TECH END SEMESTER EXAMINATIONS, NOV-DEC 2023

Introduction to Petroleum Engineering [CHE 4304]

Marks: 50

Duration: 180 mins.

Answer all the questions.

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

- 1) Distinguish between the proven, probable and possible reserve. (3)
 - A) (4)
 - B) List any 02 each onshore and offshore oil fields in India (4)
 - C) The exploration of petroleum crude is done based on two ways; surface geology and subsurface geology. Give an outline to both the geological surveys. (3)
- 2) Name any four components of a rotary drilling rig and discuss the role of any TWO of them. (3)
 - A) (3)
 - B) Discuss the several functions of drilling mud (4)
 - C) Summarize the well casing process; its importance, types and procedure during drilling. (3)
- 3) Define the term "wettability". Distinguish between the water-wet, and oil-wet surfaces (3)
 - A) (4)
 - B) A well was drilled at a depth of 10000 ft to recover the oil from reservoir having initial pressure of 450 atm. When the drill bit reaches the reservoir, the oil recovery started as a result of reduction in the reservoir pressure (PR). Predict the primary recovery method responsible for the recovery of oil and analyze its effect on PR, gas-oil ratio and oil recovery rate when the pressure is reduced to:
(a) 320 atm, and
(b) 180 atm.
(Assume that the bubble point pressure of oil is 285 atm and there is no water aquifer present near to the reservoir). (3)
 - C) Suggest the EOR methods that lowers the interfacial tension between the displacing fluid and displaced fluid and thereby improves the mobility ratio for the recovery of residual oil from reservoir. Explain any ONE of the methods in detail. (4)
- 4) Describe the volumetric method for the estimation of original oil in place (OOIP). Derive an expression for the evaluation of OOIP in the case of water drive (4)
 - A) (3)
 - B) If a crude oil product is blackish, less sweet, high TAN value and has specific gravity of 0.94, predict (3)

the type of crude oil

- C) Explain any three important properties of crude oil/ petroleum products. (3)
- 5) What is the purpose of crude oil desalination? In the crude oil desalination unit, the crude oil forms an emulsion with water. Analyze and suggest methods to demulsify the crude oil with detailed explanation. (4)
- A)
- B) In the petroleum refinery, the products obtained from CDU and VDU contain significant amount of sulfur which would decrease the efficiency of other subsequent refinery processes for their conversion. Thus for the desulfurization of hydrocarbon product, recommend a method or process route in the form of a process flow diagram along with an explanation. (4)
- C) What are the different types of coke formed in delayed coking process? Differentiate them (2)

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