INTERNATIONAL UNIVERSITY OF EAST AFRICA
'Learning to Succeed'

FACULTY OF ENGINEERING

END OF SEMESTER EXAMINATIONS - APRIL -MAY 2025

PROGRAMME : Bachelor of PETROLEUM ENGINEERING

YEAR/SEM : Two (2), Semester II

COURSE CODE : PTE2222

NAME : GEOSTATICS AND RESERVOIR MODELING

DATE: 24/04/2025

TIME: 09:00 AM – 12:00 PM

INSTRUCTIONS TO CANDIDATES:

1. Do not open this examination until you are told to do so
2. **ATTEMPT ALL QUESTIONS IN SECTION A AND ANY THREE (3) IN SECTION B.**
3. All rough work should be in your answer booklet
4. The time allowed for this examination is strictly 3 hours
5. **ON THE FIRST PAGE OF YOUR ANSWER BOOKLET**
   - Write your registration number properly
   - Write the course name and course code
   - Write examination venue
   - Do not write, draw or scratch anything else on the first page
   - Writing unnecessary information like phone numbers in the first page shall annul your exam
   - Answer booklets that do not carry the required information, or that have unnecessary writing in the first page shall not be marked.
   - Do not carry any section of this question paper out of the examination room, submit it together with your answer booklet.

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Section A (40 Marks)

1.1 What is the primary purpose of a reservoir simulator? (4 marks)

1.2 List two limitations of reservoir simulators compared to real-world systems. (4 marks)

1.3 Name the two simulation approaches and their key distinction. (4 marks)

1.4 Identify the five steps in a simulation study. (4 marks)

1.5 Contrast homogeneous and anisotropic systems. (4 marks)

1.6 What property determines wettability in reservoir fluids? (4 marks)

1.7 State the Young-Dupres equation and its variables. (4 marks)

1.8 Write Darcy's law for single-phase flow and label terms. (4 marks)

1.9 Compare body-centered and mesh-centered grids. (4 marks)

Section B (60 Marks)

2.0 Explain the role of a reservoir simulator in petroleum engineering, highlighting its purpose, limitations, and the importance of the simulation engineer. (20 marks)

3.0 Describe the five basic steps of a reservoir simulation study, emphasizing the significance of model selection and data preparation. (20 marks)

4.0 Discuss the key properties of reservoir rocks and fluids and their impact on flow dynamics. (20 marks)

5.0 Examine the use of pseudo-functions and computational considerations in reservoir simulation, including data collection and restart procedures.