JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

UNIVERSITY EXAMINATIONS FOR THE DEGREE IN SCIENCE IN RENEWABLE ENERGY TECHNOLOGY AND MANAGMENT

THIRD YEAR RESIT EXAMINATIONS 2020/21 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TET 3321

COURSE TITLE: Petroleum Technology

EXAM VENUE: **STREAM: BSc REN TECH & MGT**

DATE: ../11/2020 EXAM **SESSION:**

DURATION: 2 HOURS

Instructions

1. **Answer question 1 (Compulsory) and ANY other two questions**
2. **Candidates are advised not to write on question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION ONE (COMPULSARY) (30 MARKS)

a) Define the term petroleum reservoir engineering (1 marks)

b) Differentiate between;-

i. Total porosity and effective porosity (2 marks)

ii. Primary recovery and secondary recovery (4 marks)

c) Using relevant illustrations, describe the formation of petroleum (8 marks)

d) Discuss the six branches of petroleum engineering. (12 marks)

e) State and briefly explain any three types of well casing. (3 marks)

QUESTION TWO (20 MARKS)

a) Briefly describe the two essential characteristics that a geological formation must exhibit in order to form a commercial reservoir of hydrocarbons. (4 Marks)

b) A sandstone core sample is cleanly cut and carefully measured in a laboratory. The cylindrical core has a length of 3 cm. and a diameter of 0.75 cm. The core is dried and weighed. The dried core weighs 125 g. The core is then saturated with freshwater. The water-saturated core weighs 127.95 g. Determine the porosity of the sandstone core. Neglect the weight of air in the dried core and assume the density of water is 1 g/cc. (4 Marks)

c) Discuss the six branches of petroleum engineering. (12 marks)

QUESTION THREE (20 MARKS)

a) Define the term "directional drilling" as used in rotary drilling. (2 Marks)

b) List any two types of floating marine drilling rigs. (2 Marks)

c) Describe the circulating system in rotary drilling and state any three main objectives of this system. (8 Marks)

d) Describe the drilling procedure (4 Marks)

e) List and briefly describe any four drilling problems that maybe encountered during rotary drilling. (4 Marks)

QUESTION FOUR (20 MARKS)

a) Describe any four natural drive mechanisms used to transport hydrocarbons towards and out of the production wells. (8 Marks)

b) Define thermal enhance oil recovery and give the three common techniques used in this method. (4 Marks)

c) Discuss the advantages and disadvantages associated with transportation of oil and gas via pipelines. (8 Marks)

QUESTION FIVE (20 MARKS)

a) Discuss at least five key environmental impacts that occur during production of crude oil and natural gas. (20 Marks)