UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

FIRST SEMESTER EXAMINATIONS, NOV. – DEC. 2018

COURSE NO: PE 381
COURSE NAME: PRODUCTION OPERATIONS AND EQUIPMENT
CLASS: PE III **TIME:** 3 HOURS

Name**:** _____Index Number: _____

Answer three (3) Questions out of four. Begin each question from a fresh page

QUESTION ONE (25)

a. Give the components of the production system and for each component, state their functions/roles in production operations. (10)

b. State the four major sections of the separator and describe briefly their functions. (8)

c. What are wellhead chokes? Differentiate between a fixed orifice and an adjustable orifice chokes and mention at least one suitable application for each. (5)

d. Give two reasons why sometimes chokes are installed in wireline nipples downhole in the tubing string. (2)

QUESTION TWO (25)

a. How is the level of fluid in a process vessel controlled? Describe the process indicating necessary equipment involved.

b. What are the available optional methods by which fluid which enters the wellbore will be allowed to flow to surface in a production well, or to the formation in an injection well? With

aid of diagrams describe the options stated; how they conduct hydrocarbons from the wellbore to surface. (10)

c. Chokes are used in flowlines downstream the wellhead to back pressure the well, give four reason why this is done. (4)

d. After drilling through the reservoir/productive section, what are the available options by which fluid communication can occur between the reservoir and the wellbore? (Aid your answers with diagrams/sketches). Which of the options would you recommend to offer the best well control and why? (6)

QUESTION THREE (25)

a. Explain what completion operation of production and injection wells entails and state three reasons why completion operation very important in efficient oil and gas production. (5)

b. Mention five basic essential characteristics or attributes of all completion facilities (5)

c. Packers are essential component of completion equipment. What would be your five reasons for employing a packer device in your wellbore? (5)

d. The electrical submersible pump (ESP) is an efficient artificial lift option, give 3 advantages and 3 disadvantages of its application. Mention the surface and subsurface components of the ESP installation. (10)

QUESTION FOUR (25)

a. Explain gas lift as an artificial lift method and indicate the two mechanisms under this method that cause hydrocarbons to be lifted to surface. (4)

b. Explain what multiple zones completion entails. Indicate and explain concisely the 3 depletion options employed under multiple zone completion. (6)

c. For the option that allows more than one reservoir zones fluid to flow through one tubing at the same time, mention 3 advantages and 3 disadvantages that are associated with it. (6)

d. The Agalla oil and gas field is currently producing from about 10 wellbores. One of the wells known as Antoh Well has a producing GOR of 70 % and the excess gas is just being flared. What other alternatives can you recommend/suggest to management to stop them from polluting the atmosphere? Give four alternative solutions. (4)

e. Describe how pressure is controlled in a process vessel during production of hydrocarbons. Indicate all necessary equipment involved in the process. (5)

f. In the selection of the options by which hydrocarbon fluids entering the wellbore will flow to surface, a range of considerations may influence a particular choice. State four of such factors/considerations and explain how/why. (8)

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