KIBABII UNIVERSITY

2021/2022 ACADEMIC YEAR

THIRD YEAR SECOND SEMESTER

MAIN EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE IN RENEWABLE ENERGY AND BIOFUELS TECHNOLOGY

COURSE CODE: REN 325

COURSE TITLE: GEOTHERMAL & NUCLEAR ENERGY

DATE: 31/08/2022 **TIME: 9:00AM-11:00AM**

INSTRUCTIONS TO CANDIDATES

Answer question ONE and any other two questions

This paper consists of 3 printed pages. Please Turn over

QUESTION ONE

a. Define the following terms 3mks
   i. Geothermal energy.
   ii. Geothermal fluid
   iii. Half Life

b. State ANY THREE sources of heat in the interior of the earth (3mks).
c. List the FOUR surface manifestations of geothermal resources (4mks)
d. Using a well labelled diagram, explain why understanding the structure of the earth interior of the earth is important in geothermal exploration (5mks)
e. Radioactive decay is the spontaneous decomposition of particles to produce one or more particles. State any THREE types of radioactive decay (3mks)
f. What do you understand by geothermal resource assessment? 2mks
g. Geothermal Energy and Solar energy are regarded as renewable energy resources. Give THREE reasons supporting this statement. (3mks)
h. Using a well labelled diagram, briefly describe how a single flash steam cycle works (4mks)
i. Give any THREE direct uses of geothermal resources (3mks)

QUESTION TWO

a. Describe the formation of the following geothermal resources formation using well labelled diagrams:
   I. Hydro-Geothermal resource. (7mks)

   II. Hot Dry Rock/Petro-Geothermal resource (7mks)

b. Give the THREE geothermal resource assessment explorations stating the significance of each exploration. (6mks)

QUESTION THREE

a. Identify any FIVE demerits of exploration of geothermal as the source of energy. (5mks)

b. Using well labelled diagram, briefly describe the operation principle Binary power plant (10mks).

c. Give FIVE roles of drilling fluid or mud is very important in geothermal drilling process (5mks).

QUESTION FOUR

a. Using a well labelled diagram, describe the generation of electricity from nuclear reactor. (10mks)

b. Describe space heating and cooling using geothermal heat pumps (10mks)