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**2022/2023 ACADEMIC YEAR**

**SECOND YEAR SECOND SEMESTER**

**SPECIAL EXAMINATIONS**

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

**COURSE CODE: REN 325**

**COURSE TITLE: GEOTHERMAL & NUCLEAR ENERGY**

**DATE: 10/8/2023**

**TIME: 8:00-10:00AM**

***INSTRUCTIONS TO CANDIDATES***

Answer question ONE and any other two questions

This paper consists of 3 printed pages. Please Turn over

### QUESTION ONE

- a. What do you understand by Geothermal Energy? (2mks)
- b. Geothermal Energy deals with extraction of heat from the earth. Briefly state the three main reasons why the interior of the earth is still so hot? (3mks).
- c. State any FOUR advantages of using geothermal energy compared to other sources of energy. (4mks)
- d. Differentiate between Fission and Fusion as used in nuclear energy (2mks)
- e. State any TWO damages caused by the continuous exposure of radioactive action during nuclear energy generation. (4mks)
- f. What do you understand by the following terms as used in geothermal resources classification:
  - I. Vapour dominated geothermal resource. (2mks)
  - II. Liquid dominated geothermal resource (2mks)
- g. List FOUR direct uses of geothermal heat (4mks)
- h. List **THREE** physical features that show the manifestation of geothermal energy resource beneath the ground. (3mks).
- i. Give four main objectives of exploration process in geothermal energy resources study (4mks)

**SECTION B:**

**ANSWER ANY TWO QUESTIONS FROM THIS SECTION (40MKS)**

**QUESTION TWO**

- a. Describe the formation of the following geothermal resources formation using well labelled diagrams:
  - I. Hydro-Geothermal resource. (8mks)
  - II. Hot Dry Rock/Petro-Geothermal resource (8mks)
- b. List any FOUR negative impacts of geothermal exploration on environment (4mks).

**QUESTION THREE**

- a. Using well labelled diagram, briefly describe the operation principle of vapour dominated single flash geothermal power plant (10 mks).
- b. With the aid of a well labelled diagram, describe geothermal energy generation using Binary Cycle (10mks)

**QUESTION FOUR**

- a. Name any FIVE Geothermal sites in Kenya (5mks)
- b) State FIVE factors that determines the cost of Geothermal project (5mks)
- c) How do you compare geothermal power plant and coal power plant in terms of:
  - I. Capital cost. (2mks)
  - II. Operation and maintenance cost.(2mks)
  - III. Environmental sustainability (2mks)
- c. Briefly explain how the abundant geothermal energy Kenya can help in the realization of the government's big 4 agenda (4mks).