UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

Department of Environmental Health Science

BACHELOR OF SCIENCE DEGREE IN ENVIRONMENTAL HEALTH SCIENCE

MAIN EXAMINATION PAPER MAY 2019

TITLE OF PAPER	:	ENVIRONMENTAL PHYSICS
COURSE CODE	:	EHS106
DURATION	:	2 HOURS
MARKS	:	100
INSTRUCTIONS	:	READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
	:	ANSWER **ANY FOUR** QUESTIONS
	:	EACH QUESTION **CARRIES 25** MARKS.
	:	WRITE NEATLY & CLEARLY
	:	NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
	:	BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.
REQUIREMENT	:	USE OF CALCULATORS

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.

QUESTION ONE

1. Define energy efficiency?   [1 mark].
2. As the environmental health officer at UNISWA, you are to advice top management of the university to integrate energy efficiency approaches into its energy use and management in order to cut on cost. Advance your reasons (**importance of energy efficiency**) to convince management in this endeavor.   [10 marks].
3. Having convinced the UNESWA top management on the importance of energy efficiency, recommend ways that you would want the UNESWA community to adopt in order to improve energy efficiency.   [14 marks].

Total 25 Marks

QUESTION TWO

Discuss H.E.P. as one of the energy resources, under the following themes:

1. What does the acronym H.E.P. stand for?   [1 mark].
2. How would you classify this energy resource? Is it renewable or non-renewable?
                                                                                                    [1 mark].
3. Describe how this source of energy is taped?   [4 marks].
4. In a tabular form, list five Advantages and five disadvantages of using this energy source.   [10 marks].
5. Explain how this source of energy can be managed sustainably on a national level.   [4 marks].
6. As an environmental health scientist, propose ways of improving its disadvantages?   [5 marks].

Total 25 marks

QUESTION THREE

1. State the first and second laws of thermodynamics.   [4 marks].
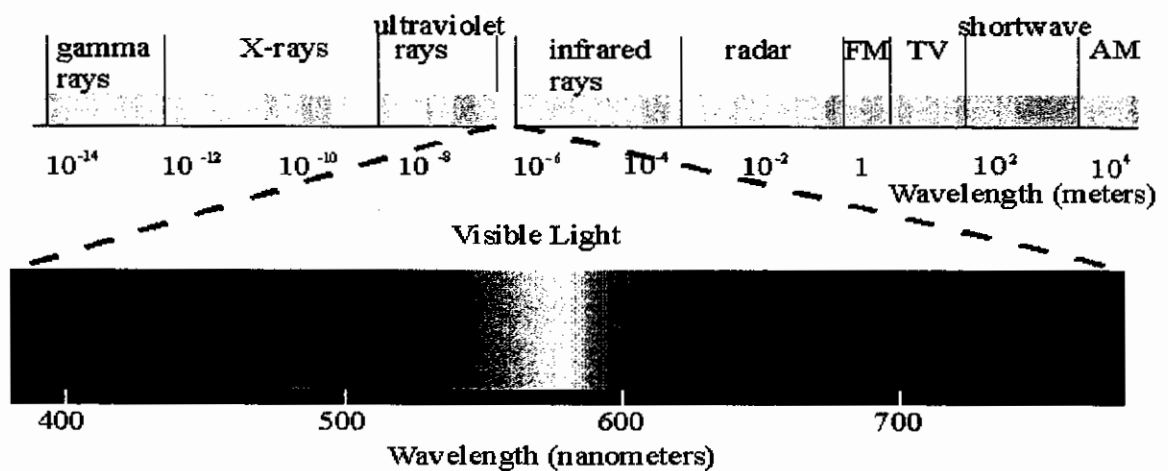
Figure 1: the electromagnetic spectrum. The visible portion of the spectrum is shown in the expanded insert.

1. Study the figure above and identify the wavelength of yellow light. Then, estimate the number of waves of yellow light that span the distance between a computer monitor and a user who is sitting 0.5m meter from the computer. [5 marks].
2. Define entropy and in a tabular form similar to the one below, outline the environmental issues verses entropy. [10 marks].

Low entropy state	High entropy state
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

3. Discuss the environmental challenges of using oil as a source of energy. [6 marks].

Total 25 marks

QUESTION FOUR

1. Draw and label the structure of the atmosphere and give the heights of the different spheres from the ground upwards. [11 marks].
2. A typical Swazi homestead in Matsanjeni consisting of six people uses methane gas for cooking and boiling water.
   a. Write and balance the combustion reaction that take place when they are using the gas. [5 marks].
   b. Calculate the mass of carbon dioxide produced per MJ of energy from the combustion of methane. Given that 1 kg of methane burns to produce 55.5 MJ/kg of energy. [5 marks].
   c. If the homestead used a 19 kg gas cylinder for a period of three months (90 days), compute the mass of carbon dioxide released to the atmosphere during this period of time. [4 marks].

Total 25 marks

QUESTION FIVE

1. Draw a labeled sketch of the earth's structure. [3 marks].
2. Define the following terms:
   a. Geology [1 mark].
   b. Asthenosphere [1 mark].
   c. Mineral resource [1 mark].
   d. Rock [1 mark].
3. Based on the way rocks are formed, list the **three classes** of rocks and briefly explain how each of them was formed. [18 marks].

3

Total 25 marks

END OF EXAMINATION