UNIVERSITY OF ESWATINI
Faculty of Health Sciences
Department of Environmental Health Science

DEGREE IN ENVIRONMENTAL HEALTH SCIENCE

Re-sit EXAMINATION PAPER JANUARY 2020

TITLE OF PAPER	:	PHYSICS FOR HEALTH SCIENCES (NURSING AND ENVIRONMENTAL HEALTH STUDENTS)
COURSE CODE	:	EHS103
DURATION	:	2 HOURS
MARKS	:	100
INSTRUCTIONS	:	READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
	:	ANSWER **ANY FOUR** QUESTIONS
	:	EACH QUESTION **CARRIES 25** MARKS.
	:	WRITE NEATLY & CLEARLY
	:	CALCULATOR, GRAPH PAPERS, RULAR AND A SET OF MATHEMATICAL INSTRUMENTS ARE REQUIRED FOR THIS EXAM PAPER
	:	EXECPT THE GRAPH PAPER, NO OTHER PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
	:	STUDENTS ARE ALLOWED TO USE GRAPH PAPERS AND SCIENTIFIC CALCULATORS
	:	BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

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

QUESTION ONE

A car moves from rest with a uniform acceleration of 2 m/s^2 for the first 30 s from O to A. it continues at a constant velocity for the next 40 s from A to B and finally takes 15 s to decelerate uniformly to rest at C.

    a. Calculate the constant speed reached after 30 s.   4 marks.

    b. Sketch a velocity-time graph for the whole journey.   5 marks.

    c. From the graph find the total distance covered.   11 marks.

    d. Calculate the average speed of the car for the whole journey.   5 marks.

Total 25 marks

QUESTION TWO

1. A horizontal unbalanced force of 40 N is applied to a mass of 100 kg at rest on a smooth horizontal surface. How long does it take for the mass to reach a velocity of 40 m/s.   8 marks.

2. A cage of mass 200 kg is held by a cable. Find the tension in the cable when the cage is

    a. Held at rest.   4 marks.

    b. Lowered with a constant speed.   2 marks.

    c. Raised with constant acceleration of 2 m/s^2.   8 marks.

    d. State Newton's law of gravitation.   3 marks.

Total 25 marks

QUESTION THREE

1. A mass of 2 kg is 0.6 m above a table top that is 80 cm above the floor. What is the potential energy of the mass relative to

    a. The top of the table   6 marks.

    b. The floor?   6 marks.

2. Answer the following questions.

    a. State the law of conservation of energy.   2 marks.

    b. A water fall is delivering 800 kg of water per second from a height of 10 m to a small hydroelectric generating station. How much potential energy is available per second to rotate the water turbines?   5 marks.

    c. From (b) above, what is the maximum output of electrical power if the efficiency is 75%?   6 marks.

Total 25 marks

QUESTION FOUR

1. State Archimedes' principle. 2 marks.
2. State the law of flotation. 2 marks.
3. A balloon of negligible weight and capacity 100 m^3 is filled with (a) helium of density 0.18 kg/m^3 and then with (b) hydrogen of density 0.09 kg/m^3. The density of air is 1.2 kg/m^3. Calculate the lifting powers of the two balloons. 11 marks.
4. Calculate the volume at S.T.P. of a gas whose volume is 100 cm^3 at
   a. -5 ^{0}C and 746 mmHg. 5 marks
   b. Calculate the volume of the same gas at 4 ^{0}C and 771 mmHg. 5 marks.

Total 25 marks

QUESTION FIVE

1. Static Electricity can be very useful in the health practice. Describe the applications of the static electricity under the following themes:
   a. Lightning conductors [5 marks]
   b. Earthing chains [5 marks]
   c. Shock from patients [5 marks]
2. Conductors and insulators are applied in the health practice. Highlight the application of
   a. Humidity in operating theatres [5 marks]
   b. Dry blankets and bedding [5 marks]

Total 25 marks