

SCIENCE EDUCATION CENTRE KAMPALA

"MAKING SCIENCES PASSABLE"

P.O.Box 24, Kyambogo, Kampala (U) Tel: 0772 381 336 / 0704 758 093 / 0706 381 336

ULSCE SCIENCE BOOSTER PACKAGE 2024 PHYSICS PAPER 1

Theory 535/1

SET 3

2hours 30minutes

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INSTRUCTIONS TO CANDIDATES.

- This paper consists of **seven** examination items, it has two sections **A** and **B**
- Section A has three compulsory items.
- Section B has two parts I and II. Answer one item from each part.
- Answer five items in all.
- Any additional item(s) answered will not be scored.
- All answers must be written in the booklets provided.

FOR EXAMINER'S USE ONLY

SECTIONS	SCORE	EXAMINER
A A	1	
В		
Total score	galan basa	

SECTION A

Item 1

A school is planning to organize a project to design a solar heater to reduce the usage of fire wood and charcoal. They have a concave reflector that reflects sun light at a frequency of 1875Hz a kettle, a metre rule and other necessary materials for the project however, they are not sure of the best distance from the reflector the kettle should be placed to effectively use the reflected light for cooking



Task

As a physics learner prepare a report to help the students to understand;

- i) The best position to attach the kettle
- ii) The steps to follow to determine the position in (i) above
- iii) Whether the cooking will be effective if the light must travel at a minimum speed of $2.5 \times 10^8 ms^{-1}$ for effectiveness

Hint the wave length of the light is 0.8m

Item 2

It has been noted that many learners in your locality are finding it hard to understand the concept of atomic model. Due to this the administration of the schools in your area has organized for a science fair in the nearby medical Centre in order to explain the concept of atomic models. You have been selected to represent your school in this science fair.

Task

- a) As a physics learner organize a short note you will use on this fair.
- b) On the day of the fair, a few metres behind the medical centre a scientist discovered that there existed a radioactive substance which he suspected to have a short half-life. The scientist got a sample from the suspected ore and took it for further investigation and started to observe its decay. Below are the results he obtained;

Time (days)	0	5	10	15	20
Activity /count rate	250	140	76	38	25

When the scientist presented to the nurses and doctors his observations, they didn't understand what the scientist was trying to show them. The scientist advised the nurses to close the centre claiming that the radioactive substance is dangerous to human beings and they were told the place shall be safe for opening when the activity of the substance is less than 32 counts per day

Task

As a physics learner

- Help advise the nurses and the patients on when the medical centre will be reopen.
- ii) Advisee the community on the need for the closure

Item 3

A businessman ships have cars on the Indian Ocean. He imports them seasonally. The shipping company has informed him that he cannot transport them throughout the year. This is because some seasons are not favorable due to water movements being up and down.

The strength of water movements on the ocean is sometimes high or low. The businessman has failed to understand the company's explanation.



Task

As a learner of physics, assist the business man to understand:

- a) Why he cannot import his cars throughout the year?
- b) What brought up those variations on the ocean?
- c) How helpful the above occurrence is to the environment.

Part 1

Answer only one item from this part

Item 4

In a tile making factory, a piece of tile needs to be heated to a temperature of 100° C and mixed with the colour pigment at 10° C to have them printed on the tiles. On a given day a piece of tile of mass 0.5Kg that requires 960J of heat energy to cause the temperature of a 1Kg mass to increase by 1K is passed into a trough containing the pigment of mass 0.4Kg which requires 4200J of heat energy to cause the temperature of 1kg mass to increase by 1K. Unfortunately on this day there was power problem to effectively operate the system for effective mixing to have the desired product. This problem made the operator so worried on the quality of the tiles' design.

Hint

On a normal operation, the desired tile and the pigment has to be mixed till the temperature is 30°C

Task

As a learner of physics help and check whether the tile's design is of good quality.

Item 5

In a certain school, the girls' latrine is about 30m away from the s.3 classrooms. The larine has a damp wall and the paint peeled off on some of the lower parts of the walls. During the cold morning lessons, the latrine seems not to smell at all but in the afternoons especially when it is hot, the latrine is so smelly. The district health inspector visited the school and inspected the latrine. He recommended the latrine to be broken down and a new one of identical dimensions to be contracted however the HM is disturbed about how the smell of the latrine which is 30m away reach the classrooms. The HM assigned the science department the task of mitigating such challenges when the new latrine is being constructed however these members got into an argument on the materials to use.



Task

As a learner of physics help;

- I) HM to understand how this problem is possible
- II) Why the problem is worst in the afternoon
- III) Advise the science department on how this problem can be addressed as they are constructing the new latrine.
- IV) Write a short note to the science department on the materials to be used in this construction and their significance.

Part II

Answer only one item from this part

Item 6

A tungsten is a material used for making an electric bulb filament because of its high resistance that allows it to convert electrical energy to light energy. During one of the physics projects in your school, a student makes a simple bulb that will use 4 dry cells to deliver a current of 2A to operate it. He went to the nearby electronic shop and the shop keeper gave him many tungstens without their resistances labeled.

Task

As a physics student design;

- i) The steps the student and the shop keeper can follow to find the right tungsten for the project.
- ii) A short note on the features to consider when picking the right one

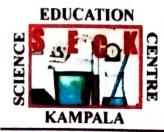
Item 7

A poultry farm in Mubende recently constructed a new poultry house with 10 small rooms each having a bulb connected to one switch. One day a worker mistakenly hit the bulb in the first room and got broken while he was on duty. That evening the farmer noticed that the other rooms had no lights this made him so puzzled and disturbed why the problem in the first room affected the lights in all the rooms.

Task

- a) As a physics student, help the farmer understand the cause of this situation and how it can permanently be solved.
- b) After a year the farmer decided to expand the farm. He bought a hatcher to help hatching the eggs. This made the power to consistently deem. H*pe then consulted a fellow farmer who told him he needed a transformer to solve the problem. However he doesn't know what this is and what type and specific features he needs to look for when buying this. As a learner of physics write a short note to the farmer to guide him.
- c) If eventually the farmer bought the transformer and connected it to the main power line that supplies power of 24kw and all the equipment needs the transformer to work at only 80% to run delivers the power of 840W. Help the farmer to establish whether the transformer will serve the purpose

END



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Theory 535/1

SET 4

2hours 30minutes

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. B	To be bald his	Sallawari tanilan 1
Total score		