EDUCATION SCIENCE CENTRE KAMPALA

SCIENCE EDUCATION CENTRE KAMPALA

"MAKING SCIENCES PASSABLE"

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ULSCE SCIENCE BOOSTER PACKAGE 2024

PHYSICS PAPER 1

Theory

535/1

SET 2

2hours 30minutes

Name:.....

Signature .....

Random number						personal number		

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		
B		
Total score		

SECTION A

Item 1

Israel is a senior four student at Seeta High school. He enjoys watching TV all the time, he claims that it's the only way he can relax himself. His mother however has had heated arguments about him watching too much television through the night especially with the lights off. He now finds it hard to see clearly the work in his books however he can see the work on the blackboard fine. On reading about his condition, he discovered that television emits waves of frequency 300Hz.

Hint: (speed of light in air $= 3.0 \times 10^8 m/s$*, speed of sound*$= 330 m/s$*)*

Task

a) What advice can you give to Israel on the condition he has and how can he correct the condition?
b) Which particular wave caused his condition, under which category does it fall and what properties does it possess?
c) Determine the wavelength of this wave.

Item 2

Nuclear scientists use a radioactive element of uranium in a nuclear reactor to generate electricity. In the reactor, this element's mass breaks down to form a barium nucleon while emitting three alpha particles and gamma rays. The scientists discovered that during the process one of the scientists had a hole in his protective suit. This caused panic among the scientists.

Hint; uranium and barium have atoms ${}^{235}_{98}U$ and ${}^{x}_{y}Ba$ respectively

Task:
With the aid of nuclear equations explain some of the possible reasons as to why scientists panicked?

Item 3
Senior Two learners had an argument in the dormitory over a science fiction movie they had just watched which showed the same person of who weighed 730N on earth flying in the air on different planets with the kind of weights he possesses. These learners couldn't tell how true this was. At the end of the documentary a chart below was displayed on the screen and still didn't make sense to the learners

Hint: acceleration due to gravity on earth is 10m/s²

CHART

Planets	**Acceleration due to gravity (ms^{-2})**
Moon	1.67
Mercury	3.59
Mars	3.77
Jupiter	25.95

Task
Using the chart from the documentary give a comment to these learners on whether this is possible or not and why.

SECTION B

PART I

*Choose **one** question from each part*

Item 4
Sebunya is a professional car racer in formula 1. At the start of his race of a total distance of 2200m under a hot sun he accelerated from rest to a velocity of 72km/hr. in 30s and then maintained this velocity for 60s. When he reached the last kilometer, he accelerated to a velocity of 144km/hr in 20s however he noticed during his last turn that the car was over sliding [skidding] and that the car had no grip on the track. Allover a sudden one of the tyres burst and the car decelerated to rest in 15s.

Task

a) As a student of physics explain to the fans the events that lead to the stop?
b) What are some the precautions that should be taken by the racer the next time to avoid the same incident
c) What distance did Sebunya cover?
d) Do you think Sebunya finished the race?

Item 5

Brian is a butler in a mansion on one of the hills of Muyenga who was asked to make a bath for Musa's son. Musa was specific that the bath was supposed to be 30^{0}C. when he went to the bathroom he discovered that the water was off. He had to then climb a flight of 20 stairs each of height 20cm carrying a bucket with hot water at 100^{0}C of mass 2kg that he was mix with the cold water of mass 4kg at 10^{0}C in the bath room with in 60s.

Task

a) What was the temperature of the water organized by Brian after mixing it, and was it fit for a bath by Musa's son.
b) What was the rate at which Brian did work.
c) What precautions does Brian need to put in place next time so that the water remains hot by the time it reaches upstairs.

Part II

*Choose **one** question from each part*

Item 6

Hillary is a senior four vacist and is interested in starting a small bakery to help improve on his and family income. His main challenges were to be the electricity bill which he felt could and be too much and how to his appliances were going to remain undamaged with un reliable electricity in the region this has caused a halt to his preparations. His business is to a run two ovens rated 2000W a fridge 120W, three bulbs 60W each.

Task

a) what was the
b) As an expert in domestic wiring, what precautions should have been taken to avoid this occurrence next time?
c) What is meant by 'bulbs were each rated 25W, 240V'? Determine the current and resistance of the bulbs that blew up
d) Design a circuit showing how best the four bulbs can be arranged together in the house with reasons for your arrangement.

Item 7

Mike an expert on scrap has all his life moved from one home to another looking for scrap. However, on one of his hunts for scrap he came across a special material that had gotten some other pieces of metal stuck on it. This was quite interesting for mike and became very curious. He placed this metal onto an electric hot plate rated 240V, 25W after which the metals couldn't get stuck on it again this made him very sad as he felt he had destroyed something very special.

Task

a) With reasons, illustrations and examples, advise Lawrence on the material mike landed on
b) What was the value of current through the electric hot plate that made the material unable to get metals get stuck on it again.
c) Why do you think the metals couldn't get stuck on it again?
d) With aid of illustration explain to mike how could make more materials like this one.

END