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PHYSICS
Paper 1
July / Aug. 2024
$2\frac{1}{2}$hours

UGANDA TEACHERS' EXAMINATIONS SCHEME

Uganda Certificate of Education

JOINT MOCK EXAMINATIONS

PHYSICS
Paper 1

2 hours, 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of **two** *sections;* **A** *and* **B**. *it has seven examination items.*

Section **A** *has* **three compulsory** *items.*

Section **B** *had 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.*

Turn Over

SECTION A (All items compulsory)

ITEM 1

A foreign investor secured a space in rural set-up where human settlement has been set-up to set -up a steel rolling industry associated with production of very sharp sound that human ear cannot with stand. On wearing recommended eye protective mirror, an erect, virtual and twice in size image is observed, 60cm from mirror.

TASK:

As a student of physics;

(a) identify the type of sound waves produced and state their practical use to man.

(b) suggest measures that can be taken to minimize their negative effects.

(c) (i) identify the type of mirror recommended with a support.

(ii) how far, from metal surface should engineer, cutting bend.

ITEM 2

One of the government's manifesto is to improve on health care to her people by constructing and equipping health facilities by installing an x-ray machine. In a report, made by the news reporter of one the papers included: -

- Appreciation comments regarding the installed machine services.
- Complaint against statement "**Out of Bound**" that was put at the entrance where machine was installed.
- A suggestion box was missing

Hint:

Only authorized people.

TASK:

As a student of physics:

(a) identify scientific roles that account to appreciation attitude as a result of machine installation.

(b) with aid of the machine set up, briefly describe its mode of work, to the public.

(c) suggest the relevance of statement "Out of bounds".

(d) suggest way forward so as to enjoy the services of installed machine.

Turn Over

ITEM 3

In a certain year, Eid-l-aduha celebrations day had been sported for Tuesday 14th but to the peoples' surprise, the date of Eid changed to Monday 13th. This affected mainly business community. This is true because Muslims celebrate their Eid upon sighting of the moon. As a physics student, help to explain to the public and business community why the date had to be changed and what caused it to change making them lose the expected sales.

Jupiter in our solar system has 12 earth years as its period around the sun, with about 10 hours of its day, it also has over 95 named moons yet the earth has only one moon and 1 year of revolution plus 24 hours of day.

Using your physics concepts, explain to the locals who were urging saying this is not true, why Jupiter has such tremendous difference from the earth.

Students saw a shooting star in the sky and started making their wishes, little did they know that their wishes are not connected to the shooting star.

Help these understand how a shooting star comes about, using your knowledge of physics.

SECTION B.

PART I (Answer only one Item)

ITEM 4

On a rainy day, due to a leaking roof, materials used to prepare tea got wet, as a result tea process delayed. An emergence meeting was organized so as to accelerate the process. Eventually hot water at 15^0C was poured in a metallic container having wooden handles was used. After one hour heating, water was allowed to boil for ten minutes before serving started with optional cups, metallic or clay make.

Hint:

Boiling point of water	=	100^0C
Density of water	=	$1000kgm^{-3}$.
Specific heat capacity of water	=	$4200Jkg^{-1}k^{-1}$
Specific latent heat of vapourasation	=	$2260000Jkg^{-1}$

TASK

Using physics knowledge:

(a) suggest ways of accelerating process of making tea.

(b) Determine total quantity of heat needed to make tea ready

(c) Explain practical role of wooden handle on the metallic container.

(d) Recommend with support, type of cup to be used such that the learners are not late for lesson.

Turn Over

ITEM 5

Commercial boats are made from materials of negligible mass. 100 bags of cement are to be transported by an 80kg mass boat operator using the boat. The operator's seat is 30cm from the centre of a uniform boat by structure and departure time is at noon.

Hint:

Density of water	=	$1000kgm^{-3}$
Sun's intensive heating	=	at noon
Bag of cement	=	50kg
Acceleration due to gravity	=	$10ms^{-2}$
Cross-sectional area of boat	=	$200m^2$

TASK

As a learner of physics;

(a) How far should the bags of cement be, before boat balances horizontally on water?

(b) Identify and state law governing the boats movement.

(c) How deep does boat sink, before the above law is applicable?

(d) Comment on the safety of the boat, in relation to the departure time.

Part two (answer only one item)

ITEM 6

During rural electrification national programme, water has been collected and stored in valley dams. Through pipes, water flows and falls on water wheel attached to electrical generators and in process, generator is driven, inducing current in generator. The electric power generated through cables is used to operate electrical devices like in our homes after a p.d of 120kV applied to cables, having 10A through the cable.

Hint:

Resistance of cables = 3Ω

TASK

As a learner of physics;

(a) State the energy transfers which occur during this process of producing electricity.

(b) Draw the structure of a simple generator and briefly describe it's made of operation to produce electricity using this method.

(c) Is it an effective method for operating an electrical device like electrical flat iron rated (60W, 200V)

(d) Recommend scientific ways of improving on quantity of electricity produced using this approach.

Turn Over

ITEM 7

In preparation for project work on model of an electric mortar, a technician realizes that one more magnet is needed. The model mortar is to be used to drive a maize mill to mill one tonne of maize for the school consumption. Iron bar, steel bar and bar magnet are available in lab only.

Hint:

100kg require	=	10KW
1KWh cost	=	700/=
Milling 1 tonne	=	1 day

Using knowledge of physics;

(a) Discuss steps to be taken using available materials to make the second required bar magnet.

(b) Compare magnetic differences between first choice as iron and second choice as steel in making a second magnet.

(c) Suggest ways of improving on constructed mortar model to meet the demand of milling school maize.

(d) Determine cost of milling one tonne of maize as per school need.

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