

535/1

PHYSICS

Nov/Dec 2023

2 Hours



MEBU EXAMINATIONS BOARD

Uganda Certificate of Lower Secondary Education

S.3 END OF YEAR ASSESSMENT 2023

PHYSICS

TIME: 2 HOURS

INSTRUCTIONS.

Assume Where Necessary;

➤ Acceleration due to gravity, $g = 10\text{ms}^{-2}$

SECTION A (30 MARKS)

Attempt all questions in this section

1. Light propagating from one medium to another of different optical densities suffers change of speed.

(a) What physics term is given to this phenomenon? (01 mark)

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(b) What laws governing the term in (a) above. (02 marks)

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(c) Light from air is made to strike the surface of alcohol of refractive index of 1.36. The incident light makes an angle of 20° with the normal at the point of incidence. What is the angle of refraction as the light passes the air-alcohol interface? (02 marks)

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2. a) Define density and state its SI units. (2 marks)

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b) Helium balloons rise in air. Overtime, the helium escapes the balloon and is replaced by air, causing it to sink. Explain the above scenario. (3 marks)



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3. There are **two** types of electric charges.

(a) Name the charges. (01 mark)

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(b) State the law of electrostatics (01 mark)

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(c) Briefly explain what happens when a plastic pen is rubbed with hair. (03 marks)

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4. Using a well labelled diagram describe the formation of images by a pin hole camera. (3 marks)

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b) An object is placed 16cm away from the plane mirror. If the object moved 4cm towards the mirror, what will be the distance between the object and its image? (2 marks)

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5. The following table shows the data collected from S.3 physics lesson about Motion. Use it to answer the questions

Name of member	Distance ran (m)	Time taken(s)
Munda	25	10
Kasekende	24	12

Using the knowledge of motion, who is faster? (05 marks)

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6. An aeroplane starts from rest and accelerates at 12ms^{-2} for 8 s before take-off.



(a) Calculate the take-off speed of the aeroplane. (02 marks)

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(b) Calculate the minimum length of run-way required. (03 marks)

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SECTION B (45 MARKS)

Attempt only 3 questions from this section

7. (a) Students of The academy heading for a Geography trip would hear varying sounds of the bus at various times, at some point, the sound increased and the bus speed increased and at other points, the sound changed and speed increased, one of the students told others that it was due to acceleration and velocity, as a physics student, what is meant by the terms **velocity** and **acceleration**? (02 marks)

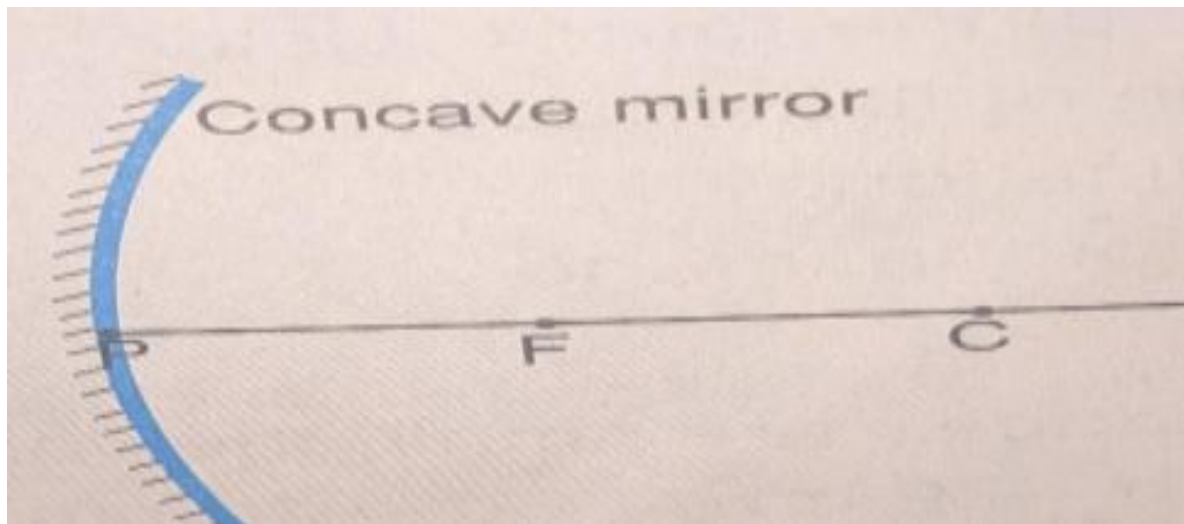
(b) Engineer Busulwa initially driving at 10 m^{-2} on **ENTEBBE EXPRESS WAY** uniformly accelerates for 4s at 2m^{-2} . He maintained this steady velocity for another 5 seconds, after which is uniformly brought to rest in another 3s.

(i) Sketch the velocity-time graph for the motion described above (03 marks)

(ii) Calculate the **total distance** covered (05 marks)


(iii) Find the average speed. (02 marks)

8. (a) The figure represents a concave mirror.



Name and **define** the parts labelled **F** and **C**. (04 marks)

(b) Nana stands 25cm in front of a concave mirror of focal length 10cm.

using  to represent Nana and by scale ray drawing, determine the;

(i) Position of nana's image from the mirror.

(ii) Magnification caused.

(iii) Nature of her image (06 marks)

(c) You are provided with a **mirror holder**, a **concave mirror**, a **white screen** and a **half-metre rule**. As a physics student, briefly describe how you can experimentally determine the focal length of the mirror in a laboratory. (03 marks)

(d) What are the practical applications of the mirror above in your daily life? (02 marks)

9. a) Mr. Bigabwa was listening to a radio station while moving on the ship called MV Pamba from Port bell to Kalangala Islands. At some point during the journey, he would not hear no sound, and some point he would hear sounds, the ship he was in would also move up and down anyhow, later on the ships captain simply said the waves were very high at some points and low at other points low, as physics student,

From your study of waves, help Mr. Bigabwa understand the following terms

i) Frequency. (01 mark)

ii) Period. (01 mark)

iii) Wavelength. (01 mark)

b) The radio station he was listening to produced waves of wavelength 20m and speed $3 \times 10^8 \text{ms}^{-1}$, help him calculate the;

i) Frequency of the radio waves. (02 mark)

ii) Periodic time (02 mark)

iii) Number of cycles completed in 5 hours. (02 mark)

c) Write down the electromagnetic spectrum in increasing wavelength. (6 marks)

10. (a) The solar system is composed of big, small and much smaller objects.



(i) Name any **four** components of the solar system. (02 marks)

(ii) Name the **force** that holds the components together. (01 mark)

(b) In the solar system, a planet is a celestial body that **moves around the sun in a define path and;**

- **Has sufficient mass to keep it in a round (spherical) shape**
- **Has “cleaned the neighborhood” around its path of debris and bolder.**

The solar system has **eight (8)** planets, which have the above qualities.

(i) .Which name is given to the **path** in which a planet moves? (01 mark)

(ii) The planets are classified into **Terrestrial** (inner) planets and **Jovian** (outer) planes. Identify the planets in their respective classes. (04 marks)

(iii).Of recent, Pluto was disqualified from being a planet and re – classified as a **dwarf**. Pluto lies in the Kuiper Belt, which is full of **icy bodies** and **debris** out

past Neptune. Pluto is very **small**, less dense and has a **small mass**. Using the above information about Pluto and the qualities of a planet, explain why Pluto was disqualified as a planet. (02 marks)

(c) All planets move around the sun in **elliptical paths**. The motion is both **rotational** and **revolution**. Rotation motion involves the planets **spinning about a fixed axis** and revolution motion involves a planet **moving around the sun**. One complete rotation is equal to **one day** and one complete revolution is equal to **one year**. With reference to planet earth;

(i) Draw diagrams to show rotational motion and revolution motion.

(02 marks)

(ii) Determine the time taken (in hours) by the earth to rotate once about its axis. (01 mark)

(iii) Determine the time taken (in hours) by the earth to revolve once around the sun (1 day = 24 Hours And 1 Year = 365 Days) (01 mark)

(d) The moon is considered a bright **celestial** body in the solar system. Justify why it is not a **luminous** body. (02 marks)

SECTION C (10 MARKS)

(This question is compulsory.)

11. Global warming may be the chief and most complicated problem to potentially affect our planet. The climate has been warming fast since the industrial revolution, because human activities are altering the composition of our atmosphere. All of earth energy comes from the sun in form of solar radiation. This energy is then radiated back into space. However, the greenhouse gases work to trap some

outgoing heat, warming the planet and its inhabitants. The problem at hand however is continued increase in the concentration of these greenhouse gases such as carbon dioxide, methane, and nitrous oxide.

As the amount of these chemicals in our atmosphere increase, they act as a blanket and retain more and more heat instead making the earth warmer.

Much of these gases come from burning of fossil fuels in running cars and industries.

Many environmentalists are concerned about this development and their dangers to the earth and its inhabitant, and the adverse effects they have on the climate.

RESOURCES



TASK

You have been appointed as the in charge of NEMA, what actions you will take in order to slow the increasing destruction of the environment which is responsible for increasing global warming.

Success in your examinations

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