| CANDIDATE'S NAME: | | INDEX NO: | |
|---|---|---|---|
| SCHOOL: | | SIGNATURE: | |

*535/1*
*PHYSICS*
*Paper 1*
*August, 2022*
*2 ¼ hrs*

# UNNASE MOCK EXAMINATIONS

***Uganda Certificate of Education***

**PHYSICS**

**PAPER 1**

**2 HOURS 15 MINUTES**

## INSTRUCTIONS TO CANDIDATES

- *Section **A** contains **40** objectives type questions. You are required to write the correct alternative **A, B, C**, or **D** against each question in the box on the right hand side of each page.*
- *Section **B** contains **10** structured questions. Answers are to be written in the spaces provided on the question paper*
- *Answer all questions.*
- *The following quantities may be useful to you.*
  - **Acceleration due to gravity, $g$ = $10ms^{-2}$**
  - **Speed of sound in air = $330ms^{-1}$**
  - **Density of water = $1000kgm^{-3}$**

**For Examiners' Use Only**

| Q.41 | Q.42 | Q.43 | Q.44 | Q.45 | Q.46 | Q.47 | Q.48 | Q.49 | Q.50 | MCQ | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |

1. Which one of the following is a unit of electric current?
   A. Ampere
   B. Volt
   C. ampere
   D. coulomb

2. Pressure in solids depends on
   A. Density of the material
   B. mass of the solid
   C. volume occupied
   D. area of contact

3. The hairs of a wet brush cling together because of
   A. Adhesion
   B. cohesion
   C. capillarity
   D. surface tension

4. Which one of the following quantities is NOT a thermometric property.
   A. Resistance of a wire
   B. Mass of a liquid
   C. Length of a liquid column
   D. pressure of a gas

5. The source of electrons in a simple cell is
   A. Dilute sulphuric acid
   B. Manganese (IV) oxide
   C. Copper plate
   D. Zinc plate

6. The image formed by the apparent intersection of light rays when their directions are produced backwards is always,
   A. Virtual
   B. Real
   C. Magnified
   D. Diminished

7. Arrange the following radiations in order of decreasing frequency
   A. Gamma rays, x-rays, light, radiowaves
   B. radiowaves, light, gamma rays, radio waves
   C. x-rays, light, gamma rays, radiowaves
   D. radiowaves, light, gamma rays, x-rays

8. When a force acts on a body moving in the direction of its line of action, the
   A. Body accelerates
   B. Momentum of the body decreases
   C. Body moves with constant velocity
   D. Direction of motion of the body changes

9. A body of mass 50 kg accelerates from 0.5 $ms^{-1}$ to 8.5 $ms^{-1}$. The impulse of the body is
   A. 25.0 Ns
   B. 400.0 Ns
   C. 425.0 Ns
   D. 450.0 Ns

10. A cuboid measures 4 cm x 2 cm x 2 cm. How many cubes of side 2 cm can be fitted into the cuboid?
   A. 2
   B. 4
   C. 8
   D. 32

11. A bullet is fired vertically upwards from the ground. If it reaches its maximum height in 4s, find the total distance it covers by the time it hits the ground.

A. 40m
C. 80m
B. 160m
D. 280m

12. A man standing 85 m from a tall wall fires a gun and hears the echo from the wall after 0.5 s. calculate the speed of sound in air.

A. $170ms^{-1}$
C. $340\ ms^{-1}$
B. $85\ ms^{-1}$
D. $43\ ms^{-1}$

13. A magnetic material is said to have lost its magnetism when:

A. molecular magnets point in the same direction
B. it is broken into pieces
C. it is connected across a direct current.
D. molecular magnets point in different directions.

14.

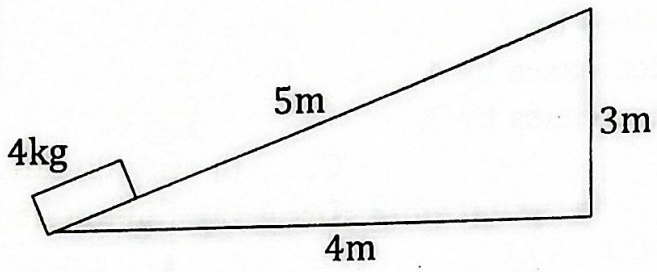



**Fig.1**

A brick of mass 4kg is lifted to a height of 3m along a smooth, inclined plane 5m long, as shown above. The work done is

A. 12J
C. 160J
B. 120J
D. 200J

15.

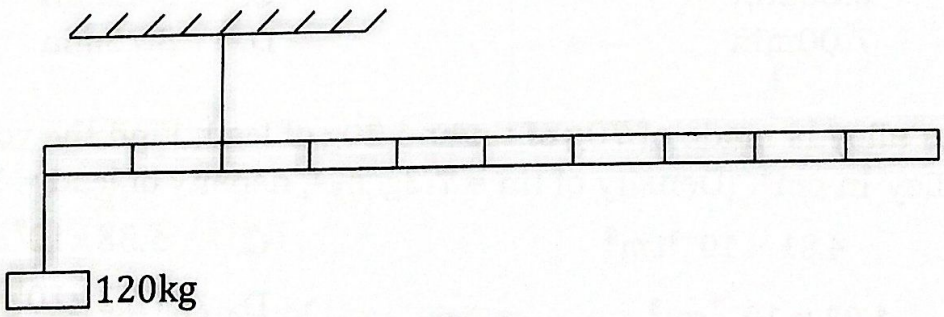



**Fig.2**

A uniform metre rule is suspended with a string at the 20cm mark and is kept horizontal by a mass of 120kg from one end as shown above. Find the mass of the metre rule

A. 80kg
C. 24kg
B. 30kg
D. 120kg

6. When the volume of a fixed mass of a gas is reduced at constant pressure, the kinetic energy of molecules of a gas will

A. decrease
B. increase
C. be constant
D. change to heat energy

7. A driver uses a convex mirror as his driving mirror because it

(i) forms an upright image

(ii) gives a bigger magnification

(iii) gives a wider field of view

A. only (i)
B. only (i) and (iii)
C. only (iii)
D. All (i),(ii),(iii)

8. Which of the following statements are true about a radio isotope which has emitted two Alpha particles and one Beta particle?

(i) Mass number reduces by 8
(ii) Mass number reduces by 7
(iii) Atomic number decreases by 4
(iv) Atomic number decreases by 3.

A. (i) and (iv) only
B. (ii) and (iii) only
C. (i) and (iii) only
D. (ii), (iii) and (iv) only

19. A tuning fork produces waves in air of wavelength 60 cm. calculate the frequency of the tuning fork.

A. 830 Hz
B. 800 Hz
C. 550 Hz
D. 600 Hz

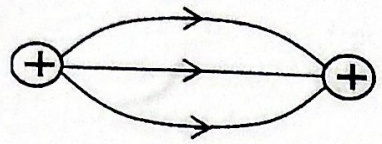
20. A kettle rated 1200W contains 2kg of water at 25°C. How long will take to raise the temperature of water to 85°C if 80% of the electrical energy supplied is absorbed by the water.

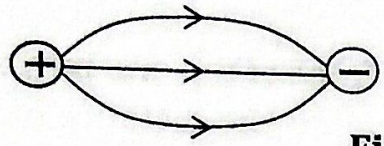
A. 5.60min
B. 7.00min
C. 8.02min
D. 8.75min

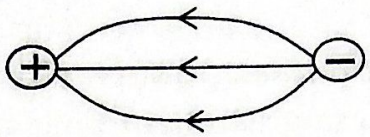
21. An alloy is made of 70g of tin and 30g of lead. Find the volume of the alloy in $cm^3$. (Density of tin = 7.3gcm$^{-3}$, density of lead = 11.3 gcm$^{-3}$ )

A. $4.81 \times 10^{-1} cm^3$
B. $1.03 \times 10^{-3} cm^3$
C. $5.38 \times 10^{0} cm^3$
D. $1.22 \times 10^{1} cm^3$

22. Which diagram correctly shows the electric field lines between two point charges

A 

B 

C 

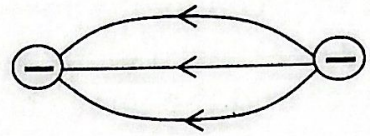
D 

**Fig.3**

23.

**Fig.4**

The diagram above shows a lens known as

A. plano-convex
B. plano-concave
C. converging meniscus
D. diverging meniscus

24. Which of the following electromagnetic waves has the longest wavelength?

A. micro-waves
B ultraviolet waves
C. radiowaves
D. infrared waves

25.

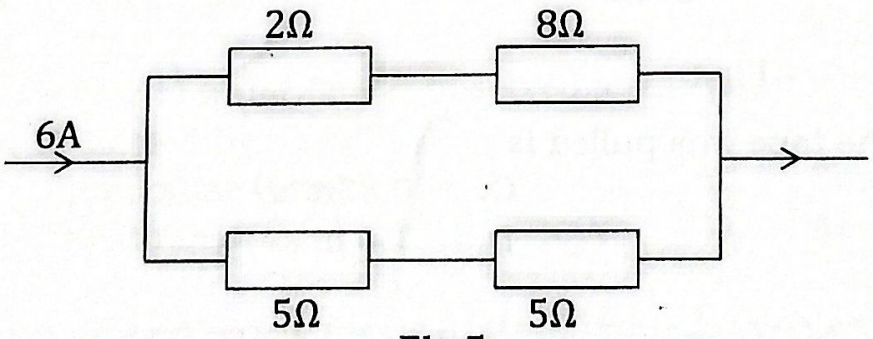



**Fig.5**

What is the effective resistance of the circuit?

A. 5 Ω B. 0.2Ω C. 20 Ω D. 26 Ω

26. A garden table weighs 60N and has a top surface of area 2.0 $m^2$. It is raining and the rain produces a pressure of 4.0 $Nm^{-2}$ on the table. Ignoring the pressure of the atmosphere, what is the force exerted by the table on the ground?

A. 52N
B. 58N
C. 62N
D. 68N

27. Which of the following is correct?

A. Green light shone on green surface is all absorbed.

B. Green light passes through a red filter.

C. A red dress in green light appears blue.

D. A red dress in green light appears black.

28. Two objects P and Q are placed along a straight line in front of a plane mirror. If Q is 1m from the mirror and the image of P is 4m from Q, find the distance of P from the mirror.

A. 2.0m

B. 3.0m

C. 5.0m

D. 6.0m

29. Which of the following can be used to measure the diameter of a bicycle spoke accurately?

A. Metre rule.

B. Tape measure.

C. Micrometer screw gauge.

D. Vernier caliper.

30. A ray of light travels through air to strike water of refractive index 1.33 at a angle of $30^0$ to the surface. Find the angle of deviation.

A. $19.4^0$

B. $7.9^0$

C. 40.6

D. $22.1^0$

31. The ticker tape shown in the figure was pulled through a ticker timer, which makes 50 dots per second.

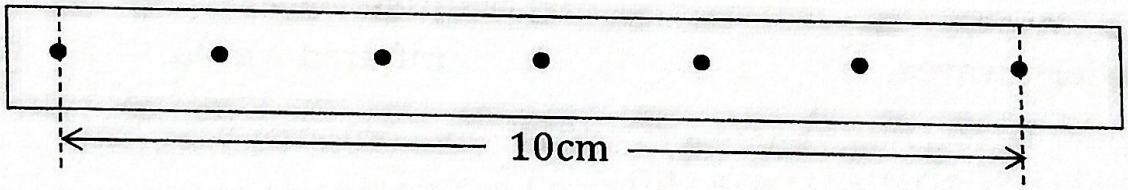



**Fig.6**

The speed at which the tape was pulled is

A. 0.1cm $s^{-1}$

B. 0.25m $s^{-1}$

C. 0.83m $s^{-1}$

D. 1.0 m $s^{-1}$

32. The Fig.7 below shows a tank containing mercury and water.
Find the pressure exerted by the two liquids on the bottom of the tank.

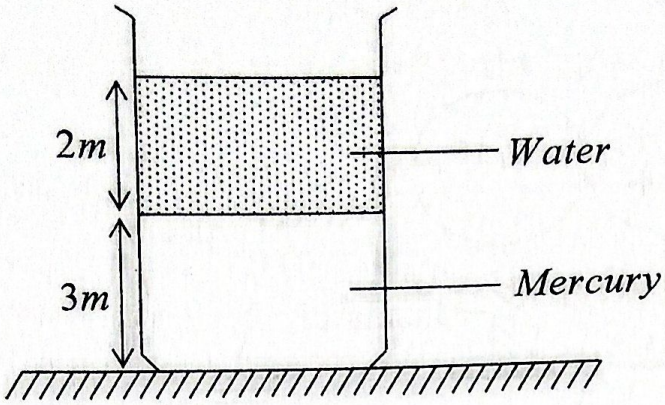



**Fig.7**

(Density of water = 1000kgm$^{-3}$, density of mercury = 13600kgm$^{-3}$)

A. $2.00\times10^{4}\,Pa$
B. $3.88\times10^{5}\,Pa$
B. $4.08\times10^{5}\,Pa$
D. $4.28\times10^{5}\,Pa$

33. A tuning fork produces waves in air of wavelength 60 cm. calculate the frequency of the tuning fork.

C. 830 Hz
C. 550 Hz
D. 800 Hz
D. 600 Hz

34. An isotope has a half-life of 6 years. This means that after;

A. 1 year, 1/6 of the isotope has decayed.
B. 1 year ,1/6 of the isotope remains undecayed.
C. 12 years, ¼ of the isotope remains un decayed.
D. 12 years ,¼ of the isotope has decayed

35. The length of air in an open pipe is 1.8m. Find the frequency of the third harmonic.

A. 183.3Hz
C. 275.0Hz
B. 229.2Hz
D. 458.3Hz

36. Which type of water flow is observed at the point where a water carrying pipe is pierced by a nail?

A. Streamline flow.
C. Smooth flow.
B. Turbulent flow.
D. Aero foil.

37. Which properties make materials suitable for use as a core in an electromagnet?

A. Difficult to magnetise and easy to demagnetize
B. Difficult to magnetise and retains magnetic strength
C. Easy to magnetise and easy to demagnetise
D. Easy to magnetise and retains magnetic strength

38.

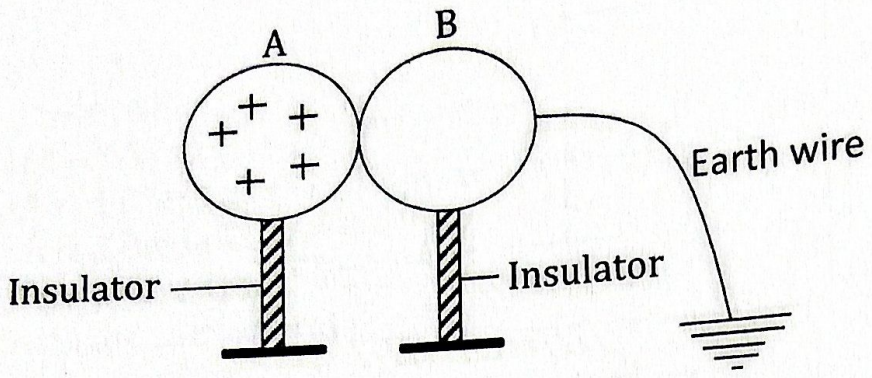



**Fig.8**

A positively changed sphere A is brought into contact with an uncharged insulated sphere B. If sphere B is earthed while still in contact with A as shown in **Fig. 8**, which of the following shows the correct charges acquired by A and B after separation?

| | **Sphere A** | **Sphere B** |
|---|---|---|
| A | Neutral | Neutral |
| B | Positive | Positive |
| C | Negative | Negative |
| D | Positive | Negative |

39. A car radiator is painted black and filled with water because

i) black bodies are good absorbers of heat

ii) water facilitates heat transfer by convection

iii) water is a poor conductor of heat

A. (i) and (ii) only.
C. (iii) only
B. (i) and (iii) only.
D. (ii) only.

40. Which of the following statements are true?

(i) Protons and neutrons are found in the nucleus of an atom

(ii) Alpha particles and beta particles are oppositely charged.

(iii) Protons and electrons occur in equal numbers in neutral atoms.

(iv) Beta particles and electrons are the same.

A. i), iii) and iv) only
C. i), ii) and iv) only
B. iii) and iv) only
D. i), ii) and iii) only

## SECTION B

41. (a) Define the term **relative density** of a liquid. *(01 mark)*

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(b) A piece of iron metal weighs **35.5N** in air. When immersed completely in water, it weighs **30.5N** and when completely immersed in alcohol, it weighs **31.5N.** Find the density of alcohol. *(03 marks)*

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*(01mark)*

42. (a) What are isotopes.

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(b) The half-life of iodine is 8 days. Find the mass which will have decayed in 32 days if the initial mass is 1.6kg. *(03 marks)*

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*(01mark)*

43. (a) Define pressure.

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(b) State two factors that affect the magnitude of pressure in liquids.

*(01mark)*

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(c) Express 740mmHg in $Nm^{-2}$ *(02 marks)*

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44. (a) Give two physical properties used in the measurement of temperature. *(01 mark)*

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(b) (i) State the equation of state of an ideal gas. *(01 mark)*

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(ii) The pressure of a fixed mass of gas is 760 mm Hg at a temperature $47^{0}C$. Its pressure is lowered to 190 mm Hg while the volume is kept constant. What is the new temperature of the gas? *(02 marks)*

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45. (a) State Hooke's law. *(01 mark)*

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(b) (i) A spring extends elastically by 10cm when a force of 20N is applied to it. Calculate the force constant of the spring. *(02 marks)*

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(ii) What force would be needed to extend the spring by 0.05m.

*(01 mark)*

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46. The diagram shows a current carrying wire placed in a magnetic field.

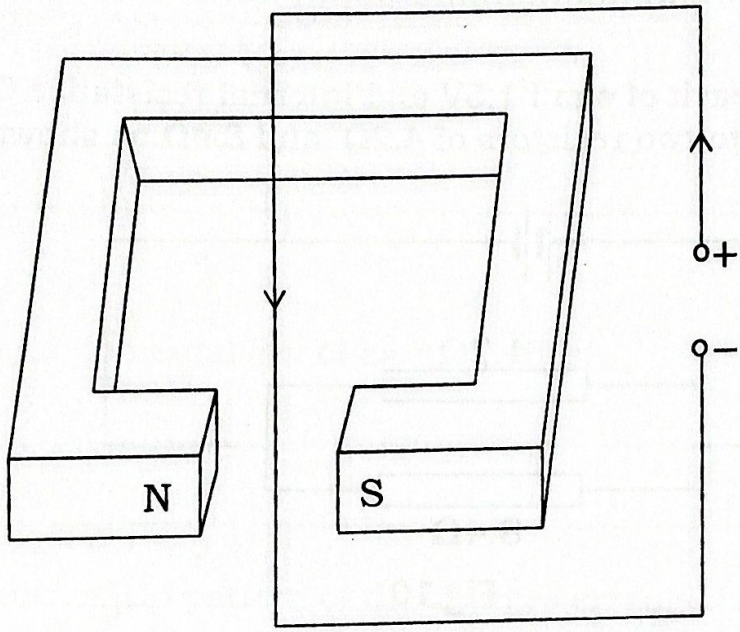


**Fig.9**

(i) What is the usual direction of magnetic field lines between the two poles of a magnet? *(01 mark)*

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(ii) The wire will experience a force. Use Fleming's left hand rule to predict the direction of this force. *(01 mark)*

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(iii) Identify two ways this force could be made stronger. *(02 marks)*

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47. (a) State Ohm's law. *(01 mark)*

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(b) Two cells, each of e.m.f 1.5V and internal resistance 0.1Ω are connected to two resistors of 4.2Ω and 8.4Ω as shown if Figure below

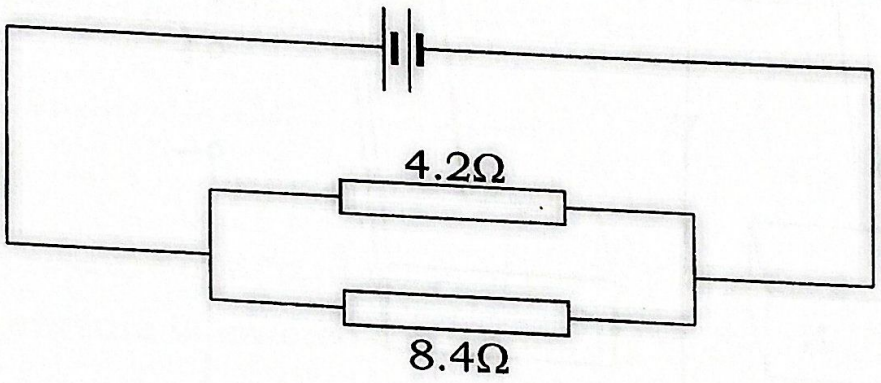


**Fig.10**

Find the power dissipated in the 8.4Ω resistor *(03 marks)*

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48. (a) What is meant by the term linear momentum. *(01 mark)*

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(b) State the principle of conservation of linear momentum. *(01 mark)*

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(c) During training, a soldier fires a pistol of mass 1.5 kg.
A bullet with a mass of 30 g is released at a velocity of 300 m $s^{-1}$.
What is the recoil velocity of the pistol? *(02 marks)*

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49. (a) State the fundamental law of electrostatics. *(01 mark)*

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(b) Draw the electric field pattern of the charges arranged as shown below

(c) State any two uses of a gold leaf electroscope. *(01 mark)*

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50. (a) Define the term diffraction *(01 mark)*

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(b) State two factors that affect the extent of diffraction of waves. *(01 mark)*

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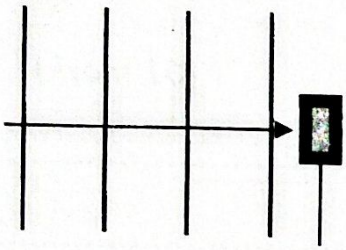
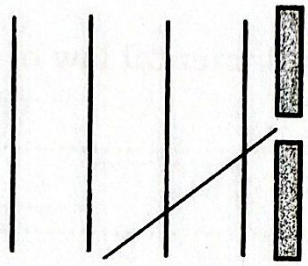
(c) Complete the following diagrams to show how plane waves are diffracted. *(02marks)*

(i)




(ii)

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