NAME…….SIGNATURE……
535/1
Physics
Paper 1
2022

RESOURCE MOCK EXAMINATIONS 2022

UGANDA CERTIFICATE OF EDUCATION

PHYSICS PAPER ONE

2 HOURS 15 MINUTES

INSTRUCTIONS TO CANDIDATES

Write your name and signature clearly in the space above.

Section ***A*** contains *40* objective type questions. You are required to write the correct answers ***A, B, C*** or ***D*** against each question in the box on the right-hand side of each question.

Section ***B*** contains *10* structured questions. Answers are to be written in the spaces provided on the question paper.

Mathematics tables and non-programmable calculators may be used.

You may find the following constants useful:

Acceleration due to gravity g = $10\ m\ s^{-2}$

Speed of light = $3.0 \times 10^{8}\ m\ s^{-1}$

FOR EXAMINER'S USE ONLY

41	42	43	44	45	46	47	48	49	50	MSQ	Total

SECTION A

1. Water waves change direction when they move from shallow water to deep water. What is the name of this effect?

   A. diffraction
   B. dispersion
   C. reflection
   D. refraction

2. Figure 1 shows a ray of light entering a block of glass.

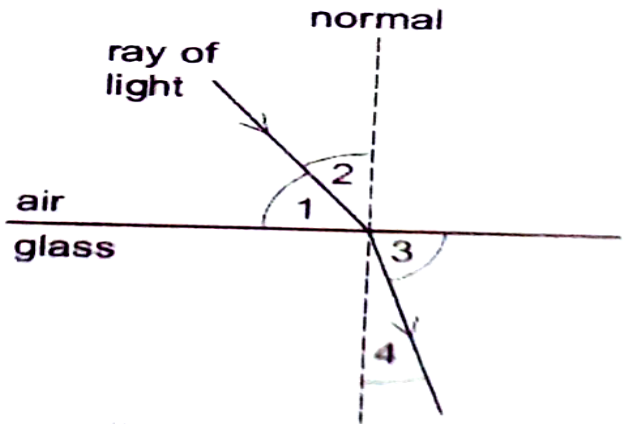


Fig 1

Which numbered angles are the angles of incidence and refraction?

	Angle of incidence	Angle of refraction
A	1	3
B	1	4
C	2	3
D	2	4

3. Which type of wave cannot travel through a vacuum?

   A. Infra-red radiation
   B. Microwaves
   C. Sound waves
   D. X-rays

4. How can a permanent magnet be demagnetized?
   A. cool the magnet for a long time
   B. hit the magnet repeatedly with a hammer
   C. leave the magnet in a coil
   D. pass a small current through the magnet

5. An electromagnet is used to separate magnetic metals from non- magnetic metals. Why is steel unsuitable as the core of the electromagnet?
   A. It is a good conductor of electricity
   B. It forms a permanent magnet
   C. It has a high density
   D. It has a high thermal density.

6. A source of frequency 500Hz emit waves of wave length 0.4m, how long does the wave take to travel 600m?
   A. 3s
   B. 6s
   C. 9s
   D. 12s

7. A solar cell converts
   A. Heat energy into electrical energy
   B. Heat energy into light energy
   C. Solar energy into light energy
   D. Solar energy into electrical energy.

8. The equation shows the decay of the nuclide X.

$$^{226}_{88}X \longrightarrow {}^{p}_{Q}Y + {}^{4}_{2}He$$

What are the values of P and Q respectively?

A. 230, 90 C. 222, 90

B. 230, 86 D. 222, 86

9. A plane mirror is on a wall. Which is a correct description of the image formed by the mirror?

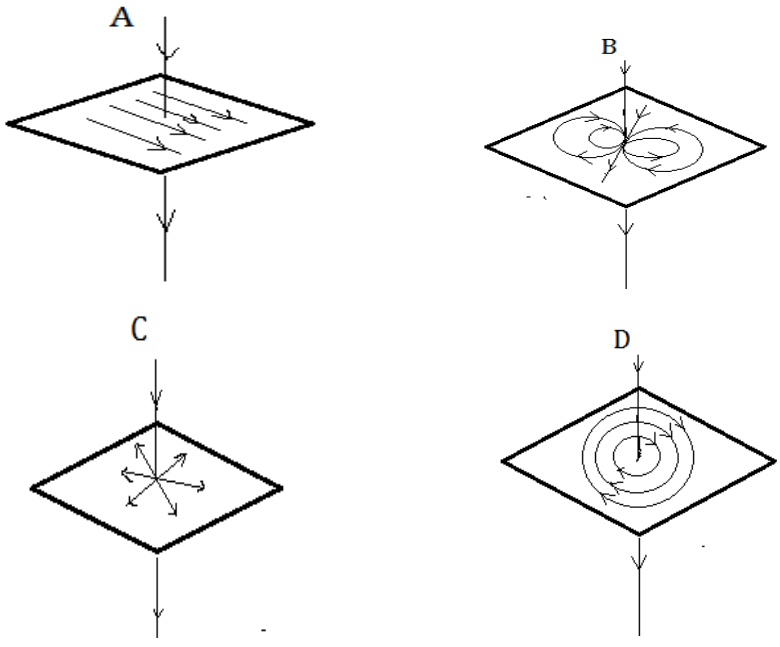
   A. It is up right and smaller than the object

   B. It is up right and the same size as the object

   C. Upside down and smaller than the object

   D. Upside down and the same size as the objects

10. A straight wire carrying a current produces a magnetic field. Which diagram shows the correct shape of the field?



11. A radioactive material has a half-life of 2minutes. Find how long it takes a sample of mass 800g to decay to 25g.

A. 24minutes C. 32minutes

B. 10minutes D. 16minutes

12. The resistance of the filament of a bulb rated at 240V, 60W is

A. 960 ohms C. 0.25 ohms

B. 4 ohms D. 14400 ohms

13. Which line correctly describes α-particles

	Electric charge	Penetrates 1cm of aluminum
A	Negative	Yes
B	Negative	No
C	Positive	Yes
D	Positive	No

14. A small amount of a radioactive isotope contains 72 billion unstable nuclei. The half-life of the isotope is 4 hours. How many unstable nuclei wound remain after 12 hours?

A. 6 billion C. 18 billion

B. 9 billion D. 19 billion

15. A spring is stretched by hanging a piece of metal from it. What is the name given to the force that stretches the spring?

A. Friction B. Mass C Pressure D. weight

16. A turning fork of frequency 610Hz is producing a sound wave whose velocity is $330ms^{-1}$. What is the wave length of the sound wave?

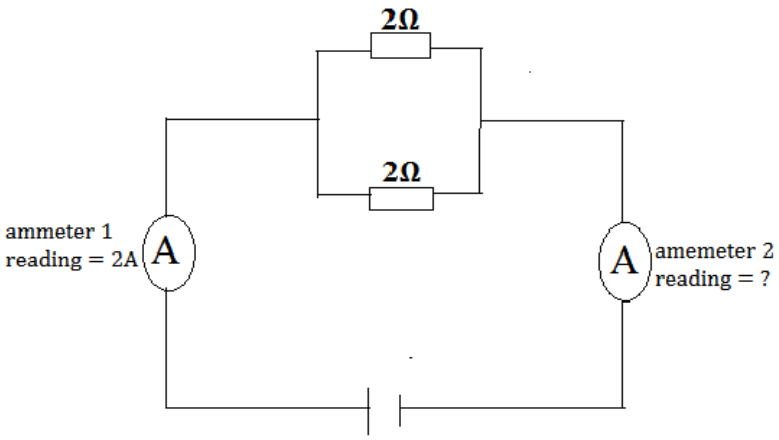
A. 540m C. 1.85m

B. 185m D. 0.54m

17. 1D is the power of the lens of focal length ..... cm

A. 10 *B*. $\frac{1}{100}$ C. 100 D. $\frac{1}{10}$

18. The circuit in the figure below, the reading of ammeter 1 is 2A.



What is the reading on ammeter 2?

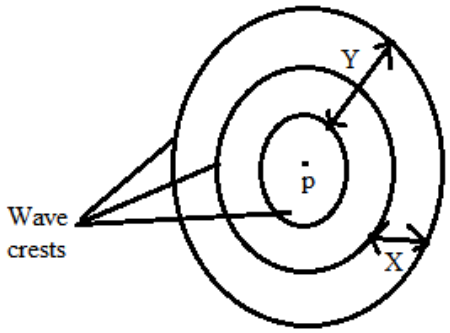
A. 0A B. 1A C. 2A D. 4A

19. Which particles are emitted during thermionic emission?

A electrons B ions

C neutrons D protons

20. A vertical stick is dipped up and down in water at P. In two seconds, three wave crests are produced on the surface of the water.



Which of the statements below is true?

A. Distance X is the amplitude of the waves.

B. Distance Y is the wavelength of the waves

C. Each circle represents a wave-front.

D. The frequency of the waves is 3Hz.

21. A car starts from rest and accelerates uniformly at 2 m s^{-2}. Find the distance it covers in 6 s.

A.12 m B. 36 m C. 72 m D. 108 m

22. A force of 50 N moves an object through a distance of 200 m in 40 s. Find the power used.

A. 100 W B. 160 W

C. 200 W D. 250 W

23. A notch on a material spreads more rapidly when the material is

A. In tension B. in compression

C. pre-stressed D. Reinforced

24. A body of mass 0.4 kg falls freely from a height of 5 m to the ground. Find the kinetic energy with which the body hits the ground.

A. 2 joules B. 4 joules

C. 20 joules D. 50 joules

25. Which of the following is false with respect to convex mirrors?
A. Images are virtual for all real object positions
B. Images are diminished for all real object positions
C. The image is always between the optical Centre and focal point
D. They are used as rear-view mirrors in vehicles

26. 

Two forces of 6 N and 8 N act on object P as shown in the figure 3 above.

The resultant force on the object is

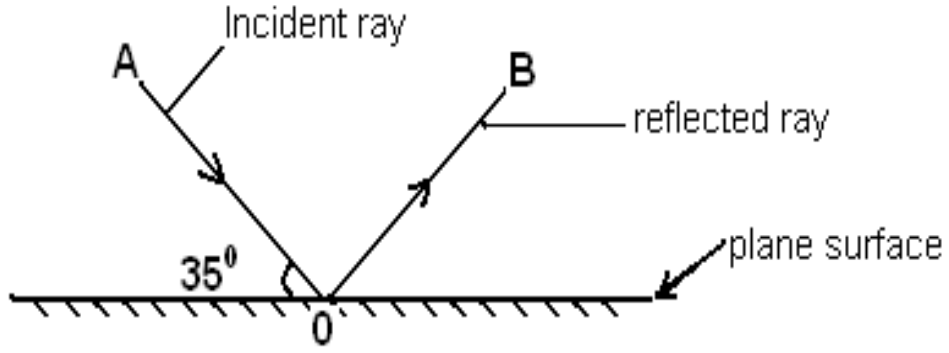
A. 1.33 N B. 2 N C. 10 N D. 14 N

27. A body starting from rest is uniformly accelerated to a velocity of 40 m s^{-1} in 5 seconds. Calculate the distance travelled in this time interval.

A. 8 m B. 14 m C. 100 m D. 200 m

28. Which one of the following is not a factor on which the frequency of waves produced in strings depends?
A. Length of the string
B. Nature of material from which the string is made
C. Tension in the string
D. Wave length in the string

29. In the figure below, a ray of light **AO** incident on a plane surface is reflected along **OB**, as shown below;-



The angle of reflection is;

A. 60^0 C. 40^0

B. 35^0 D. 55^0

30. A body weighs 80 N in air and 60 N when fully immersed in a liquid. Find the volume of liquid displaced by the body if density of the liquid is 800 kg m^{-3}

A. 40 m^3 B. 20 m^3

C. 0.25 m^3 D. 0.0025 m^3

31. A certain F.M. radio station operates at a frequency 108 x 10^6Hz. Calculate wave length of the radio waves.

A. 2.96 x 10^{-6} m B. 2.78 m

C 0.36 m D. 3.37 x 10^5 m

32. An object is placed 15 cm in front of a convex lens of focal length 10 cm. The position of the image from the lens is

A. 6 cm B. 30 cm

C. 25 cm D. 20 cm

33. When a capillary tube is dipped into mercury;

A. Cohesion between the mercury molecules is greater than the adhesion of the molecules for glass so the liquid rises in the tube

B. Cohesion between the mercury molecules is greater than the adhesion of the molecules for glass so there is capillary depression

C. Adhesion force between the liquid and glass is greater hence capillary rise

D. Adhesion force between the liquid and glass is greater hence capillary depression

34. Madam Rachael is holding a green paper with red printings on it. If she enters a room with green light, she will be seeing; -

A. Green printings on a red paper
B. Green printings on a green paper
C. Yellow printings on a red paper
D. Yellow printings on a green paper

35. An S1 student made a record 1.34 cm in a lesson on measurements. If taken correctly, which instrument did the student use to take the measurement?

A. Metre tape B. micrometer screw gauge

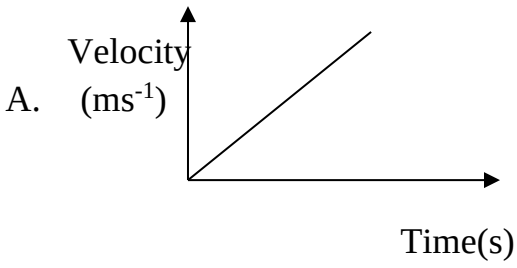
C. Vernier calipers D. tape measure

36. A girl is standing in front of two mirrors inclined at an angle of 30^0 to each other. How many images of the girl can be seen?

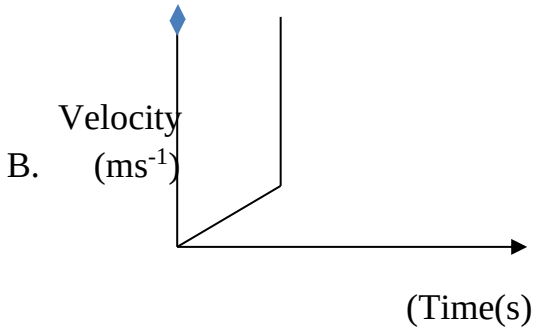
A. 11 B. 12 C. 9 D. 6

37. Which of the following graphs represents a speed against time graph for a body thrown vertically upwards?

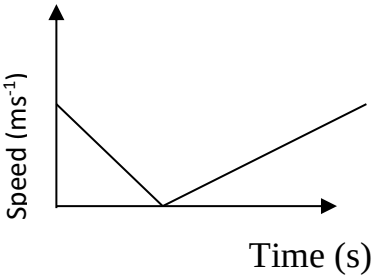
A.



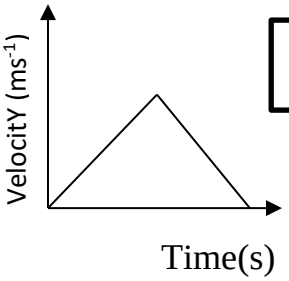
B.



C.



D.



38. The power developed when one joule of work is done in one second is known as,

A. a watt B. a joule second

C a newton D. newton second

39. Which of the following statements are conditions for a body to stay in mechanical equilibrium?

(i). The sum of forces in one direction is equal to the forces in the opposite direction.

(ii). The clockwise forces are equal to anticlockwise forces.

(iii) The sum of moments about a chosen point is zero.

(iv) The body rotates in one direction.

A. (i) and (iv) only B. (ii) and (iii) only

C (i), (ii) and (iii) only D. (i) and (iii) only

40. Figure 8 shows a uniform metre rule pivoted at its center. A mass of 200 g is hanging at the 5 cm-mark and the metre rule balances horizontally when a mass, m_1 is hang at the 70 cm-mark.

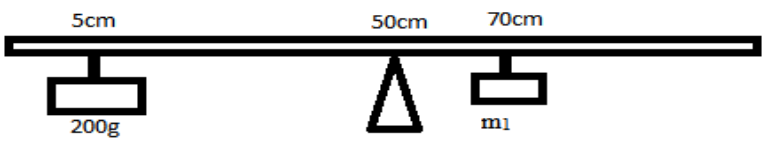


Fig. 8

Calculate the value of m_1

A. 14.3 g B. 45.0 g

C. 143 g D. 450 g

SECTION B: (40 MARKS)

41. (a) Distinguish between **tensile stress** and **tensile strain** ***(02 marks)***

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(b) A piece of wire 1.0m long and of cross-sectional area 2.0×10^{-8} m^2 is acted upon by a tensile force of 50 N. Calculate the tensile stress on the wire. ***(02 marks)***

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42. (a) What is **volume?** ***(01 mark)***

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(b) A tin of volume 30 cm^3 has a mass of 94.8 g when full of sucrose and 62.8 g when half filled with the same solution. Find the density of sucrose .

($1\frac{1}{2}$ marks)

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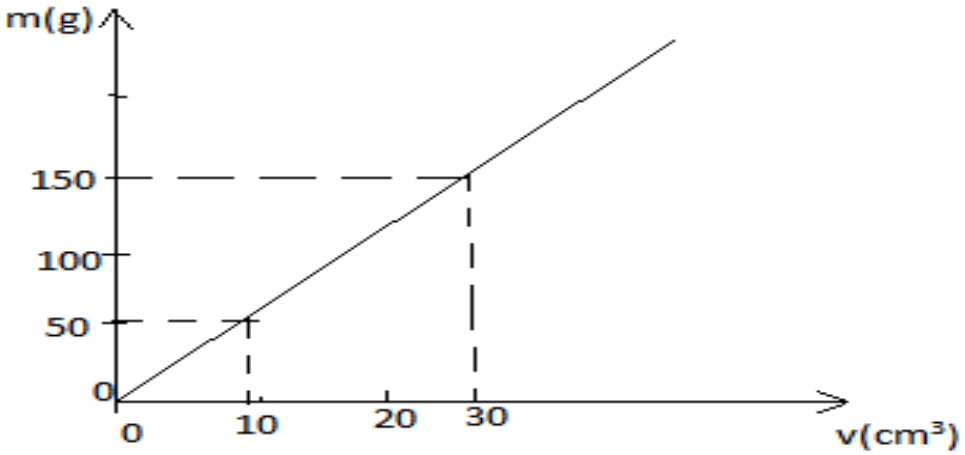
(c)The graph in the figure below shows how mass of sand varies with volume.

Use it to find density of sand. ***(1$\frac{1}{2}$marks)***



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43.(a) Name two methods of producing electrons from metal surfaces**. (2 marks)**

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(b) Describe the composition of $^{238}_{92}u$ nucleus **(2 marks)**

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44. (a) What is meant by a magnetically saturated material. (1 mark)

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(b) Explain why increase in temperature destroys the magnetism of a magnet. **(02marks)**

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(c) State two factors that affect the strength of an electromagnet. **(1 mark)**

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45. (a) State the principle on which a hydraulic press works ***(01 mark)***

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(b) A hydraulic press in which piston A carries a load *L* and an effort *E* is applied on piston B. If the area of cross section of piston *A* is 900 cm^2 and of piston B is 3 cm^2. Calculate the load *L* supported when an effort of 24 N is applied. ***(03 marks)***

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

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(b) A 240 V, 600W water heater is used to boil water for 5 min.

(i) By what means does heat spread through the water? **(1 mark)**

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(ii) Calculate:

(a) The current that flows in the heater. $\mathbf{(1\frac{1}{2}\ marks)}$

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(b) The electrical energy converted into heat. **($1\frac{1}{2}$ *marks*)**

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47.(a) What are complementary colours? ***(01mark)***

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(b) What will be the appearance of a yellow dress in a room lit with a blue bulb? ***(01mark)***

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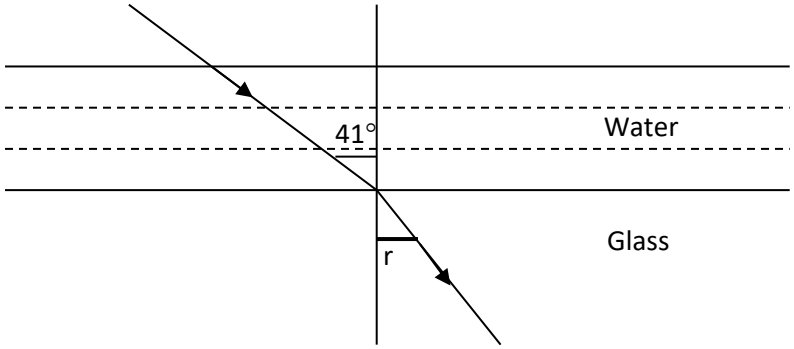
(c) A ray of light is incident on a water-glass boundary at an angle of 41° as shown in the diagram below. Calculate the angle of refraction r, if the refractive indices of water and glass are 1.33 and 1.50 respectively. ***(02marks)***



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48. (a) What is a **sound wave**? ***(01mark)***

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(b) (i) Write down **one** similarity between **light waves** and **sound waves**

(01mark)

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(ii) Draw a wave of a sound note in an open tube producing a fundamental frequency. On the diagram, name anodes and antinodes ***(02marks)***

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49. (a) What is meant by the following terms

(i) Wavelength of a longitudinal wave. ***(01mark)***

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(ii) Frequency of a wave. ***(01mark)***

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(b) Sketch a displacement time graph of a wave of amplitude 0.5 cm and frequency 4 Hz over a time interval of 1.25 seconds. ***(2 marks)***

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50. (a) State Newton's first law of motion ***(01mark)***

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(b) (i) What causes **uniform acceleration** for a body falling freely. **(01marks).**

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(ii) A plane moving horizontally at 40 m s^{-1} at a height of 200 m above the ground releases a 50 kg bag of rice when above the target point. How far from the target does the bag drop on the ground? ***(02marks)***

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END

SUCCESS