NYAMBARIA HIGH SCHOOL

END OF YEAR EXAMS

Paving Way For Kenya Certificate of Secondary Education Success

Name …….. Admission no…….

Candidate's Signature…… Date…….

FORM 3

PHYSICS

PAPER 2

TIME: 2Hours

Instructions to candidates

- *Write your name, index number, admission number and sign in the spaces provided above.*
- *This paper consists of **two** sections **A** and **B**.*
- *Answer **all** the questions in sections **A** and **B** in the spaces provided.*
- *All workings **must** be clearly shown where applicable.*
- *All numerical answers must be expressed in decimal form*
- *Non-programmable silent electronic calculators and KNEC Mathematical tables may be used where applicable.*

Contact 0724333200/0795491185 for marking schemes or order online at
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Section	Questions	Maximum Score	Candidate's Score
A	**1 – 11**	**25**	
B	**12**	**12**	
	13	**11**	
	14	**08**	
	15	**13**	
	16	**11**	
	TOTAL	**80**	

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SECTION A: 25 MARKS

1. The figure1 shows positively charged conductors mounted on insulating stands. Indicate the charge distribution on the conductors: **(2 marks)**

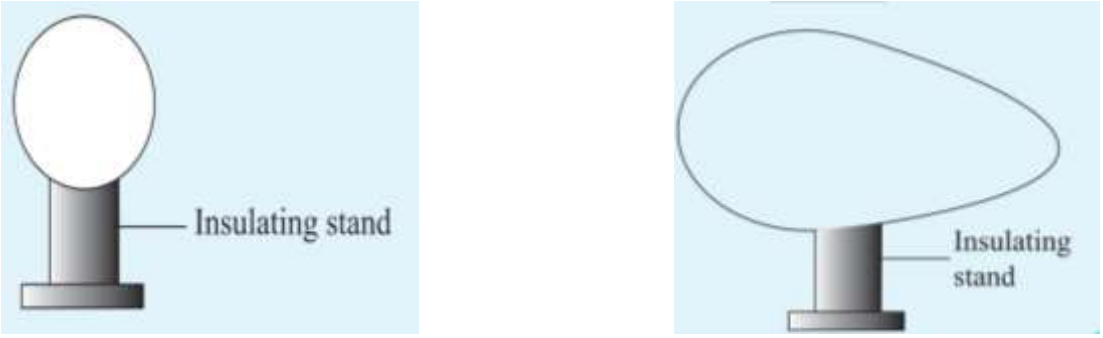


Figure 1

2. What property of light is suggested by the formation of shadows? **(1 mark)**

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3. The diagram shows how displacement varies with time as a wave passes a fixed point.

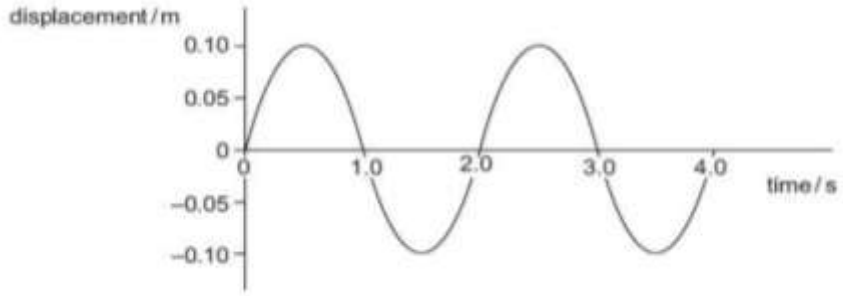


Figure 2

What is the frequency of this wave? (2marks).

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4. Distinguish between hard and soft magnetic materials. **(2 marks)**

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5. Name the conditions necessary for total internal reflection to occur **(2 marks)**

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6. Determine the ammeter reading when the potential difference of 3.0 volts is supplied across PQ in figure 3. **(3mks)**

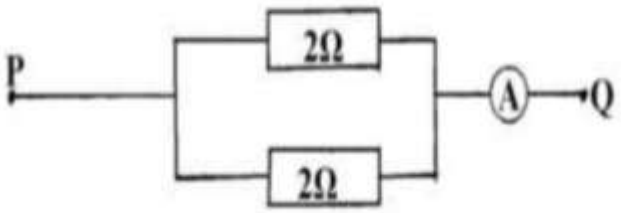


Figure 3

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7. A boy stands 190m from high wall and claps his hand, if he hears an echo 1.3 seconds later. Calculate the speed of sound in air. **(2 marks)**

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8. State any two ways in which the strength of this electromagnet can be increased**(2marks)**

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9. An object of height 4 cm is placed 15 cm before a concave mirror, focal length10cm.

Determine:

(i) the image position. **(2 marks)**

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(ii) the magnification **(2 marks)**

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10. State two defects of a simple cell and explain how each can be reduced. **(2marks)**

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11. The following figure 4 shows the features of a gold-leaf electroscope

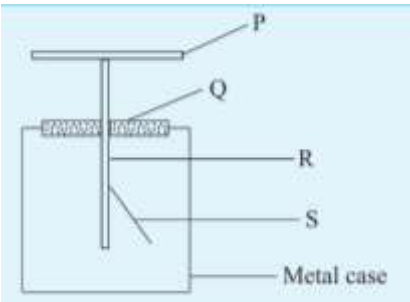


Figure 4

(i) Name the parts P and S. **(2 marks)**

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(ii) Explain the purpose of the metal case. **(1 mark)**

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SECTION B: 55 MARKS

12. (a) A spoon partly submerged in a glass of water appears bent. Explain. **(1 mark)**

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(b) I. What do you understand by the term total internal reflection and critical angle?

(2 marks)

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II. Show that refractive index $\cap = \frac{1}{\sin c}$ where c is the critical angle. **(3 marks)**

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III. Diamond has refractive index of 2.4. Calculate critical angle. **(2 marks)**

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(c) The figure 5 below shows a point at the bottom of a pond. Complete the ray diagram to illustrate how it appears to an observer O. **(2 marks)**

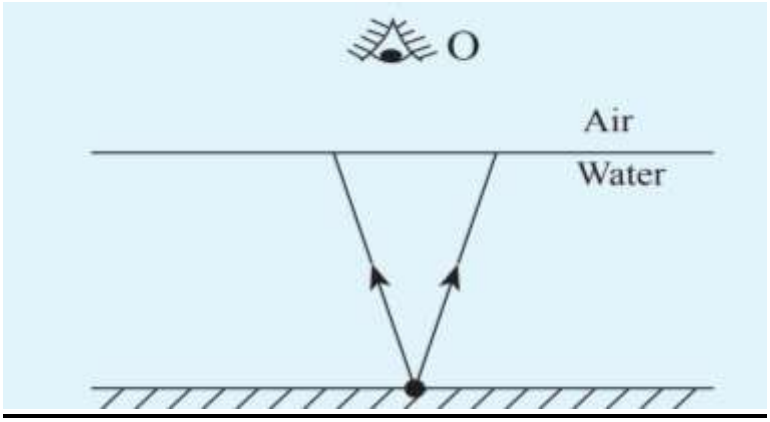


Figure 5

(d) Determine the speed of light in water given that the speed of light in air is $3 \times 10^{8} ms^{-1}$ and the refractive index of water is 1.33 **(2 marks)**

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13. (a) State Ohm's law **(1 mark)**

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(b) Explain why ammeters are always connected in series and voltmeters in parallel with the components in electrical circuits. **(1 mark)**

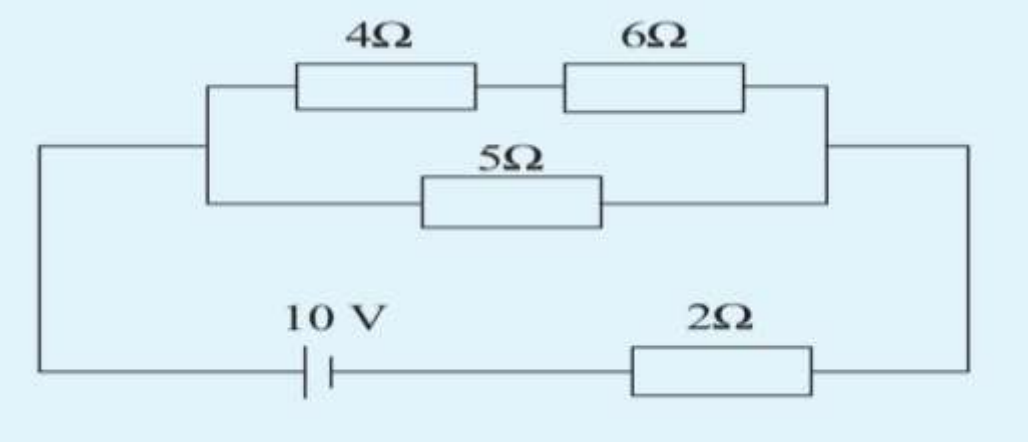
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(c) The diagram below shows four resistors connected to a 10 V power supply:



Determine the:

(I) total resistance. **(3marks)**

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(II) total current. **(3 marks)**

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(III) Voltage across the 2 Ω resistors. **(3 marks)**

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14. (a) State two factors that affect the extent of diffraction **(2 marks)**

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(b) In an experiment to study interference in sound waves, two identical loudspeakers are connected to an audio frequency generator so that they act as coherent sources S1 and S2 as shown in the figure 6 below.



Figure 6

An observer walking several meters ahead and along a line parallel to S1 S2 identifies points A and A1 as the first positions of loud sound on either side after the loud sound at the middle position O between the two sources.

(I) What is meant by the term coherent sources? **(1 mark)**

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(II) Name the type of interference occurring at points O, A and A1 **(1 mark)**

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(III) What name is given to the interference that occurs at point P exactly midway between O and A **(1 mark)**

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(c) The diagram below(figure 7) shows plane waves moving from shallow to deep end of a pond

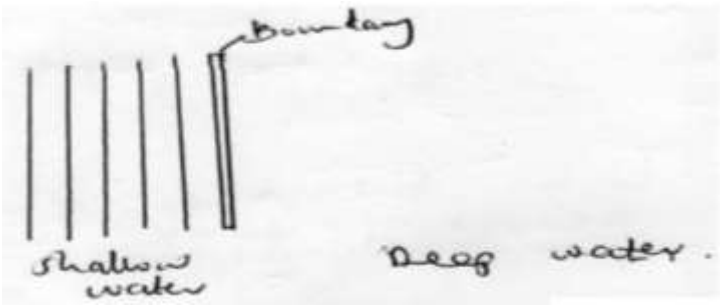


Figure 7

(I) Complete the diagram to show the waves on the deep end (l mark)

(II) State what happens to the velocity and frequency of the wave as it moves from shallow to deep end **(2 marks)**

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15. (a) Define capacitance of a capacitor and state its SI unit. **(2 marks)**

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(b) A potential difference of 4 V charges a capacitor to store charge of 30 C. Calculate the capacitance of the capacitor. **(3 marks)**

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(c) In the arrangement shown in figure 8 below, when the switch is closed, the candle is blown away from the tip of the nail.

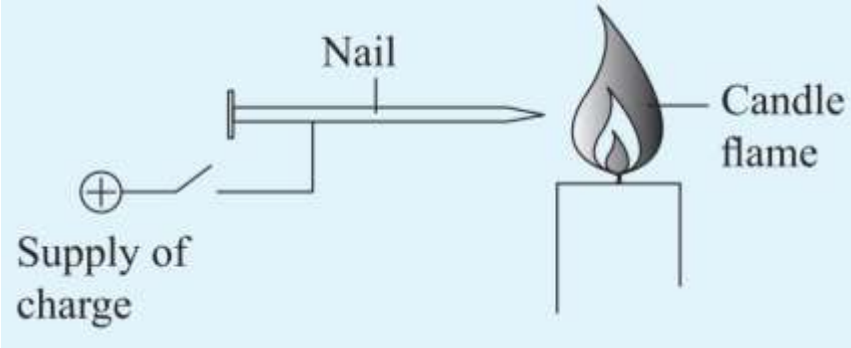


Figure 8

Explain; **(2 marks)**

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(d)In the circuit, determine:

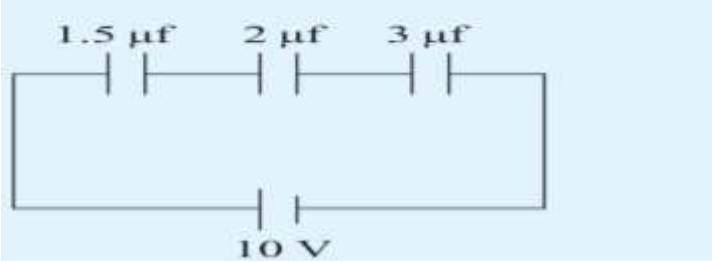


Figure 9

(i) total capacitance. **(2 marks)**

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(ii) Voltage across the 2F capacitor. **(2 marks)**

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(iii) energy stored by the 3F capacitor **(2 marks)**

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16. (a) State Fleming's left hand rule **(1 mark)**

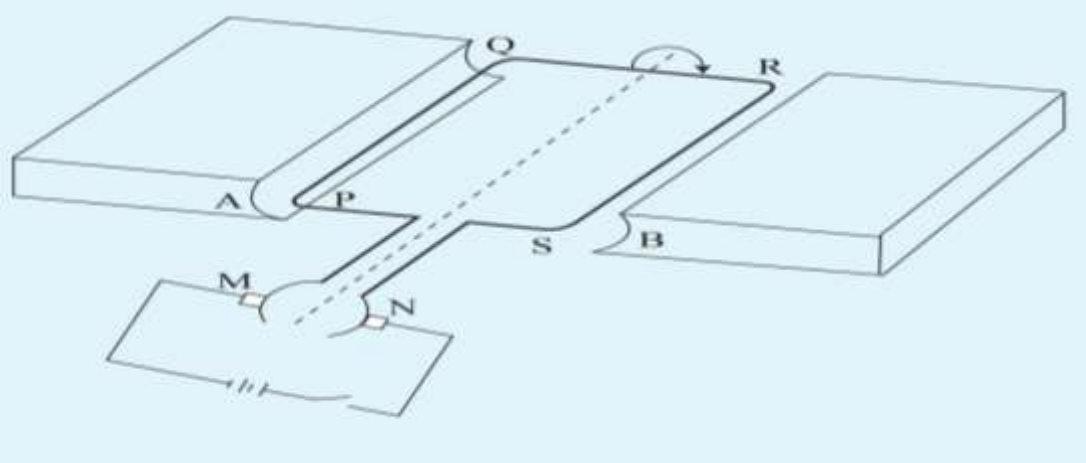
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(b) The figure below shows a coil PQRS lying between two unlike magnetic pole of pieces A and B of an electric motor.



(I) Identify the parts:

M **(1 mark)**

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N **(1 mark)**

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(II) Given that PQRS rotates in a clockwise direction, state the polarity of A. **(1 mark)**

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(II) State how you would increase the speed of rotation of the coil. **(2 marks)**

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(c) State two ways in which the force between the conductors can be increased **(2 marks)**

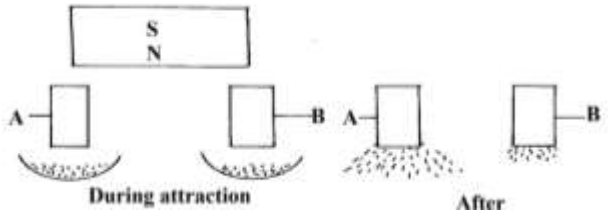
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(d) Figure below shows a simple experiment using a permanent magnet and two metal bars A and B Put close to the iron filings.



I. State with a reason which bar is made from a soft magnetic material. **(2mks)**

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II. Identify which bar can be used to make permanent magnets **(1 mark)**

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