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232/2

PHYSICS

PAPER 2

MARCH /APRIL 2020

**MOKASA I EXAMINATION - 2020**  
**Kenya Certificate of Secondary Education (KCSE)**  
**Physics Paper 2**

**Instructions to candidates**

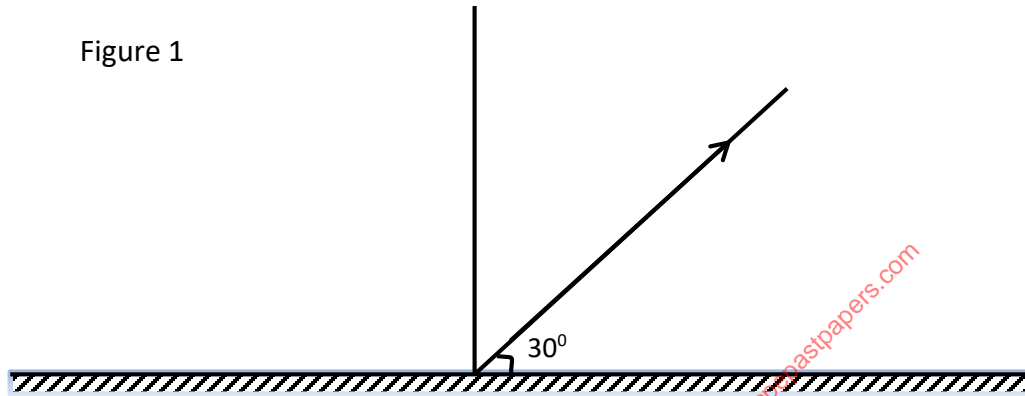
- This paper consists of two sections A and B.
- Answer **all** the questions in the two sections in the spaces provided after each question
- All working must be clearly shown.
- Electronic calculators, mathematical tables may be used.
- All numerical answers should be expressed in the decimal notations.
- This paper consists of 14 printed pages and check to ensure all the pages are there.

SECTION	QUESTION	MAX MARKS	CANDIDATE'S SCORE
<b>A</b>	<b>1 – 11</b>	<b>25</b>	
<b>B</b>	<b>12</b>	<b>10</b>	
	<b>13</b>	<b>13</b>	
	<b>14</b>	<b>11</b>	
	<b>15</b>	<b>11</b>	
	<b>16</b>	<b>10</b>	
<b>TOTAL</b>		<b>80</b>	

**SECTION A (25 MARKS)**

**Answer all the questions in the space provided**

1. **Figure 1** below shows a ray of light reflected from a mirror.



Complete the ray diagram and find the new angle of reflection after it is rotated  $10^\circ$  anticlockwise with the incident ray fixed. (2marks)

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2. Three electric bulbs are connected in series with a battery of two dry cells and a switch. At first the bulbs light brightly.

(a) State a reason why they gradually light dim. (2marks)

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(b) The switch is put off for sometimes. Explain why the bulbs again shine brightly. (1mark)

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3. A positively charged rod is brought near the cap of a lightly charged electroscope. The leaf first collapses and as the rod comes nearer, the leaf diverges.

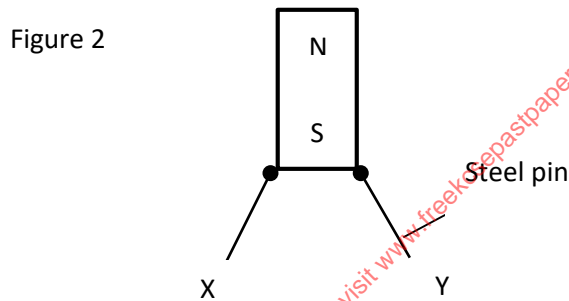
(i) What is the charge on the electroscope? (1mark)

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(ii) Explain the behavior of the leaf. (2marks)

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4. Figure 2 below shows a bar magnet attracting steel pin as shown

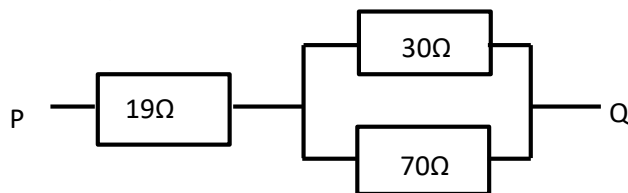


State and explain what would happen when a North pole of a bar magnet is brought near the tips of steel pin X and Y. (2marks)

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5. Determine the equivalent resistance between P and Q for the following resistors shown in Figure 3. (2marks)

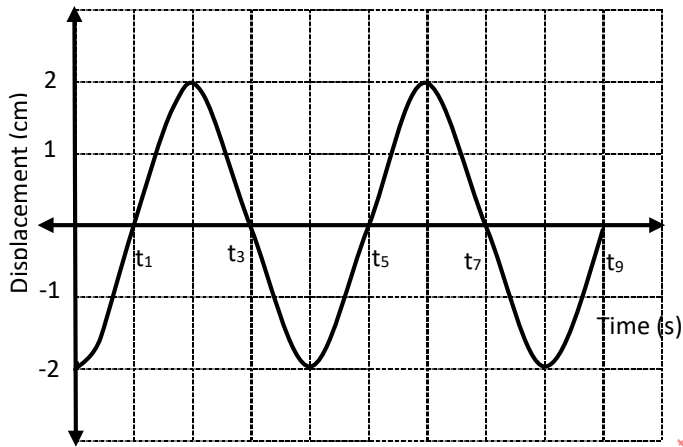
Figure 3



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6. Figure 4 below shows a wave profile for a wave whose frequency is 5Hz.

Figure 4



Determine the value of  $t_8$ .

(2marks)

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7. An electromagnetic radiation whose wavelength is greater than that of microwaves has a wavelength of 306.1224 m. Take speed of light in air,  $c = 3 \times 10^8$  m/s.

(a) Identify the radiation.

(1mark)

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(b) Calculate its frequency.

(2marks)

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8. Two heating coils A and B connected in parallel in a circuit produces power of 36W and 54W respectively. What is the ratio of their resistance?(2marks)

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9. State **two** conditions necessary for total internal reflection to occur. (2marks)

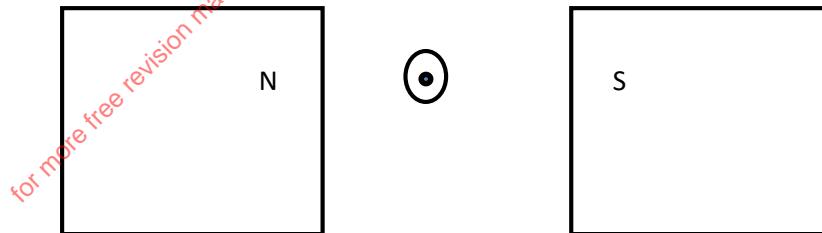
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10. Define coherent source of a wave. (1mark)

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11. Figure 5 below show a conductor carrying electric current place between two magnetic poles.

Figure 5



Complete the diagram by sketching the magnetic field and also show the direction of the force on the conductor. (3 marks)

**Section B (55 marks)**

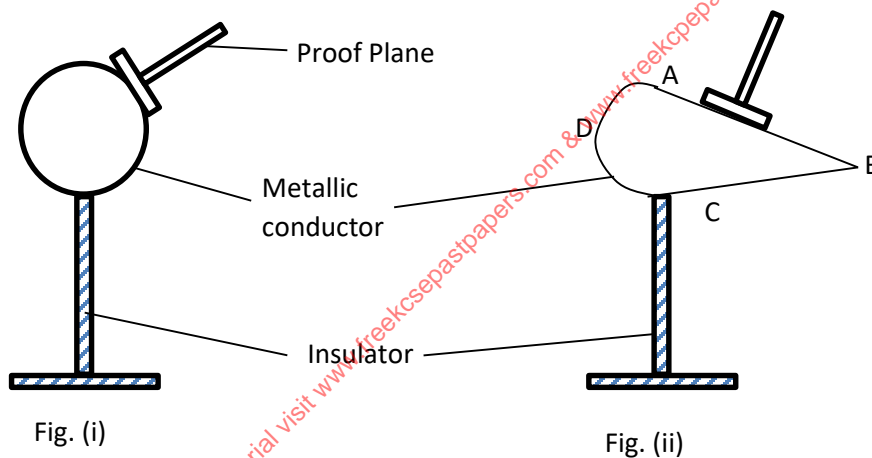
**Answer ALL the questions in the spaces provided**

12. (a) State **one** factor that affects the force between two charged bodies. (1mark)

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(b) To investigate charge distribution on metallic surfaces, electric charges were collected from different parts of the surfaces using a proof plane as shown in figure 6 below:

Figure 6



The proof plane was then placed on the cap of a neutral electroscope.

- (i) State and explain the leaf divergence of the electroscope as the proof plane is placed at various points round the spherical surface in figure (i) above. (2marks)

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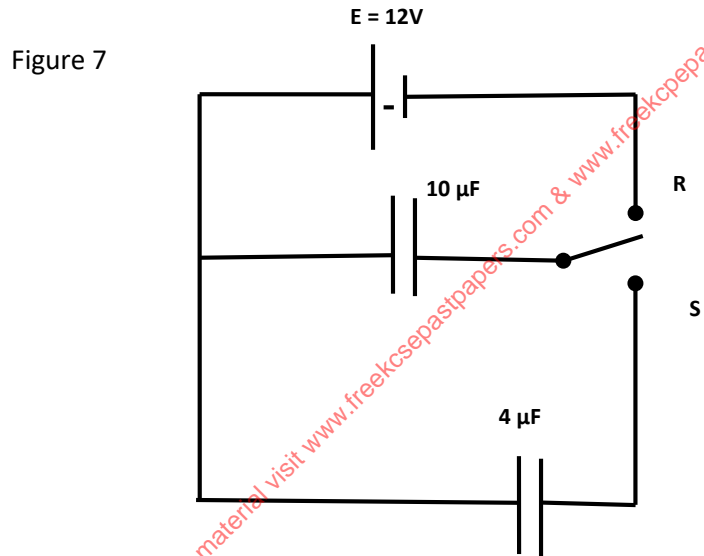
- (ii) State with reason which part of the conductor in figure (ii) gave the greatest deflection of the electroscope. (2marks)

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- (c) Figure 7 shows a  $10\mu\text{F}$  capacitor being charged from a  $12\text{V}$  battery by connecting the switch terminal on R. The switch is then connected to S to discharge the  $4\mu\text{F}$  capacitor.



Determine the resultant potential difference between the two capacitors. (3marks)

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(c) State two uses of capacitors.

(2marks)

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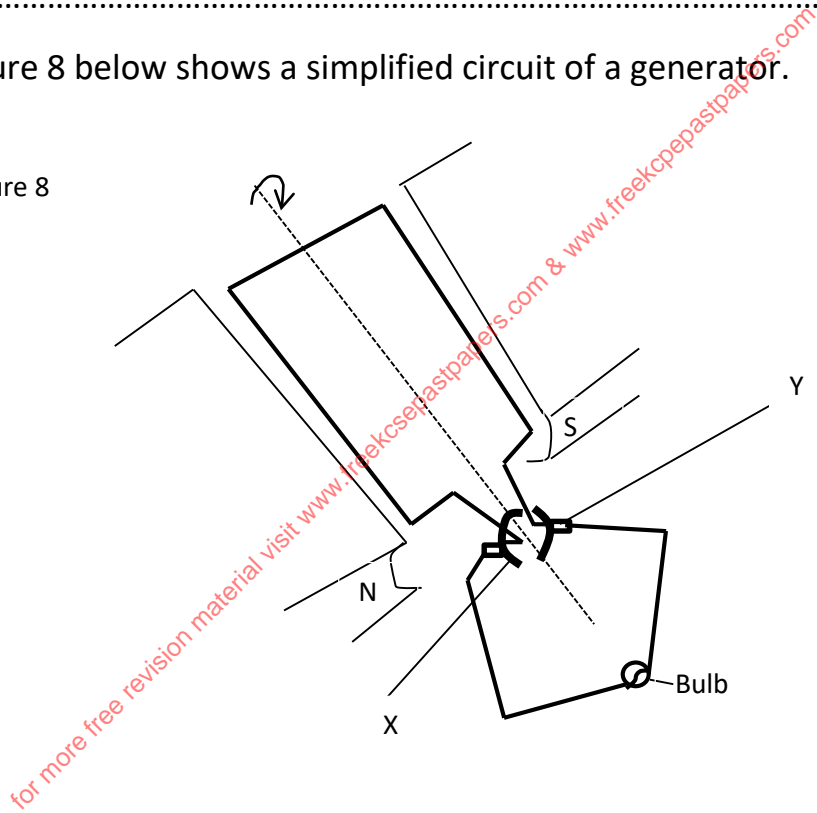
13.(a) State Faradays law of electromagnetic induction.

(1mark)

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(b) Figure 8 below shows a simplified circuit of a generator.

Figure 8



(i) Identify parts X and Y.

(2marks)

X: .....

Y: .....

(ii) State **two** ways of making the bulb light brighter.

(2marks)

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(c) An a.c generator produces an e.m.f of 50.0V which is used to operate a circuit that requires a minimum of 250.0V. If the power of the generator is 200W, determine the:

(i) Current generated by the a.c source. (2marks)

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(ii) Current supplied to the circuit by the transformer assuming 100% efficiency. (2marks)

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(iii) Ratio of turns in the coils of the transformer, primary: secondary. (2marks)

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(d) Explain how power losses in a transformer are minimized. (2marks)

(i) Eddy currents

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(ii) Hysteresis losses

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14.(a) A disc of a siren with 100 holes is rotated at constant speed making 0.5 revolutions per second. If air is blown towards the holes, calculate:

(i) The frequency of the sound produced. (2marks)

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(ii) The wavelength of the sound produced, if the velocity of sound is 340 m/s. (2marks)

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(b) A ship sends out an ultrasound whose echo is received after 5 seconds. If the wavelength of the ultrasound in water is 0.05 m and the frequency of the transmitter is 50 KHz, calculate the depth of the ocean. (3marks)

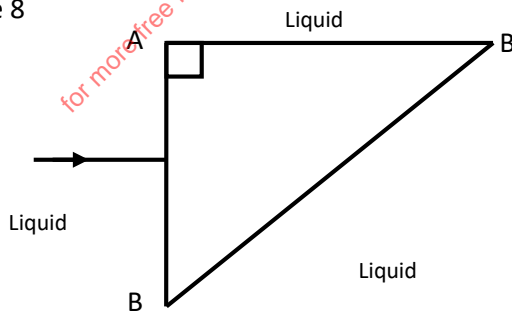
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(c) A ray of light is incident at right angles to the face AB, of a right angled isosceles prism of refractive index 1.6 as shown in Figure 8 below.

Figure 8



If the prism is surrounded by a liquid of refractive index 1.40, determine:  
 (i) The angle of incidence on the face BC. (1mark)

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(ii) The angle of refraction on the face BC.

(3marks)

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15.(a) Distinguish between principal focus and focal length of a concave lens.

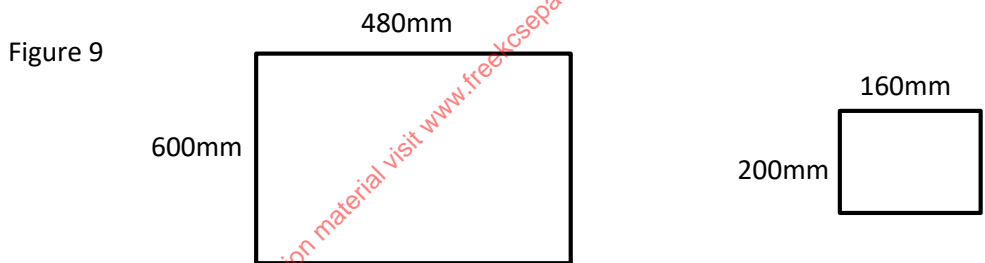
(1mark)

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(b) Figure 9 below shows sketches of a window frame and its image formed on a screen by a convex lens.



(i) State the nature of the image formed.

(2marks)

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(ii) Calculate the linear magnification of the imaged formed.

(2marks)

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(iii) The image of the frame was produced 500mm from the lens. Calculate the focal length of the lens. (3 marks)

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(c) A student finds that at a distance of 25 cm, the words in a book looked blurred.

(i) What eye defect does the student suffering from? (1mark)

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(ii) In which direction does he/she move the book to be able to see the words clearly from the distance? (1mark)

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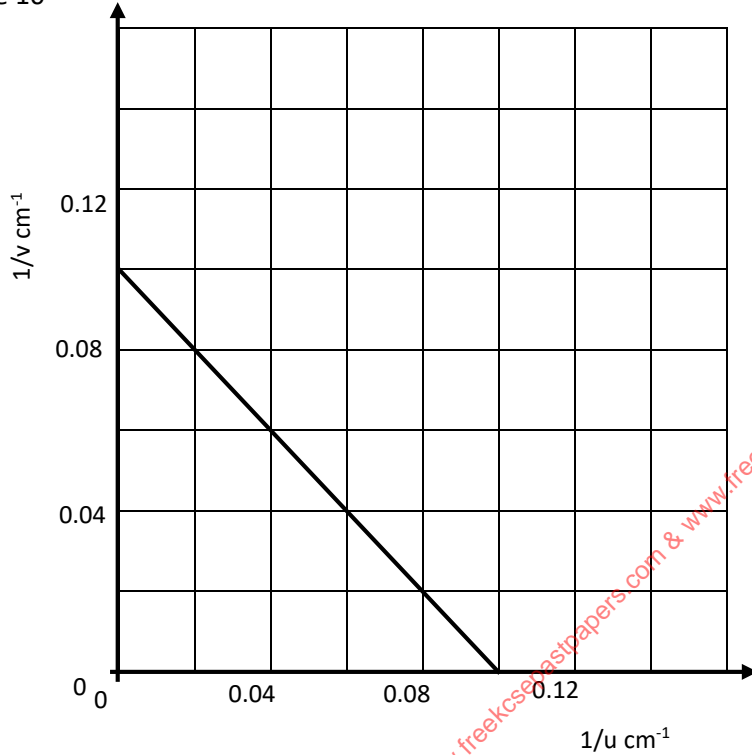
(iii) Which lens can be used to correct the eye defect? (1mark)

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16.(a) (i) Figure 10 shows a graph of  $1/v$  against  $1/u$  for a concave mirror. Use your graph to determine the focal length of the mirror. (2marks)

Figure 10



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(ii) Determine the image distance when the magnification is  $m = 2$  for the concave mirror above. (3 marks)

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(b) State **one** application of each of the following

(i) Convex mirror.

(1mark)

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(ii) Parabolic mirror.

(1mark)

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(c) A small object is placed 15 cm in front of a convex mirror of focal length 10 cm. Determine the position of the image. (3marks)

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