

**MUTOMO SUB-COUNTY KCSE REVISION MOCK EXAMS  
2015**

232/2  
PHYSICS  
PAPER 2  
(THEORY)  
TIME: 2 HRS

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NAME \_\_\_\_\_  
SCHOOL \_\_\_\_\_

INDEX NO. \_\_\_\_\_  
SIGNATURE \_\_\_\_\_  
DATE \_\_\_\_\_

**232/2**  
**PHYSICS**  
**PAPER 2**  
**(THEORY)**  
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**MUTOMO SUB-COUNTY KCSE PACESETTER, 2015**  
**Kenya Certificate of Secondary Education (K.C.S.E)**

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PHYSICS  
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INSTRUCTIONS TO CANDIDATES

1. Write your name, school and index number in the spaces provided above.
2. Sign and write the date of examination in the space provided above.
3. This paper consists of **two** sections, Section **A** and **B**. Answer **ALL** the questions in both section in the spaces provided in this paper.
4. **ALL** working must be clearly shown.
5. Mathematical tables and silent electronic calculators **may be** used.
6. The following constants may be used where necessary
  - Plancks constant,  $h = 6.63 \times 10^{-34} \text{ JS}$
  - Charge of an electron,  $e = 1.6 \times 10^{-19} \text{ C}$
  - 1 electron volt (1eV)  $= 1.6 \times 10^{-19} \text{ J}$

FOR EXAMINER'S USE

Section	Question	Maximum score	Candidate's score
A	1-12	25	
B	13	12	
	14	11	
	15	12	
	16	11	
	17	09	
	Total	80	

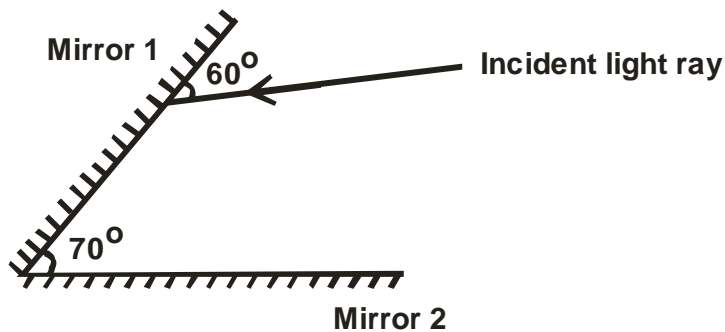
*This paper consists of 10 printed pages*

*Candidates should check to ensure that all pages are printed as indicated and no questions are missing*

**SECTION A (25 MARKS)**

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

1. The figure below shows a ray of light incident on the surface of one plane mirror.



Sketch the path of the ray on the diagram after striking mirror 2 indicating all the angles. (2 marks)

2. Explain why eight dry cells of 1.5V each arranged in series to give a total e.m.f of 12.0V cannot be used to start a car just like a lead-acid accumulator. (2 marks)

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3. When a candle flame is brought near the cap of a charged electroscope, the electroscope discharges. Explain this observation. (2 marks)

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4. a) Define the term “half-life”. (1 mark)

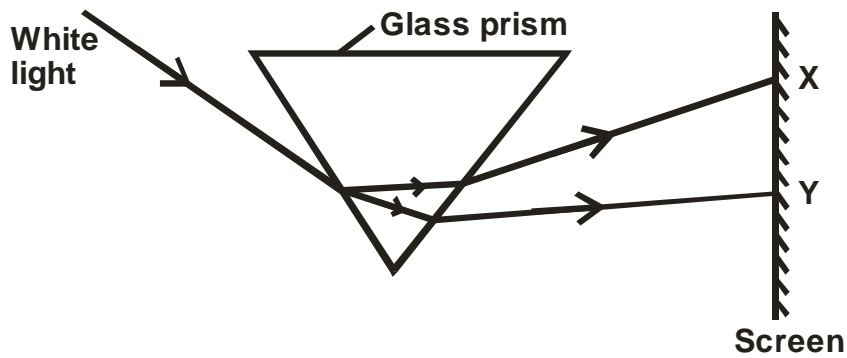
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- b) The activity of a radioactive source is initially 450 counts per second. After 72 hours, it reduces to 100 counts per second. If the background count per second is 50, determine the half-life of the substance. (3 marks)

5. The figure below shows an experiment set up used to illustrate dispersion of white light.



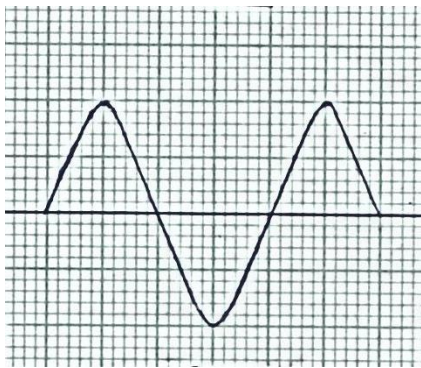
- a) Identify the colours X and Y. (1 mark)

X \_\_\_\_\_

Y \_\_\_\_\_

- b) What physical property changes for the colours when they enter the prism? (1 mark)

6. The figure below shows the waveform of a voltage displayed on a cathode ray oscilloscope.



- a) Given that, the Y gain calibration is 50V per cm, determine the peak voltage of the input signal. (2 marks)

- b) State **one** advantage of a CRO over ordinary voltmeters when used to measure voltage. (1 mark)

7. a) With the help of a diagram(s) show the difference between half-wave rectification and full-wave rectification output. (2 marks)

- b) State the advantage of full-wave rectification over half-wave rectification. (1 mark)

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8. Diffraction is not a common phenomenon in light. Explain why. (1 mark)

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9. Apart from temperature, state any **one** other factor which affects the resistance of a metallic conductor. (1 mark)

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10. Electrical power is transmitted over long distances at very high voltages. Explain why it is so. (1 mark)

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11. The figure below shows some of electromagnetic waves in the electromagnetic spectrum.

Visible light	Ultra violet rays	Microwaves
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- Arrange them in order of increasing energy contents. (1 mark)

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12. A lens forms an image that is four times the size of the object on the screen. The distance between the object and the screen is 120cm.

- i) State the type of lens used. (1 mark)

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- ii) Calculate the focal length of the lens. (2 marks)

**SECTION B (55 MARKS)**

Answer *ALL* the questions in this section in the spaces provided.

13. a) Sound is a mechanical longitudinal wave. Explain why sound is classified as;

i) A mechanical wave. (1 mark)

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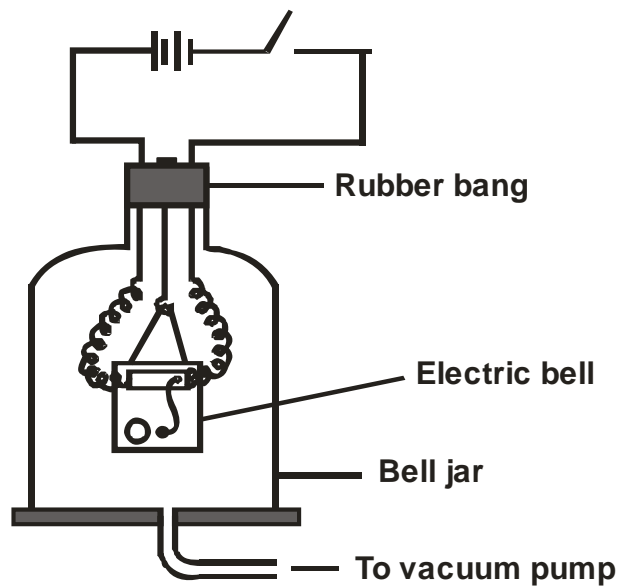
ii) A longitudinal wave. (1 mark)

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b) The diagram below shows a set up that was used to demonstrate that, sound is a mechanical wave.



i) State the function of the vacuum pump. (1 mark)

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ii) When the switch is closed, state and explain what happens as the air is continuously drawn from the bell jar. (3 marks)

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iii) State **two** possible reasons why it is not possible to reduce the sound completely in this experiment. (2 marks)

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- c) A fishing boat uses ultrasound of frequency  $6.0 \times 10^4 \text{ Hz}$  to detect fish directly below. Two echoes of the ultrasound are received, one after 0.09 seconds coming from the shoal of fish and the other after 0.12 seconds coming from the sea bed. The sea bed is 84m below the ultrasound transceiver.
- i) State **two** reasons why ultrasound is preferred. (2 marks)

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- ii) Calculate the speed of the ultrasound waves in water. (2 marks)

14. a) i) State what is meant by the term “electromagnetic induction”. (1 mark)

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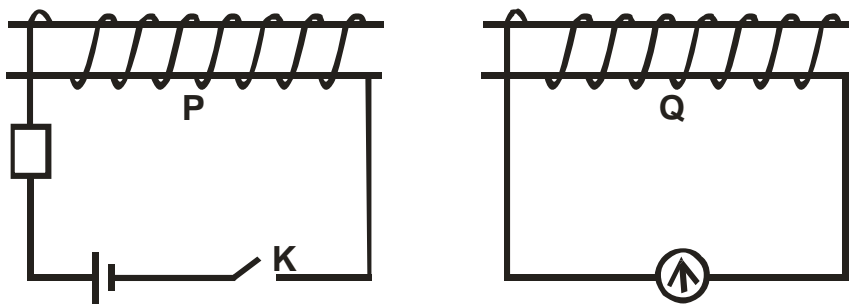
- ii) Highlight the **two** conditions necessary for electromagnetic induction to take place. (2 marks)

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- b) The figure below shows two coils P and Q placed close to each other.



- i) State what happens when the switch K in coil P is closed. (1 mark)

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- ii) Explain your answer in (i) above. (3 marks)

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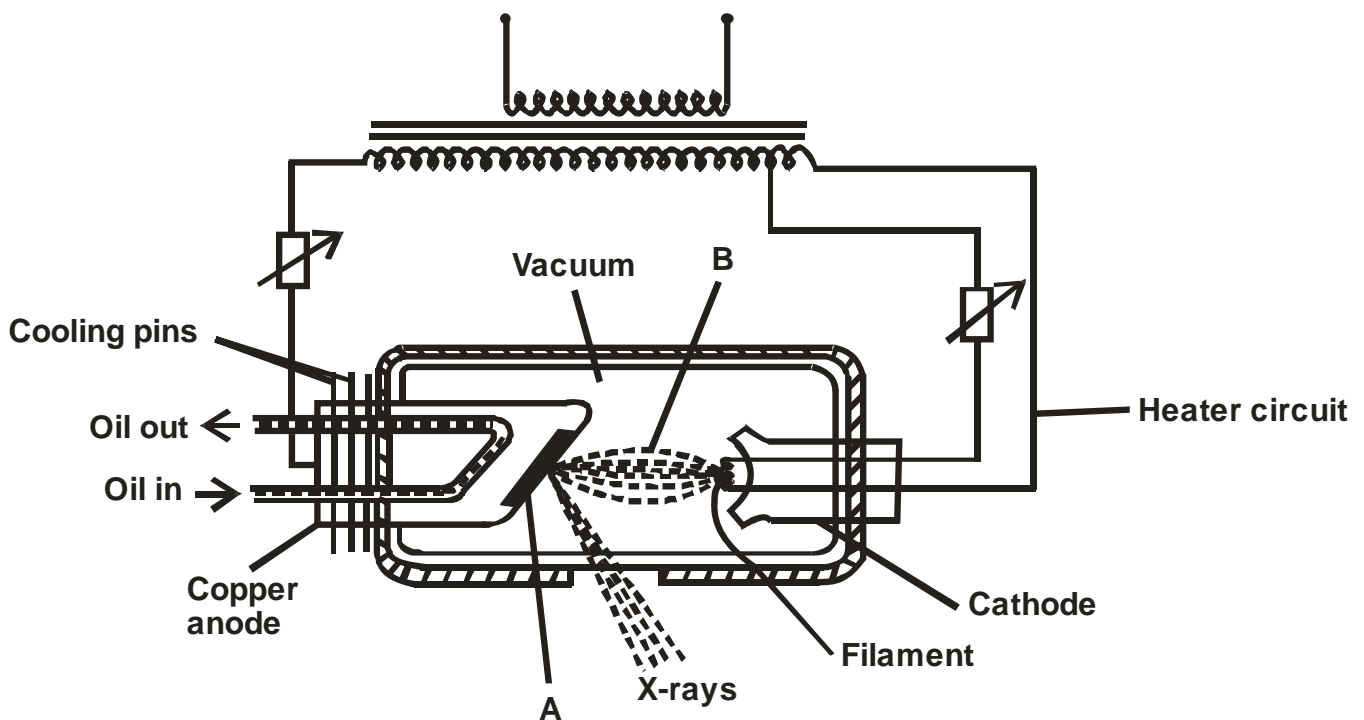
iii) Which phenomenon is being demonstrated in this set up?

(1 mark)

c) A transformer uses 240V a.c supply to deliver 9.0A at 80V to a heating coil. If 10% of the energy taken from the supply is lost in the transformer itself, determine the current in the primary winding.

(3 marks)

15. The figure below shows the essential components of an x-ray tube.



a) Name the parts labelled A and B.

(2 marks)

A \_\_\_\_\_

B \_\_\_\_\_

b) Explain how electrons are produced.

(2 marks)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



- c) During the operation of the tube, the target becomes very hot.
- i) Explain how this heat is caused. (1 mark)
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- 
- ii) State any **two** ways in which cooling can be achieved. (2 marks)
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- 
- d) Explain why:
- i) The tube is evacuated. (1 mark)
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- ii) The cathode is concave shaped. (1 mark)
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- e) In a certain x-ray tube, the electrons are accelerated by a potential difference (p.d) of 12000V. Assuming that all the energy goes to produce x-rays, determine the frequency of the x-rays produced. (3 marks)

16. a) What is photoelectric effect?

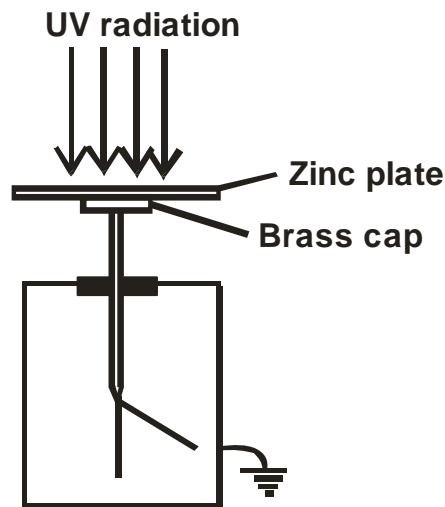
(1 mark)

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b) The figure below shows a set up that was used to demonstrate the photoelectric effect.



i) If the electroscope was negatively charged, State the observation made.

(1 mark)

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ii) Explain your answer in (i) above.

(2 marks)

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iii) State and explain what would happen if the electroscope was positively charged.

(2 marks)

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c) (i) Define the term “work function”.

(1 mark)

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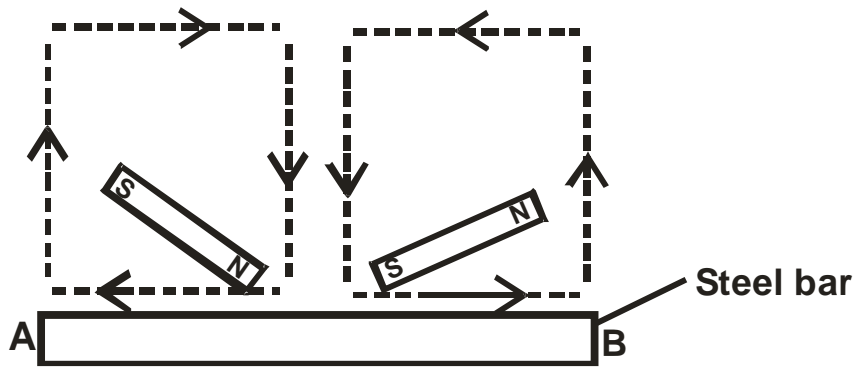
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(ii) A surface whose work function is 2.46eV is illuminated by light of frequency  $3.0 \times 10^{15}$  Hz.

Calculate the maximum kinetic energy of the ejected photoelectrons.

(4 marks)

17. a) The figure below shows a method of magnetization used in making magnets.



i) Name the method. (1 mark)

ii) Identify the polarities A and B of the magnet produced. (2 marks)

A \_\_\_\_\_

B \_\_\_\_\_

iii) Apart from this method, state any other method used in magnetization. (1 mark)

b) In demagnetization by electrical method:

i) State the type of current used. (1 mark)

ii) Explain your answer in (i) above. (2 marks)

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c) Explain why when demagnetizing a magnet, the magnet should be held in the East-West direction. (2 marks)

(2 marks)

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