

Name: .....

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School: .....

Candidate's Signature: .....

Date: .....

232/2

**PHYSICS**

Paper 2

(Theory)

July/August 2013

**Time: 2 Hrs**

**TRANS-MARA WEST ASSESSMENT TEST (TWAT)**  
*Kenya Certificate of Secondary Education (K.C.S.E)*

**PHYSICS**

Paper 2 (Theory)

July/August 2013

**2 Hrs**

**INSTRUCTIONS TO CANDIDATES**

- ✓ *The paper consists of **TWO** sections **A** and **B**.*
- ✓ *Answer **all** the questions in section **A** and **B** in the spaces provided.*
- ✓ *All working **MUST** be clearly shown.*
- ✓ *Non-programmable silent calculators and KNEC mathematical tables may be used.*

**FOR EXAMINER'S USE ONLY**

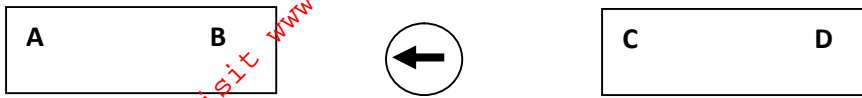
Section	Question	Maximum Score	Candidate's Score
A	1-13	25	
B	14	13	
	15	12	
	16	12	
	17	10	
	18	08	
<b>TOTAL SCORE</b>		<b>80</b>	

*This paper consists of 11 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

**SECTION A (25mks)**

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

1. Figure 1 below shows a plotting compass placed between two strong magnets.  
Fig. 1



- (I) Give the polarity of the end **D** of the right hand magnet. (1mk)

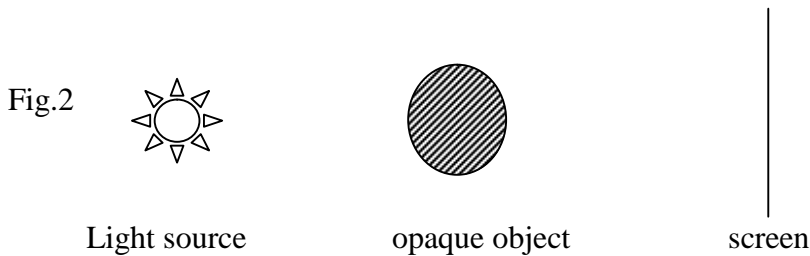
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- (II) Draw on the diagram the resulting magnetic field pattern between B and C. (2mks)

2. The photoelectrons liberated from an illuminated metal surface constitute a photoelectric current. What is the effect of decreasing the intensity of illumination on the magnitude of the photoelectric current? (1mk)

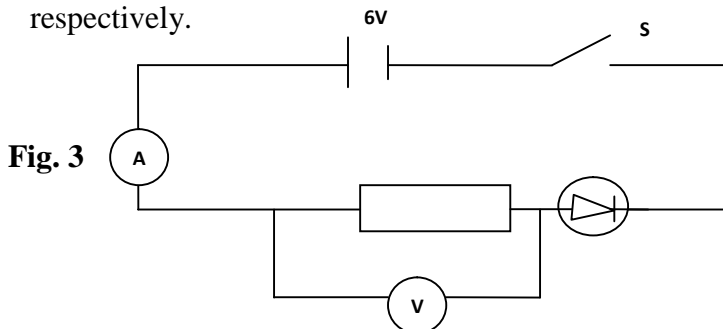
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3. An opaque object is placed before a light source as shown in figure 2 below.



- Draw rays in the diagram to show how the shadow is formed. (2mks)

4. In the circuit diagram in figure 3 below, the voltmeter and ammeter read 4v and 40 mA respectively.



- Determine the resistance of the diode. (3mks)

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5. Give the reason why x-rays would not be suitable to verify the thickness of aluminium foil manufactured in industries. (1mk)

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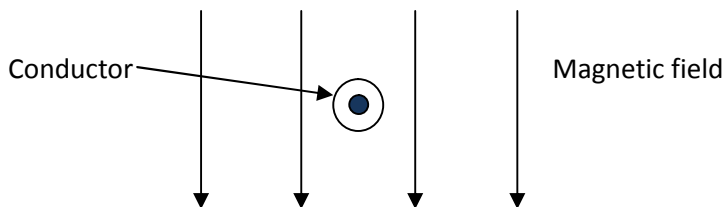
6. Naeku wanted to change the magnitude of reflection of a charged leaf electroscope. Give **two** methods she could use. (2mks)

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7. Give **one** observable change on water waves when passed from deep to shallow water. (1mk)

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8. Figure 4 below shows a conductor in a uniform magnetic field carrying current in the direction shown.



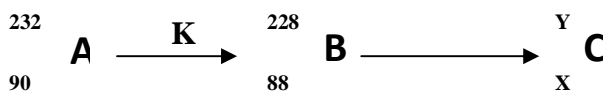
Indicate on the diagram the direction of motion of the conductor. (1mk)

9. Name the property of light applied in transmitting light signal in optical fibres. (1mk)

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10. Find the maximum number of 75W bulbs that can be connected to a 3A fuse on a main power supply of 240V. (3mks)

11. Below is a nuclear reaction:



**Identify radiation K.** (1mk)

X

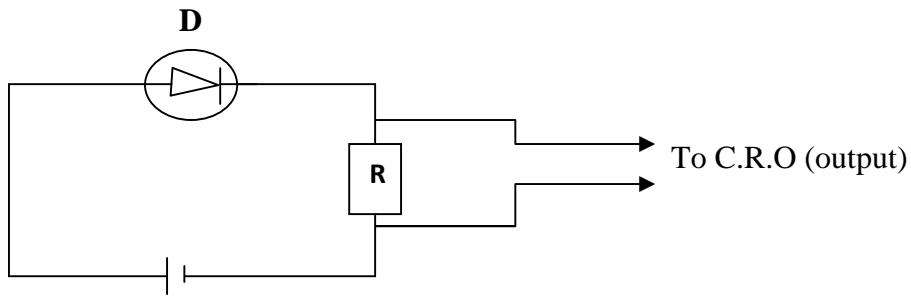
Y

12. What position should a small boy stand in front of a concave mirror to view his?

(i) Enlarged and upright image in a barber shop? (1mk)

(ii) Enlarged and inverted image in a fashion modeling room? (1mk)

13. Figure below shows the supply of d.c. to a resistor, **R** through a diode, **D**.



(i) Give the bias of the diode. (1mk)

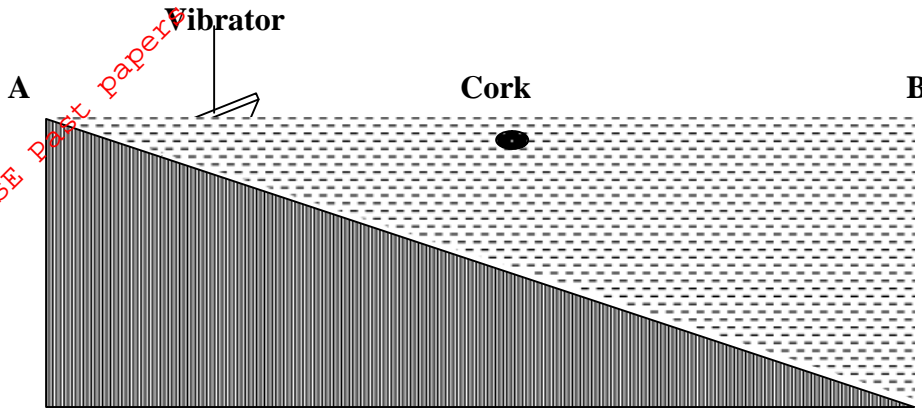
(ii) An a.c. supply is now supplied to the resistor **R**. On the axes provided below, sketch the output observed in the C.R.O. connected across **R**. (1mk)



**SECTION B (55MKS)**

*Answer all questions in this section*

14. (a) Figure 6 below shows the cross-section of a ripple tank full of water. A piece of cork floats on the surface of water and a straight edge vibrator placed at shallow end A to generate waves that travel to deep end B.



- (i) Name the types of waves generated on the water surface. (1mk)

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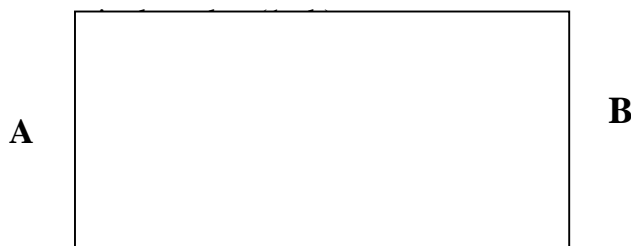
- (ii) The cork is observed to stay put despite passing water waves. Explain this observation. (2mks)

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- (iii) It was estimated that successive waves pass the cork every 0.25 seconds. If the speed of the waves is 0.28m/s, determine the frequency and wavelength of the waves at that point. (4mks)

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- (iv) In the space provided, sketch the wavelength as viewed from a point above the



(v) Explain the answer in part (iv) above.

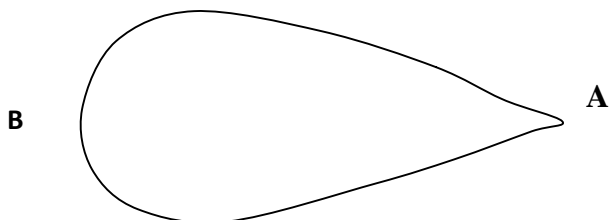
(2mks)

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(b) A ship sends out an ultrasound whose echo is received after 10 seconds. If the wavelength of the ultrasound in water is 0.05m and the frequency of the transmitter is 50 KHz, calculate the depth of the ocean. (3mks)

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15. Fig.7 below shows a pear shaped conductor with positive charge on its surface.



A proof plane is used to touch side **B** of the conductor and then the cap of an uncharged electroscope. This is then repeated with side **A**.

(i) Give the observation made on the electroscope in each case. (2mks)

**B**.....  
.....  
**A**.....  
.....

(ii) What conclusion is drawn from the observation in (i) above. (1mk)

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(iii) Draw on the diagram above, the illustration of your conclusion in (ii) above. (1mk)

(iv) Name **one** application of such a conductor. (1mk)

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(b) Figure 8 below shows the charged plates of a parallel plate capacitor where the distance of separation,  $d$  is small.



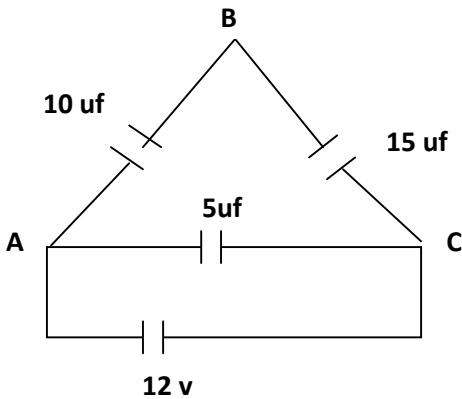
- (i) Complete the diagram to show the electric field pattern in the space between the plates. (2mks)
- (ii) Without changing the distance  $d$  between the plates, suggest one method by which you could increase the capacitor. (1mk)

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- (iii) State a device where a variable air capacitor could be used. (1mk)

(c) Figure 9 below shows a circuit of three capacitors and a d.c. source.



Determine:

The p.d. across **A.B.** (3mks)

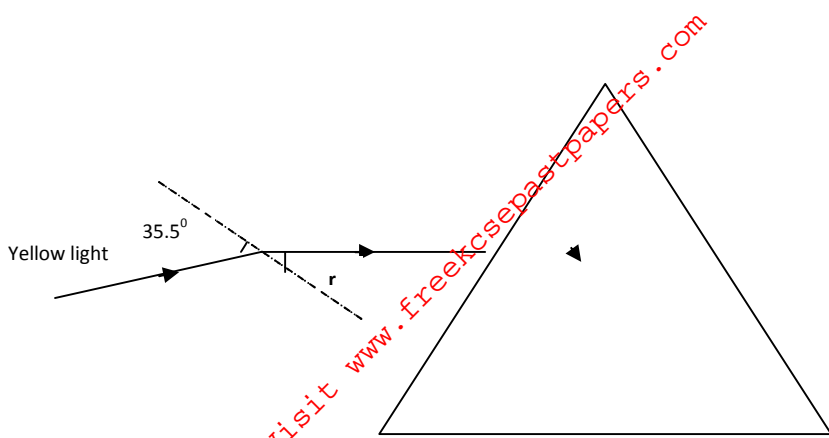
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16. Figure 10 below shows the path of a ray of yellow light through a glass prism of refractive index 1.60.



(a) Determine the value of angle  $r$ . (3mks)

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(b) Show on the figure the critical angle,  $c$  and determine its value. (4mks)

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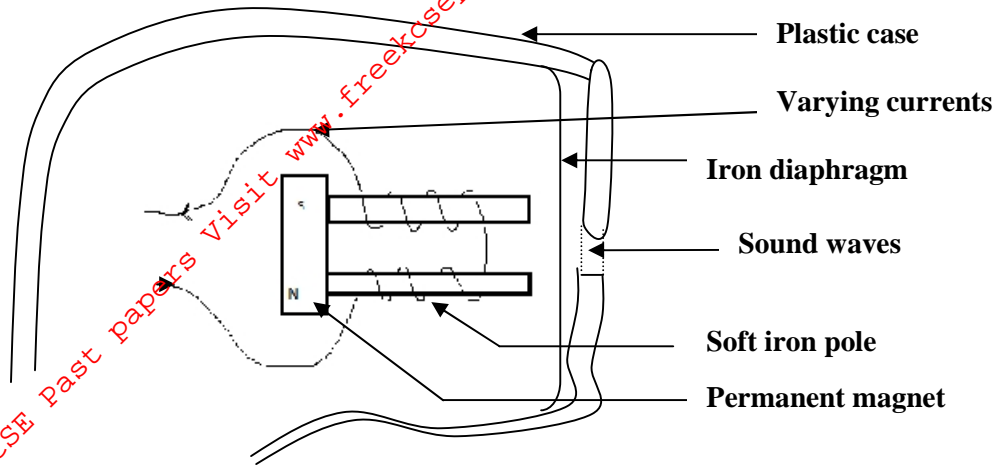
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(c) Determine the speed of light in glass given that the speed of light in vacuum,  
 ( $C = 3.0 \times 10^8 \text{m/s}$ ) (3mks)

(d) On the same figure, sketch the path of the light after striking the prism if the prism was replaced by another of similar shape but lower refractive index. (Use dotted line for your answer) (2mks)



17. (a) Figure 11 below shows the circuit of a simple telephone receiver. When a person speaks into the microphone on the other side, a varying current flows:



- (i) State the reason why the solenoids are wound in opposite directions around the soft-iron pole pieces as shown. (1mk)

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- (ii) Explain how the speech current from the microphone is converted into sound in the receiver. (3mks)

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- (iii) State and explain the effect of replacing the soft iron pole pieces with steel pole pieces. (3mks)

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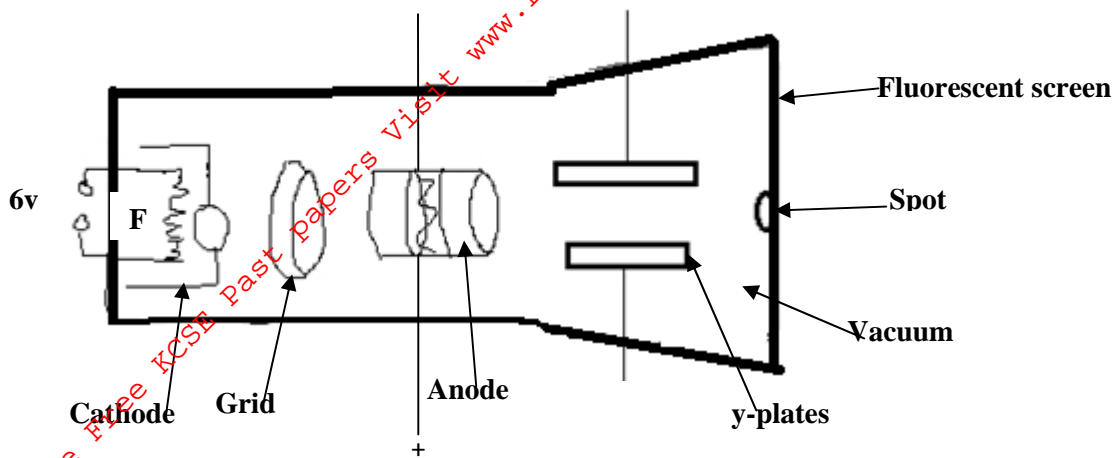
- (b) A step-down transformer has 400 turns in the primary coil and 20 turns in the secondary coil. A 50  $\Omega$  resistor is connected to the secondary output. If the effective primary voltage is 240v, determine the current through the 50  $\Omega$  resistors. (3mks)

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18. (a) Figure 12 below shows a section of a cathode ray tube.



(i) Describe how the electrons are produced in the tube. (2mks)

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(ii) Give the function of the grid. (1mk)

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(iii) State what would be observed on the screen if an a.c. voltage is connected across the y-plates. (1mk)

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(iv) Give the reason why it is possible to have a wider screen in the television set than on the CRO. (1mk)

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(b) If the resistance of the filament is 2  $\Omega$ , calculate the energy developed in it in 1 minute. (3mks)

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