Name……………………………………………………Admno……………………

School……………………………………………… Class…………………

Index no…… …………………………………………...Date……………..

232/2
PHYSICS
Paper 2
Theory
FORM FOUR
2 Hours

MOMALICHE 3, CYCLE 8 JOINT EXAMS

Kenya Certificate of Secondary Education

Instructions to candidates

a) This paper consists of **TWO** sections : **A** and **B**
b) Answer **ALL** the questions in section **A** and **B** in the spaces provided
c) All working **MUST** be clearly shown
d) Mathematical tables and non-programmable silent electronic calculators may be used.

For Examiners Use Only

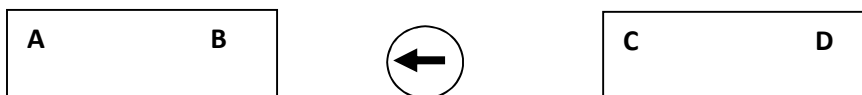| Section	Question	Maximum score	Candidate's score
A	1-13	25	
B	14.	14	
	15	11	
	16	11	
	17	7	
	18	12	
Total		80	

Answer all questions in this section the spaces provided

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

    | A   B | ← (compass) | C   D |

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

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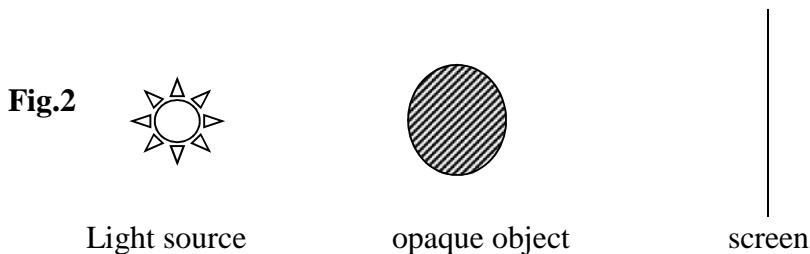   (II)   Draw on the diagram the resulting magnetic field pattern between B and C.

                                                                                      (2marks)

2. State one property of an image formed by a convex mirror.   (1mark)

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

    Fig.2   (light source)   (opaque object) | (screen)

        Light source   opaque object   screen

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

4. In the circuit diagram in figure 3 below, the voltmeter and ammeter read 4v and 40 mA
        respectively.   6V   S

    Fig. 3   (A)

                         (V)
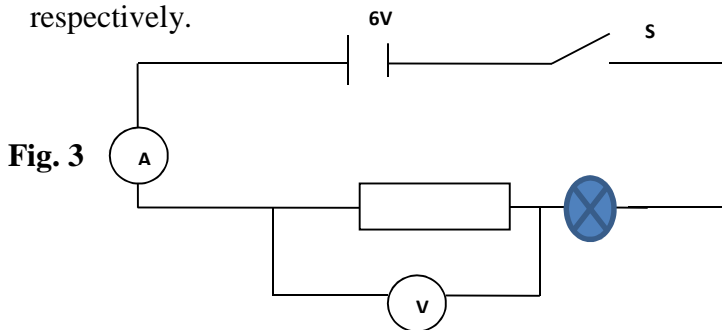
    Determine the resistance of the filament of the bulb.   (3marks)

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5. Name the electromagnetic wave that borders both x-rays and visible light.   (1mark)

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6. A dry cell is not recharged once used up. However when used well, it can serve someone for some time. State two precautions necessary when using it other than storing it in dry condition.

(2marks)

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

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

Conductor

Magnetic field
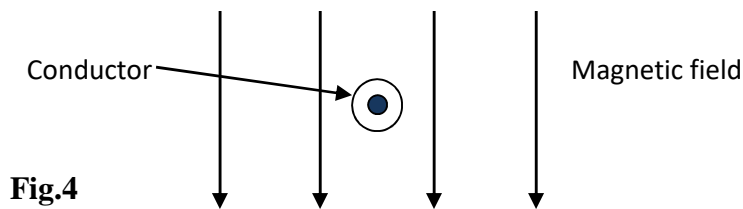
Fig.4

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

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

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10. A heater of resistance R_1 is rated P watts, V volts while another of resistance R_2 is rated 2P watts, V/2 volts. Determine R1/R2.   (3marks)

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11. Figure 5 shows light passing through a transparent block.

Fig.5
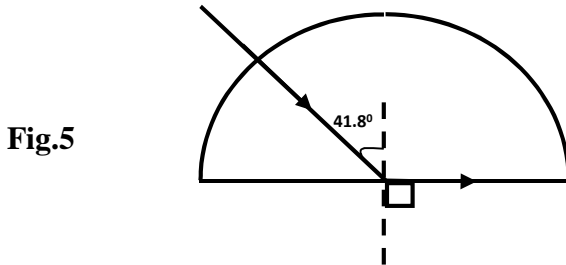
Determine the refractive index of the block.   (2 marks)
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12. What position should a small boy stand in front of a concave mirror to view his;

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

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

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13. Figure 6 below shows a wave profile for a wave whose frequency is 2.5Hz

Fig.6
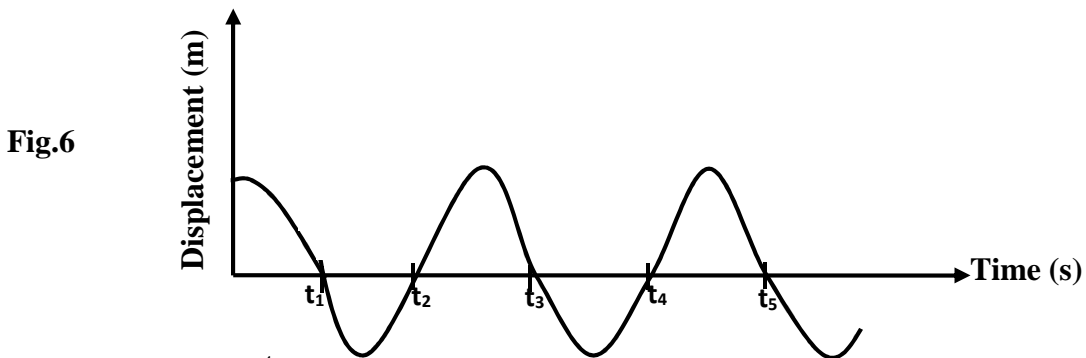
Determine the value of t_3 (3 marks)
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4

Answer all questions in this section the spaces provided

14. (a) What is dioptres?   (1mark)

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   (b) State two differences between the eye and lens.   (2marks)

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(c). A compound microscope with objective lens L_1 of focal length 0.8cm and an eyepiece lens L_2 of focal length 2.5cm is shown in the figure 7 below. An object O is placed in front of the objective lens at a distance u_1 of 1.2cm. The system forms a final image I_2 at a distance of 10cm from L_2. Determine the distance of separation, d, of lenses L_1 and L_2.   (3marks)

Fig.7

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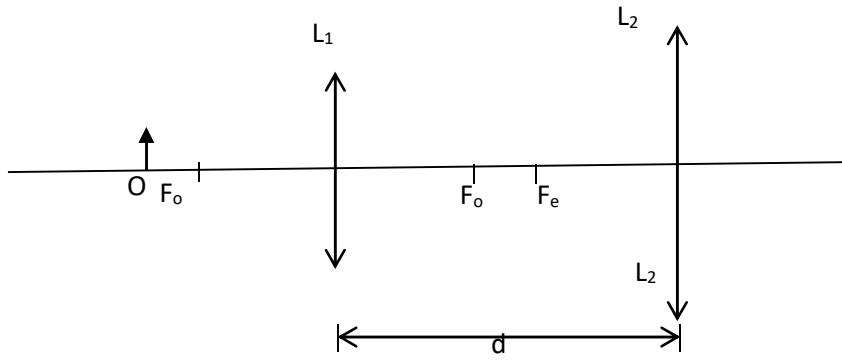
   d) The figure 8 below shows an experimental set up consisting of a mounted lens, L, a screen, S, a metre rule and a candle.

Fig.8
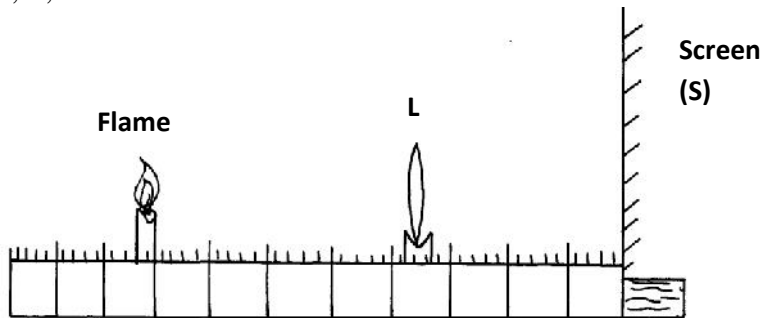
(i) Describe how the set up may be used to determine the focal length f, of the lens.   (4marks)

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(ii) State why the set up would not work if the lens were replaced with a diverging lens. (1mark)

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(iii) An object is placed 20cm from a converging lens of focal length 8cm. Determine how far the image is from the object.   (3marks)

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15. Figure 9 below shows a pear shaped conductor with positive charge on its surface.

Fig.9   B   A
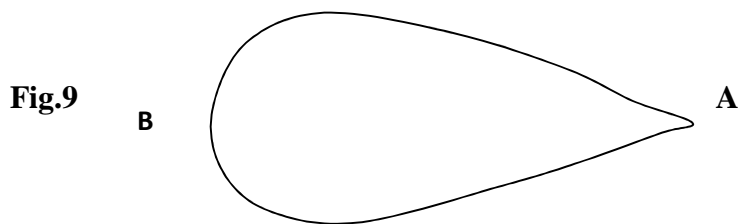
(a) A proof plane is used to touch side **B** of the conductor and then the cap of an uncharged electroscope. This is then repeated with side **A**.

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

B...

A...

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

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(b) (i) Draw on the diagram above, the illustration of your conclusion in (ii) above.   (1mark)

(ii). Name **one** application of such a conductor.   (1mark)

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(c). Figure 10 below shows the charged plates of a parallel plate capacitor where the distance of separation, d is small.

Fig.10
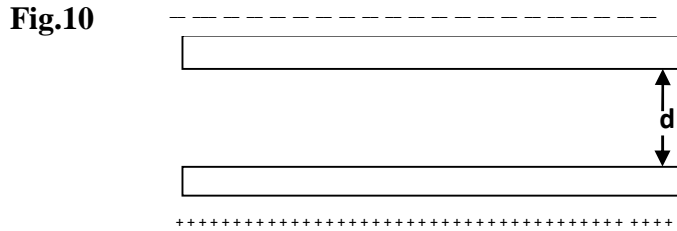
(i). Complete the diagram to show the electric field pattern in the space between the plates.

(2marks)

(ii). Without changing the distance d between the plates, suggest one method by which you could increase the capacitance. (1mark)

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

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(d). Figure 11 below shows a circuit of three capacitors and a d.c. source.

Fig.11
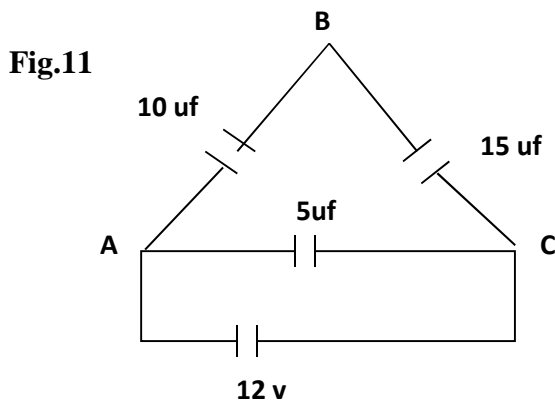
Determine the p.d. across **A.B**. (3marks)

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16. Figure 12 below shows the path of a ray of yellow light through a glass prism of refractive index 1.60.

Fig.12

Yellow light

35.5⁰

r
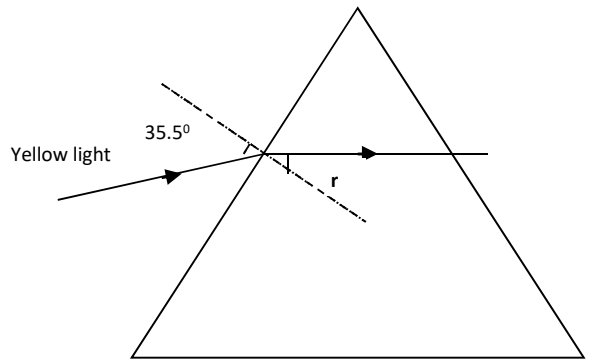
(a). Determine the value of angle **r**.   (3marks)

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(b). Show on the figure the critical angle, c and determine its value.   (3marks)

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(c). Determine the speed of light in glass given that the speed of light in vacuum.

   $(C = 3.0 \times 10^8 \text{m/s})$ (3marks)

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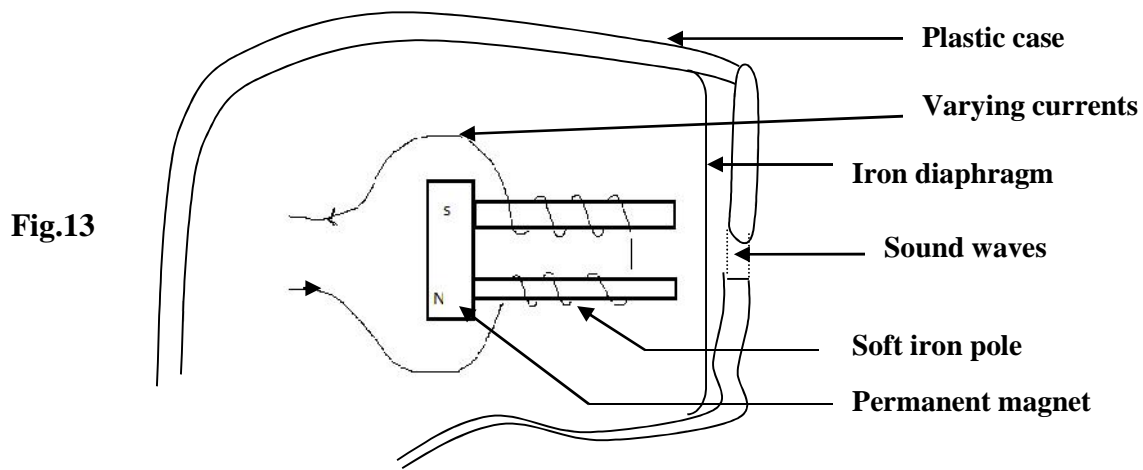……..

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 (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)   (2marks)

17. Figure 13 below shows the circuit of a simple telephone receiver. When a person speaks into
the microphone on the other side a varying current flows.

Fig.13

(i). State the reason why the solenoids are wound in opposite directions around the soft-iron pole

pieces as shown.   (1mark)

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

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

(3marks)

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18. a) State the Ohms' law. (1mark)

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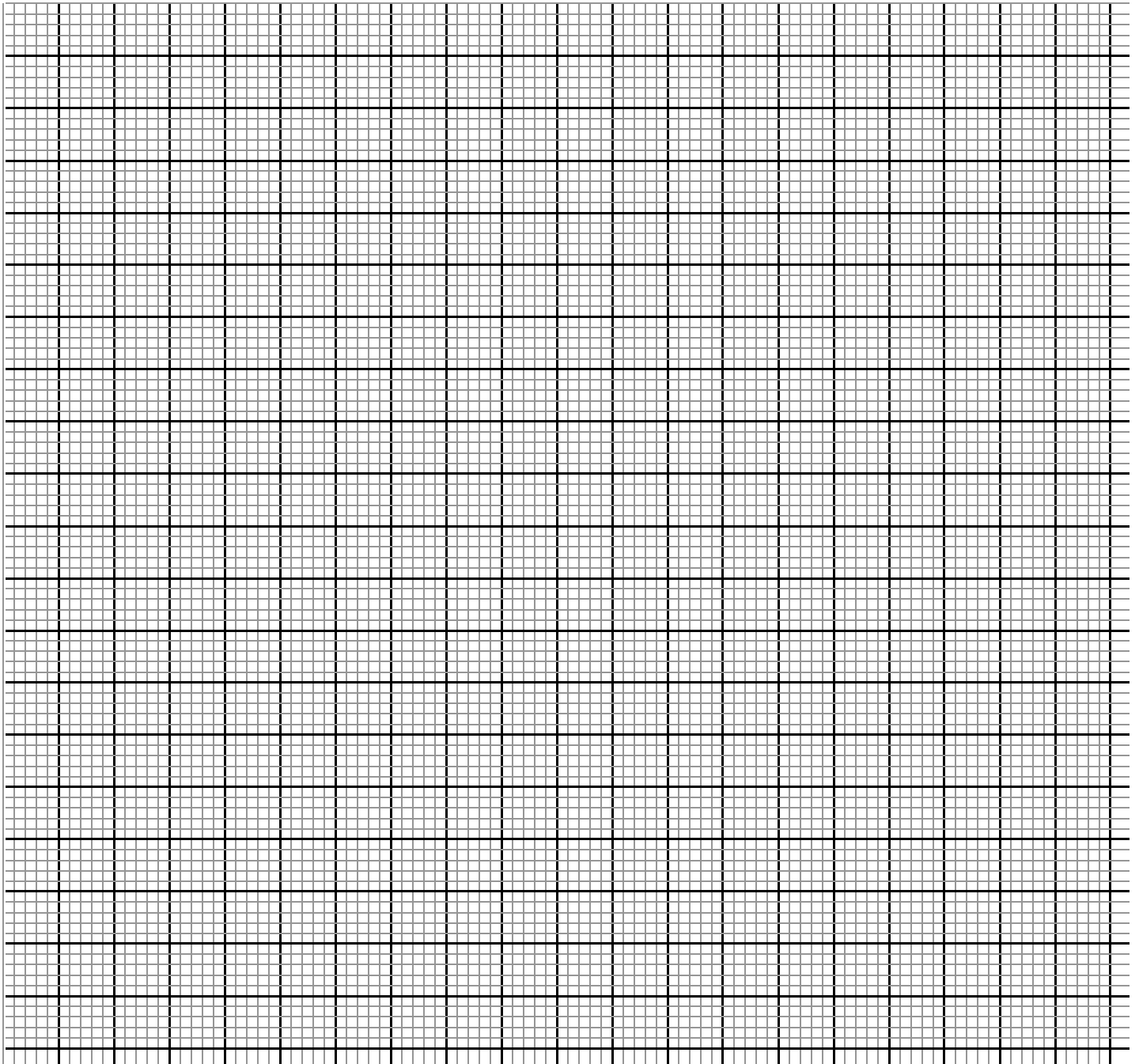
b) Three resistors x,y and z where x = 200 , y = 100 and z is unknown resistance are connected in parallel. This arrangement is then placed in a circuit and current passing through, and potential difference across its measured the table below shows the result.

p.d(V)	2.0	4.0	6.0	8.0	10.0	12.0
Current(l) (A)	0.10	0.20	0.30	0.40	0.50	0.60

i)   Plot a graph of p.d against current.   (5marks)

ii)   Use your graph to calculate the value of unknown resistance.   (3marks)

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c) Four resistors are connected in a circuit as shown in the diagram below
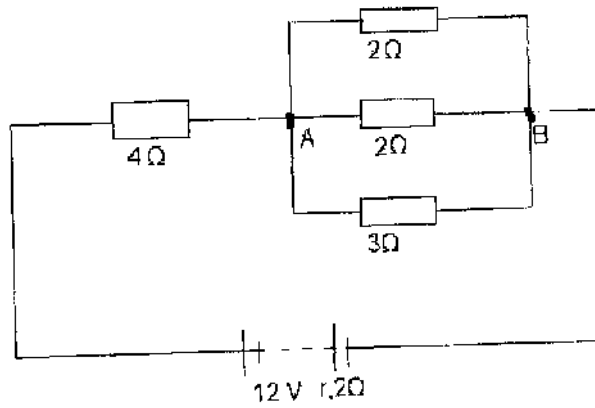
Calculate the p.d across AB.   (3marks)

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