**NAME:……………………………..………………ADM NO………..…CLASS:………………….**

**SCHOOL:………….…….………………CANDIDATES SIGNATURE:…………..DATE:…………**

**FORM 4**

**232/2**

**PHYSICS**

**TIME: 2 HOURS**

**THE EAGLE JOINT EXAM-2021**

**TERM I-PREMOCK EXAM**

***INSTRUCTIONS TO THE CANDIDATES***

* *Write your* ***name****,* ***adm number, class and school*** *in the spaces provided.*
* ***Sign*** *and write the* ***date*** *of examination in the spaces provided*
* *Mathematical tables and silent non-programmable calculators may be used.*
* *This paper consists of* ***section A*** *and* ***section B****.*
* *Answer* ***all*** *the questions in* ***section A*** *and* ***section B*** *in the spaces provided.*
* *All working must be clearly shown.*

**For Examiners Use Only: -**

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| --- | --- | --- | --- |
| **SECTION** | **QUESTION** | **MAXIMUM SCORE** | **CANDIDATE’S SCORE** |
| A | 1-10 | 25 |  |
| B | 11 | 13 |  |
| 12 | 10 |  |
| 13 | 12 |  |
| 14 | 12 |  |
| 15 | 8 |  |
| **TOTAL SCORE** |  | **80** |  |

***This paper consists of 13 printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no question is missing.***

**SECTION A (25 MARKS)**

1. State and explain the effect of polarization in the performance of a simple cell. (2 marks).

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2.Explain why eight dry cells in series cannot be used to start a car engine even though they   
 have the same e.m.f. as the lead acid accumulator (1 mark)

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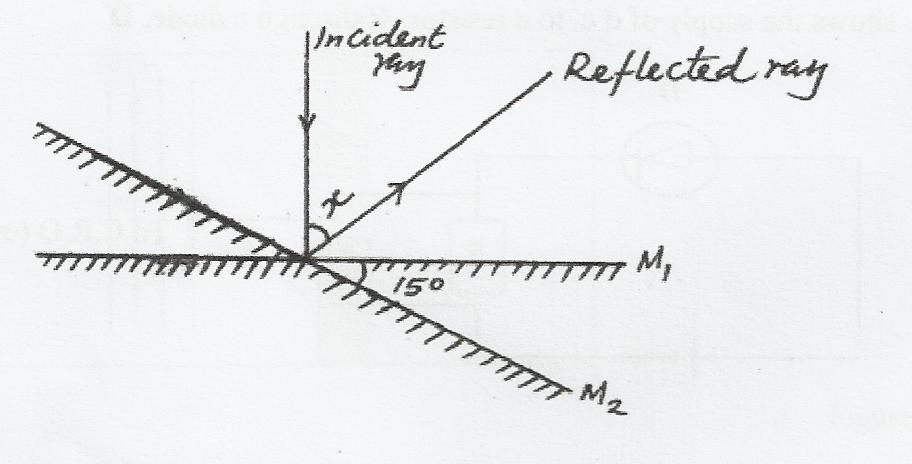
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3. Figure 1.0 below shows a ray of light incident along the normal. The mirror is rotated at an   
 angle of 15o in a clockwise direction without changing the position of the incident ray.

**Fig. 1.0**



Determine the angle between the reflected ray and the incident ray. (2 marks)

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4. A battery of e.m.f E drives a current of 0.25A when connected to a 5.5 Ω resistor. When the5.5 Ω resistor is replaced with 2.5 Ω resistor the current flowing becomes 0.5 A. Find the emf,   
 **E** and the internal resistance, **r**, of the battery. (4 marks)

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5.a). Figure 2.0 shows a motor connected to a magnetic switch called a relay operated by an   
 ordinary switch S1. Use the information in the figure to answer questions that follow.



**Fig. 2.0**

i). Explain how the relay switches on the motor when S1 is closed. (3 marks)

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ii). State with a reason the effect on the motor if the iron core is replaced with a steel core and

switch S1 is put on and then off. (2 marks)

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6. A negatively charged rod is brought near the cap of a leaf electroscope. The electroscope is   
 then earthed momentarily by touching with the finger. Finally, the rod is withdrawn. State and   
 explain the observation made. (2 marks)

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7. State any two ways of in increasing the size of an image formed by a fixed pinhole camera.

(2 marks)

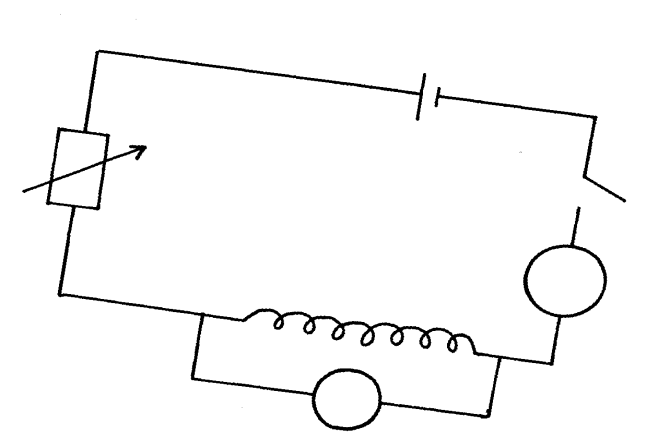
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8. The figure 3.0 below shows a circuit that can be used to verify Ohm’s law



**Fig. 3.0**

**S**

**Rheostat**

**nichrome wire**

**A**

**V**

Explain briefly how the setup can be used to verify ohm’s law (3 marks)

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9.Other than progressive waves travelling in opposite direction at the same speed, state any other

two conditions necessary for the formation of stationary wave (2 marks)

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10.Arrange the following radiations in order of their wavelengths: infrared, blue light, ultraviolet,   
 radio waves, X-rays. (2 marks)

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**SECTION B (55 MARKS)**

11. a) Distinguish between transverse waves and longitudinal waves. (2 marks)

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b) Plane water waves travels from a deep end into a shallow end in a swimming pool at a

velocity of 4m/s. if the wavelength of these waves in deep end is 6cm and in the shallow end

is 1.5cm, determine the velocity of these waves in the shallow end. (3 marks)

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c) State one factor that affects the velocity of sound in a solid. (1mark)

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d) A disc siren with 200 holes is rotated at constant speed making 0.5 revolutions per second. If

air is blown towards the holes, calculate:

i) The frequency of sound produced. (3marks)

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ii) The wavelength of the sound produced if velocity of sound in air is 340ms-1 (2 marks)

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c). State one way of reducing echoes in a room? (1 mark)

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12). a) State one major reason why prisms are preferred over mirrors in periscopes. (1 mark)

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b) Figure 4.0 below shows a ray of light incident on one side of a glass prism. Complete the   
 ray diagram to show how the ray is dispersed. (3 marks)

**Fig.4.0**

Screen

White light

c). Light travels from water at a velocity of 2.26x108 ms-1 and enter glass travelling at a velocity

of 2.0x108ms-1 Calculate the refractive index of glass with respect to water. (3 marks)

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d). In a transparent liquid container, an air bubble appears to be 18cm when viewed from end A   
 and 12cm when viewed from end B as shown in figure 5.0 below. Where exactly is the air   
 bubble. If the length of the tank is 40cm? (3 marks)

**Fig. 5.0**



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13.(a) State two factors that determine the capacitance of a parallel plate capacitor (2 marks)

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(b). Figure 6.0 below shows four capacitors connected to a battery of 12 volts.

**Fig. 6.0**

**2**

**µF**

**5**

**µF**

**8**

**µF**

**12**

**V**

**3.2µF**

Calculate:

i) effective capacitance. (3 marks)

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ii) charge on 3.2F (2 marks)

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iii) p.d across 5F (2 marks)

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iv) the energy stored by 2F (2 marks)

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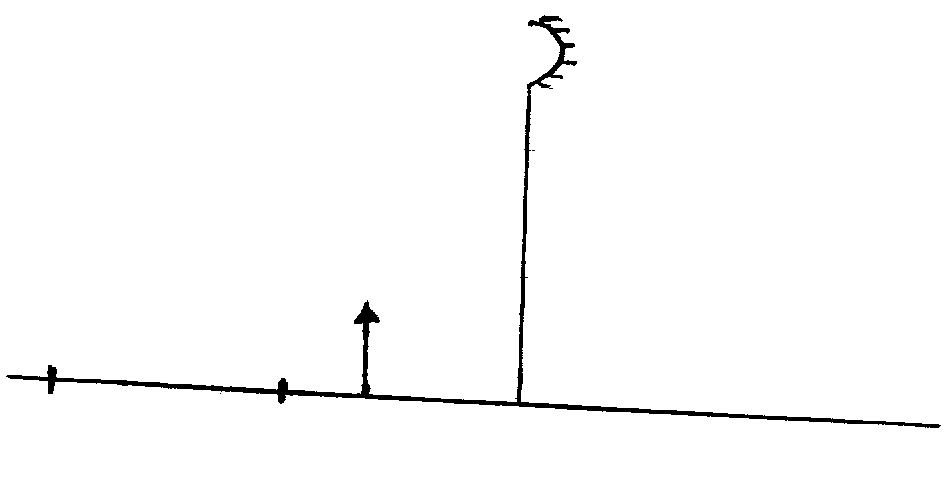
c). Give one application of capacitors (1 mark)

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14a). An object **O** stands on the principal axis of a concave mirror as shown in figure 7.0 below.

**Fig 7.0**



**C**

**F**

**O**

b) By drawing suitable rays, show the position of the image (3 marks)

c). Determine the magnification of the image formed (2 marks)

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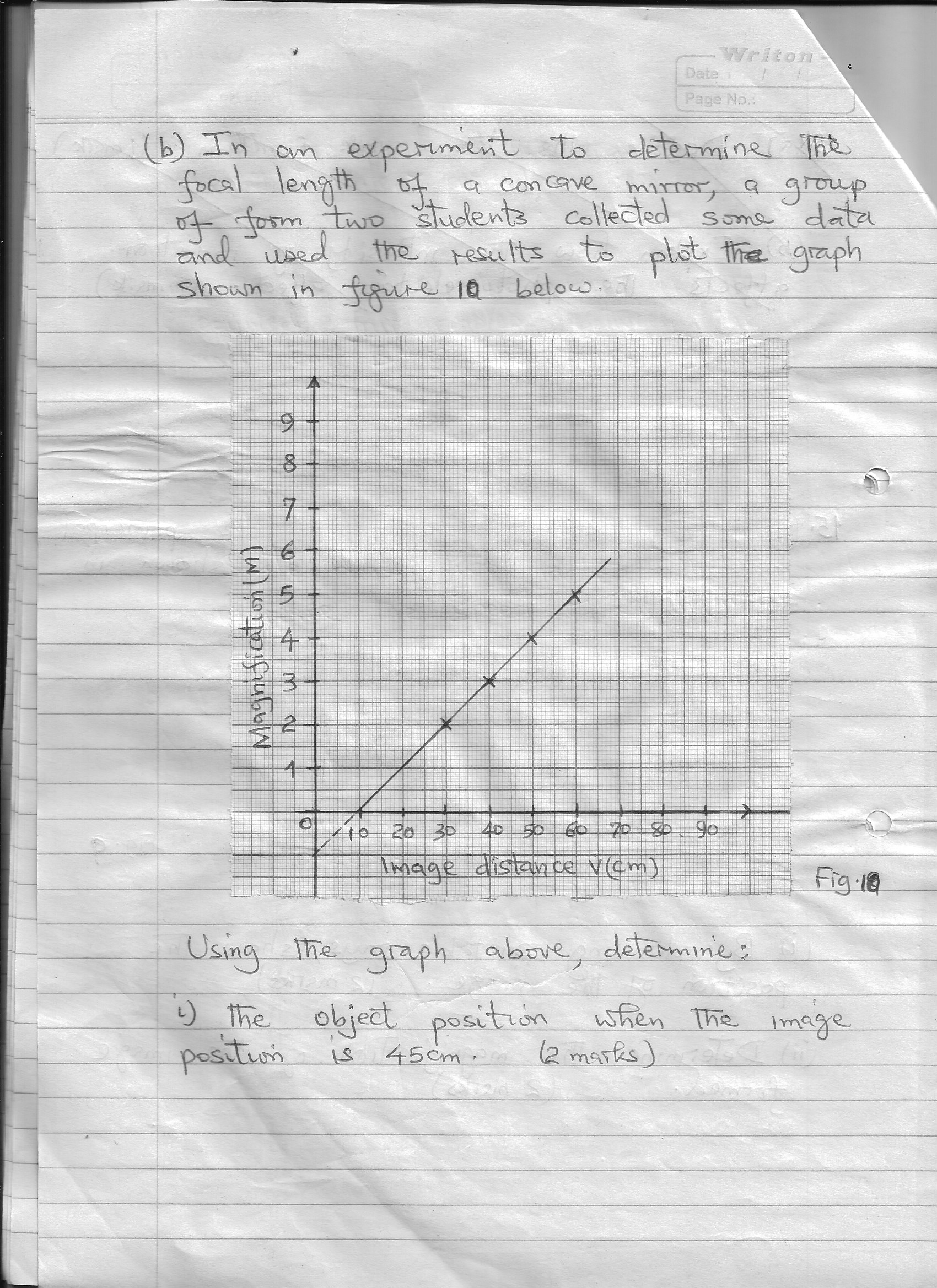
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d). In an experiment to determine the focal length of a converging lens, a group of form

four students collected some data and used the results to plot the graph shown in figure

8.0 below.

**Fig 8.0**



Using the graph above, determine:

(i) The object position when the image position is 45 cm (3 marks)

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(ii) Slope of the graph. (2 marks)

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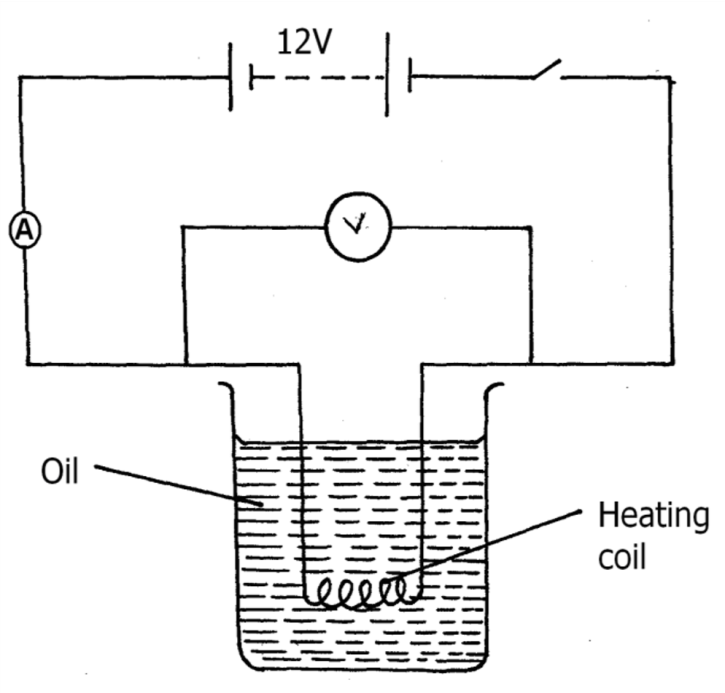
(iii). The focal length of the lens given m = - 1 (2 marks)

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15.) The figure 9.0 below shows a circuit with a coil used to warm oil in a beaker.



**Fig 9.0**

i). Explain how heat is produced in the coil (2 marks)

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ii) Given that the reading of the ammeter is 2.4A determine the resistance of the coil. (3 marks)

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iii). How much heat is produced in the coil in a minute? (3 marks)

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