NAME:………………………………………INDEX NO. …………………ADM NO…............

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PHYSICS PAPER 2
TIME: 2 HRS.

INSTRUCTIONS TO CANDIDATES:

- *Answer all the questions in the spaces provided.*
- *The paper consists of sections A and B.*
- *All workings must be clearly shown.*
- *Mathematical tables and electronic calculators may be used.*

Speed of light = 3.0 X10^{8}ms^{-1}, Density of water is 1gcm^{-3}

FOR EXAMINER'S USE ONLY:

SECTION	QUESTION	MAXIMUM SCORE	STUDENT'S SCORE
A	1 – 12	25	
B	13	13	
	14	17	
	15	11	
	16	14	
TOTAL SCORE		80	

1. State **ONE** similarity and **ONE** difference between a camera and a human eye.   (2 mks)

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2. A girl standing 200m from the foot of a high wall claps her hands and the echo reaches her 1.16

   seconds later. Calculate the velocity of sound in air using this observation.   (3 mks)

3. Calculate the effective capacitance of the capacitors shown in **figure 1** across points X and Y.
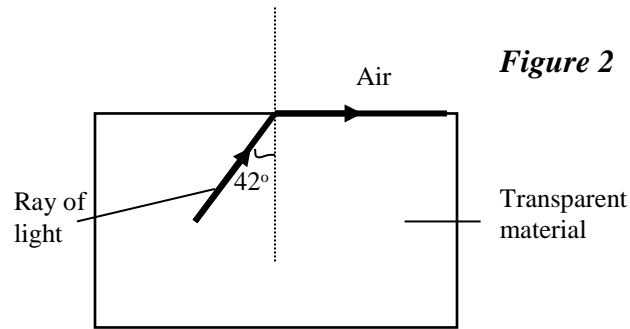
   (2 mks)
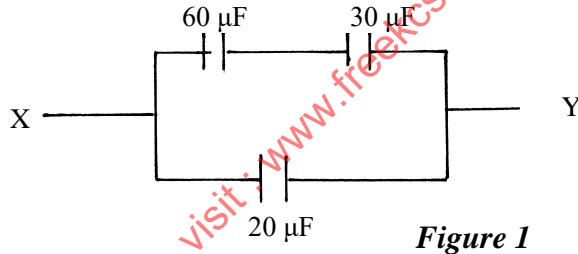
Figure 1

4. A converging lens forms an image on the screen which is three times the object. Determine the
   focal length of the lens if the distance between the object and the screen is 80 cm.   (3mks)

5. State the conditions under which total internal reflection occur.   (2mks)

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6. The following figure shows the path of a ray of light through a transparent material placed in air

Figure 2

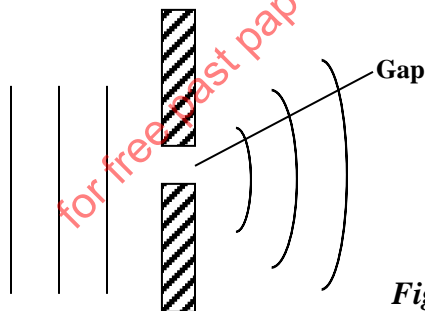Air

42°

Ray of light

Transparent material

Determine the refractive index of the transparent material   (2mks)

7. Give one important use of each of the following waves.

a). X-rays		
b). Infra red		
c). Microwaves		3mks

8. **Figure 3** below shows a wave front before and after passing through an opening as shown.

Gap

Figure 3

State what would be observed on the pattern after passing the opening if ;

   i) Wavelength is increased   (1mk)

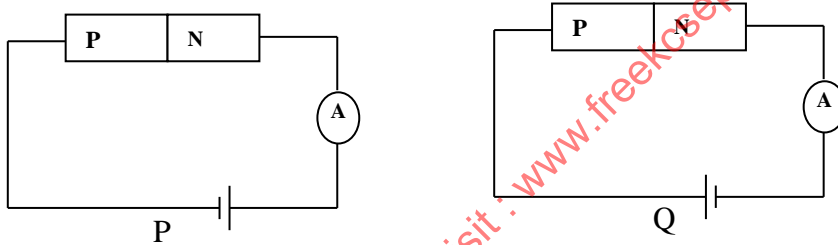   ii) Gap is increased   (1mk)

9. The potential between the anode and the cathode of an x-ray tube is 80kV. Calculate the energy of an electron accelerated in the tube. (2mks)

10. Draw the magnetic field pattern between two wires carrying current as shown in the **figure 4** below. (1mk)

$\otimes$ $\odot$ *Figure 4*

11. The **Figure 5** shown below shows two ways; P and Q of biasing a P-N junction

Figure 5

In which circuit will current flow? Explain this. (2mks)

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12. Give a reason why alpha particles in a cloud chamber cause short, straight and thick tracks. (1mk)

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13. The figure below shows the displacement-time graph of a wave traveling at 400cm/s.
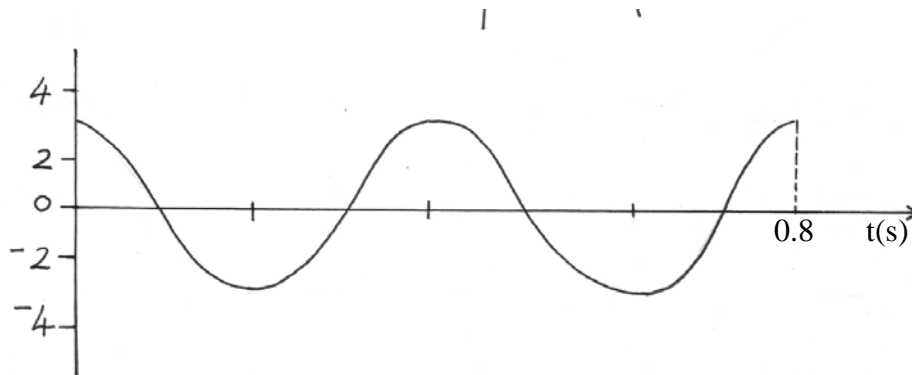
Determine for the wave, the :
(i) Amplitude (1mk)

(ii) Period (1mk)

(iii) Frequency (2mks)

(iv) Wavelength (3mks)

14. a) With an aid of a labelled diagram describe an experiment to determine the focal length of a concave mirror. (4mks)

b) The table below shows the object distance, u, a nd the corresponding image distance , V, for an object placed infront of a concave mirror.

u(cm)	15	20	26	30	50	60
v(cm)	30	20	18.75	15	12.5	12
1/u (cm^{-1})						
1/$_v$ (cm^{-1})						

5

i) Complete the table. (3mks)

ii) Plot a graph of $^1/u$ against $^1/v$.(Use grid provided) (5mks)

iii) From the graph, determine the focal length of the mirror. (2mks)

15. a) State **two** factors that determine the capacitance of a parallel plate capacitor. (2mks)

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b) Three capacitors of capacitance $100\mu f$, 500aF and $400\mu f$ are connected together in a circuit.

i. Draw a circuit diagram to show the arrangement of the capacitors which gives an effective capacitance of $250\mu f$ (3mks)

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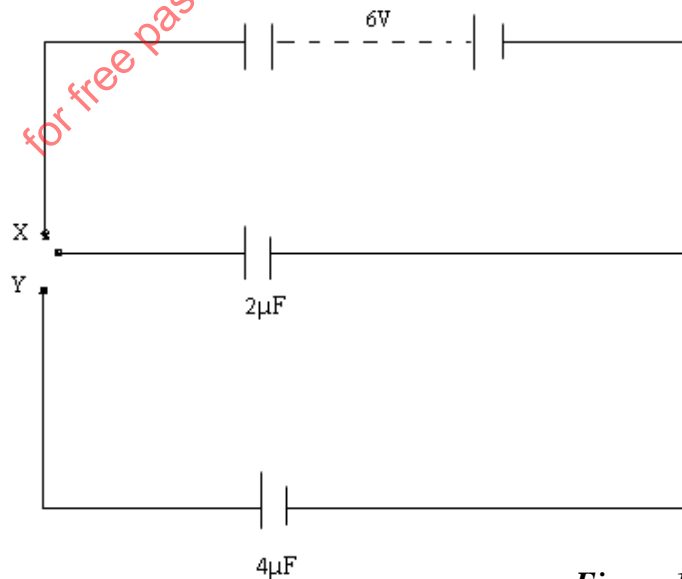...

c) The **figure 10** below shows a circuit where a battery of e.m.f 6V a voltmeter, switches X and Y, two capacitors of capacitance 2 µF and 4 µFare connected.

Figure 10

i.   Determine the charge stored in the 2 µF capacitor when switch X is closed and switch Y is open.   (3mks)

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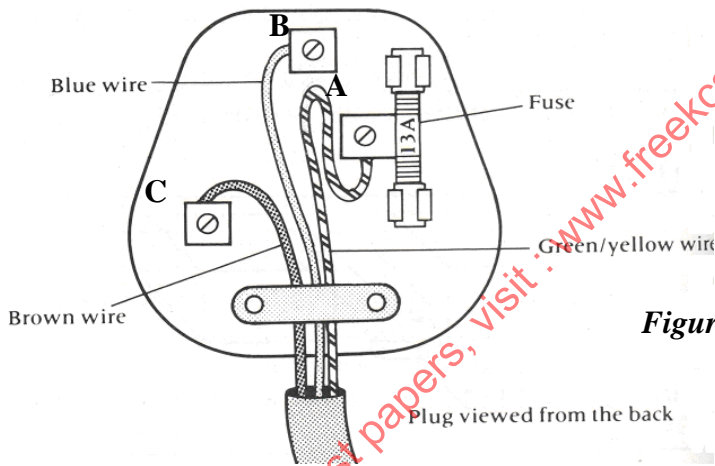
ii.   When switch Y is finally closed and switch X is open, determine the potential difference across each capacitor.   (3mks)

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16.   The **figure 11** below shows a connection to the pin plug.

Figure 11

a)   Name the parts A, B and C   (3mks)

        A -

        B -

        C -

b)   Why is the earth pin normally longer than the two pins?   (1mk)

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c)   What is the purpose of the following?   (2mks)

i). Fuse	
ii). Earthing	

d)   A consumer has the following appliances operating in the laboratory for the times
      indicated in one day

Appliance	time
1. 2 Fluorescent tubes (40W)	12 hrs
2. one 500 W fridge	24 hrs
3. one 3kW electric heater	3 hrs

i) Calculate the total power of the appliances used   (2mks)

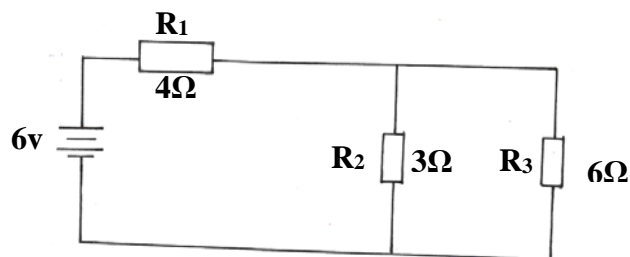ii) If the operating voltage is 240 V. How much current is drawn from the mains?   (3mks)

iii). Calculate the total electrical energy consumed in 20 days, assuming the power consumption per
day is the same.   (3mks)

17.   a) State Ohm's law.   (1mk)
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b) The figure below shows a circuit.

Calculate:
i) The total resistance of the circuit. (3mks)

ii) The total current flowing in the circuit (2mks)

(iii)The current through the 3Ω resistor (3mks)

End