

Name:..... Index No.

School: Date: Sign.....

END OF TERM 1 EXAMINATION 2020

FORM 4

232/2

PHYSICS

PAPER 2

TIME: 2 HOURS

Instructions to candidates;

- ❖ Write your name, index number and name of your school in the spaces provided.
- ❖ This paper consists of two parts **A** and **B**.
- ❖ Answer all questions in section **A** and **B** in the spaces provided.
- ❖ All working **MUST** be shown in the spaces provided after questions.
- ❖ Mathematical tables and electronic calculators may be used.
- ❖ Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

For examiners use only

Section	Question	Maximum score	Candidates score
A	1-12	25	
	13	12	
B	14	14	
	15	14	
	16	15	
	Total score	80	

SECTION A (25mks)

Answer **ALL** questions in this section in the spaces provided after each question.

- 1. What is the purpose of a fuse in domestic wiring system? (1mrk)

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- 2. Use the domain theory to explain briefly why a ferromagnetic material gets saturated when magnetized. (2mks)

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- 3. The **figure 1** below shows an object placed some distance from a biconcave lens.

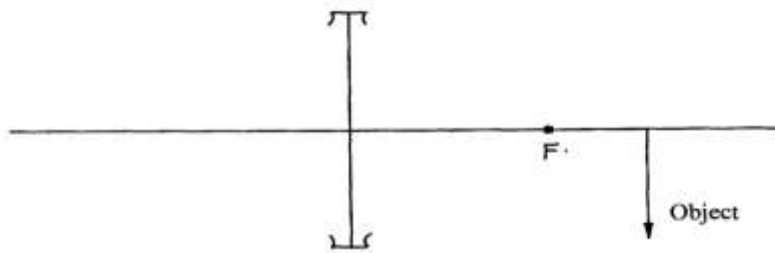


Figure 1

Construct the image on the diagram. (2mks)

- 4. What determines the hardness of X-rays? (1mk)

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- 5. Distinguish between the terms 'photoelectric' and 'thermionic' effect. (2mks)

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6. The **figure 2** below shows a light rod balanced due to the action of the forces shown. Q is a magnet of weight 4N and R is a permanent magnet which is fixed. Determine the force between Q and R and state whether it is attractive or repulsive. (3mks)

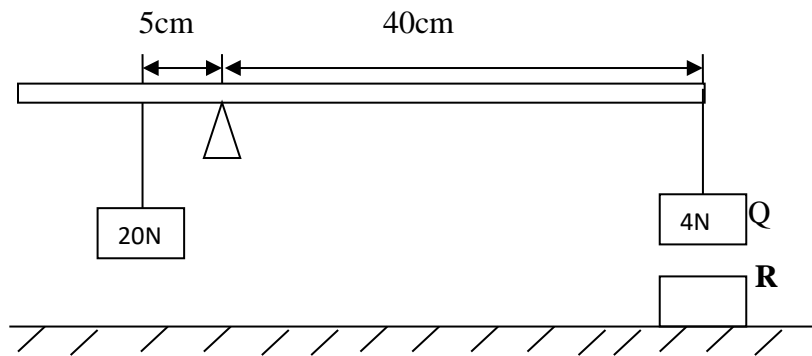


Figure 2

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7. Determine the ammeter reading when the potential difference of 3.0 volts is supplied across PQ in figure 3. (3mks)

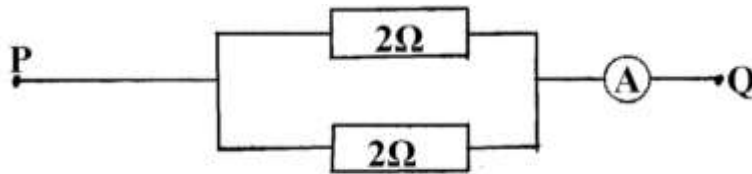


Figure 3

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8. The chart below shows an arrangement of different parts of the electromagnetic spectrum.

Radio	A	Visible	B	X – Rays	Gamma Rays
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Name the possible radiations represented by letter **B**. (1mk)

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9. A student stands at a distance 400m from a wall and claps two pieces of wood. After the first clap the student claps whenever an echo is heard from the wall. Another student starts a stopwatch at the first clap and stops it after the twentieth clap. The stopwatch records a time of 50 seconds. Find the speed of sound. (3maks)

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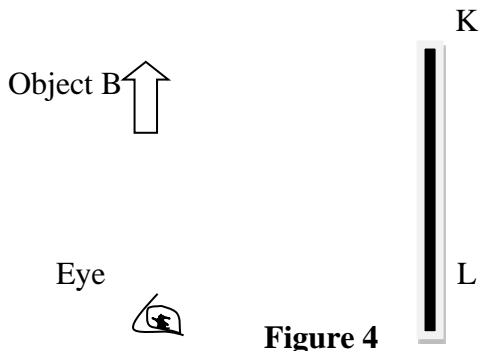
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10. The **figure 4** below shows a plane mirror KL and an object B.



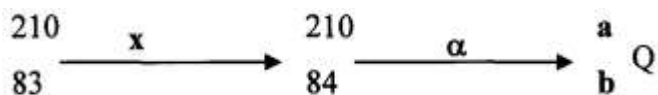
a) Complete the ray diagram to show how the person sees the image. (2mks)

b) State the nature of the image formed. (2mks)

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11. The following equation represents a decay series.



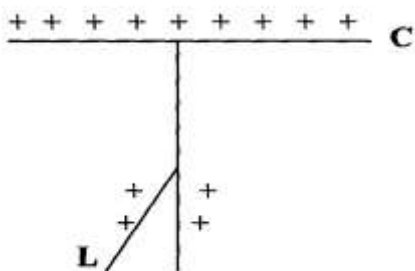
Identify the radiation **x** and determine the values of **a** and **b**. (2mks)

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12. A gold leaf electroscope is positively charged as shown in the diagram below where **C** is the cap and **L** is the gold leaf. State and explain what happens to **L** when a positively charged rod is brought near **C** without touching it. (2mks)



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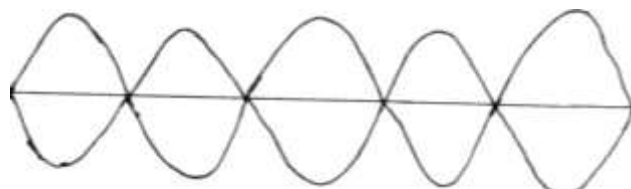
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SECTION B (55 MARKS)

Answer **ALL** questions in this section in the spaces provided after each question.

13. a) Differentiate between transverse and longitudinal waves. (2mks)
 b) **Figure 5** shows a transverse stationary wave along a string



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Figure 5

- i). Label the nodes and antinodes on the diagram above. (2mks)
- ii). If the distance between an anti-node and consecutive node is $1.0 \times 10^{-3}m$, determine the wavelength of the stationary wave. (2mks)

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- c). Five successive wave frequency in a ripple tank are observed to spread a distance of 6.4cm. If the vibrator has a frequency of 8 Hz, determine the speed of the wave. (3mks)

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- d). The **figure 6** below shows a displacement-time graph for a wave motion

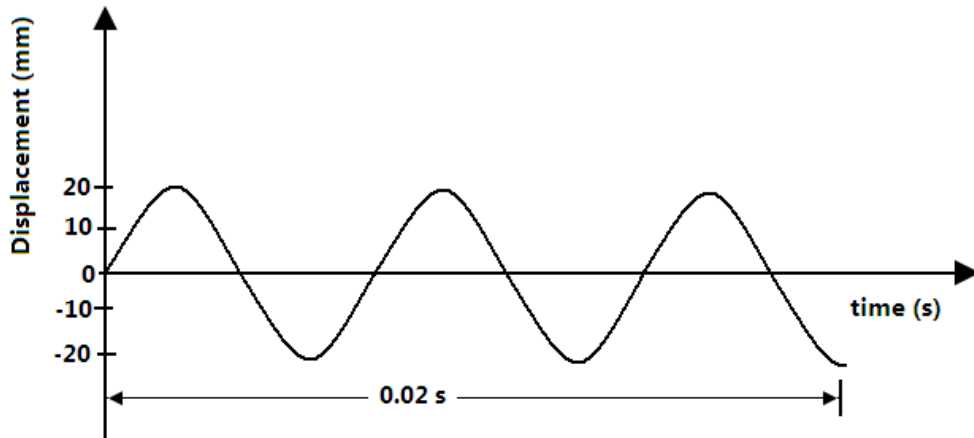


Figure 6

What is the frequency of the wave? (3marks)

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- 14. (a) What do you understand by the term **e.m.f** of a cell?. (1mk)

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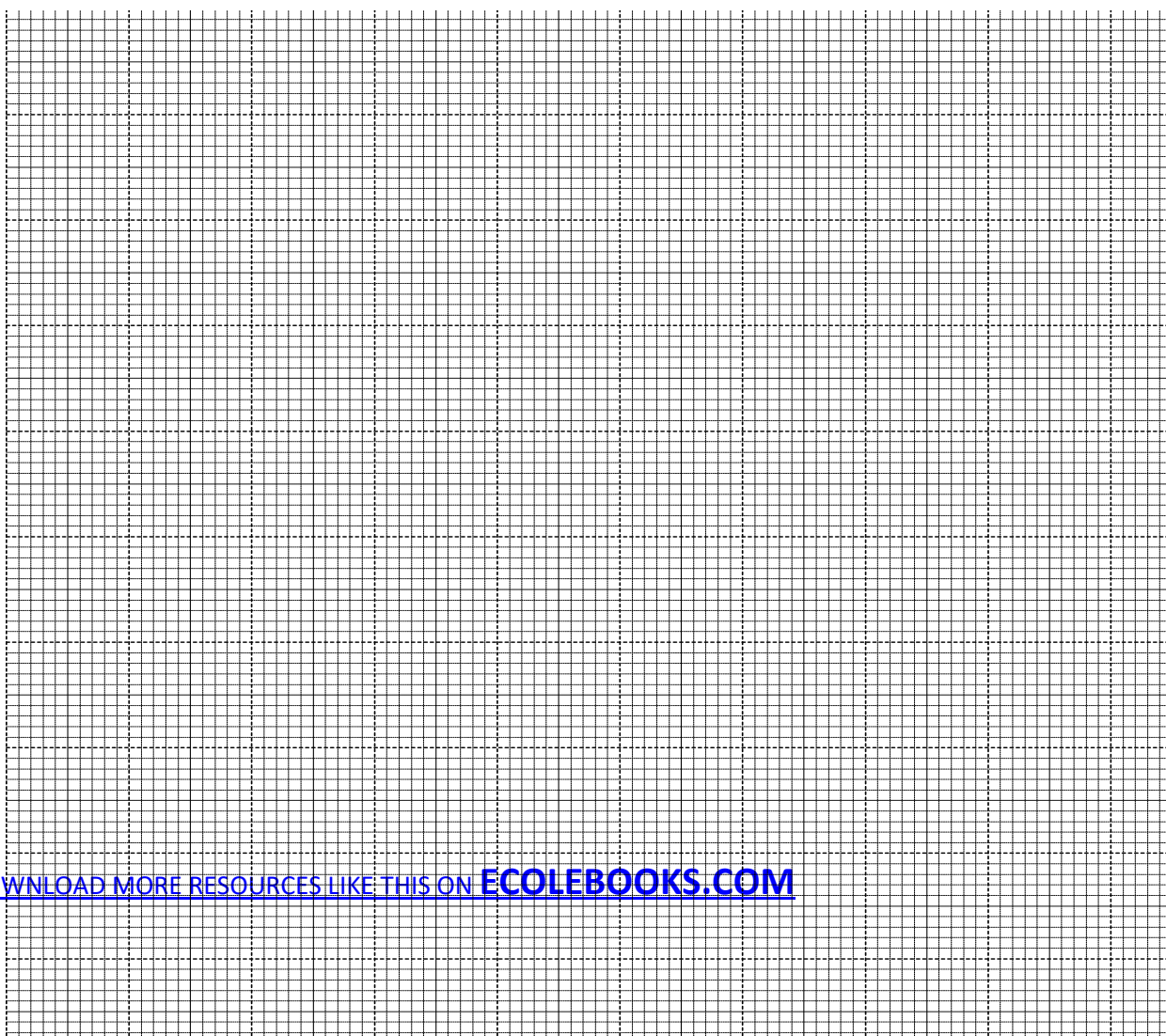
- (b) A cell of e.m.f **E** and internal resistance **r** is used to pass a current through various resistors **R** Ohms and the values of current recorded in the table below.

R(Ohms)	1.6	2.1	2.5	3.6	5.0	8.0
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I(A)	1.0	0.8	0.7	0.5	0.37	0.34
1/i(A⁻¹)						

i. Complete the table for the values of **1/i** giving your answer to 3d.p. (3mks)

ii. Plot a graph of **1/i** versus **R**. (5mks)



iii. Given that the equation $E = I(R + r)$, use your graph to determine the values of E and r . (5mks)

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15. a) State **three** factors that determine the capacitance of a parallel plate capacitor. (3marks)

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b) Three capacitors of capacitance $200\mu f$, $300\mu F$ and $600\mu f$ are connected together in a circuit.

i. Draw a circuit diagram to show the arrangement of the capacitors which gives an effective capacitance of $100\mu f$. (2marks)

c) The figure 6 below shows a circuit where a battery of e.m.f 6V , switches X and Y, two capacitors of capacitance $2\ \mu\text{F}$ and $4\ \mu\text{F}$ are connected.

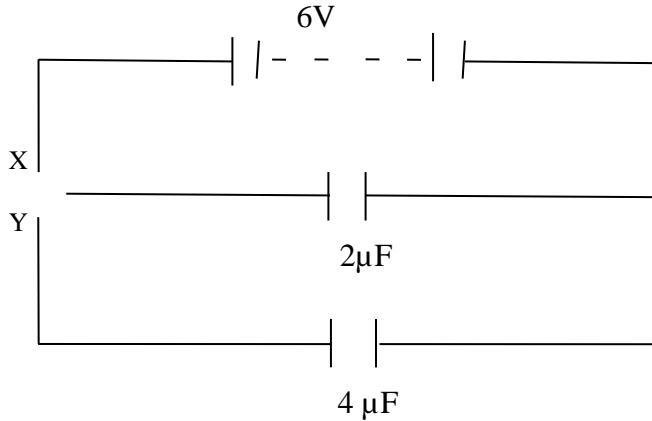


Figure 6

i. Determine the charge stored in the $2\ \mu\text{F}$ capacitor when switch X is closed and switch Y is open. (3marks)

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

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d) Briefly explain how the lightening arrester works. (3mks)

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16. (a) Define the term ‘work function’. (1mk)

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(b) List three factors which affect photoelectric effects. (3mks)

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(c) The table below shows the stopping potential and the corresponding frequencies for a certain photocell.

Stopping potential V_s (V)	0.2	0.6	1.10	1.42	1.83
Frequency f ($\times 10^{14}$ Hz)	4.0	5.0	6.0	7.0	8.0

Plot a graph of stopping potential against frequency. (5mks)



Use your graph to determine;

i) The threshold frequency.(2mks)

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ii) Plank's constant. (Take e to be $1.6 \times 10^{-19}C$) (2mks)

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iii) Work function. (2mk)

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