232/2
PHYSICS
Paper 2
THEORY
Time: 2 hours

PRECIOUS BLOOD KILUNGU
MOCK EXAM

INSTRUCTIONS

*This paper consists of **TWO** sections: **A** and **B**.*
*Answer **ALL** the questions in sections **A** and **B** in the spaces provided.*
*All working **MUST** be clearly shown.*
Mathematical tables and Electronic calculators may be used.

Take: Planck's constant h = 6.63×10^{-34}Js
Mass of electron $m_e = 9.1 \times 10^{-31}$Kg

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Section	Question	Maximum Score	Candidate's Score
A	1 - 12	25	
B	13	13	
	14	11	
	15	11	
	16	10	
	17	10	
TOTAL SCORE		80	

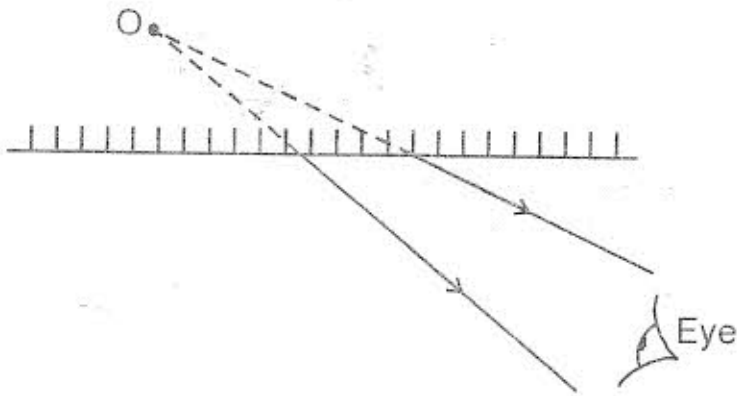
This paper consists of 8 printed pages.

Candidates should check the question paper to ensure that all the pages are printed as indicated and that no questions are missing.

TURN OVER

SECTION A (25MARKS)

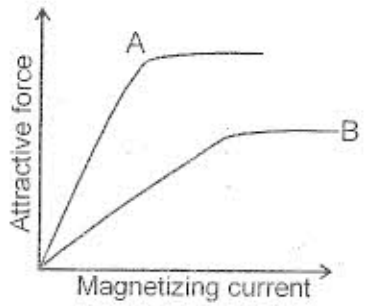
1. The figure below shows an image of an object O as seen by the eye in a plane mirror. Complete the diagram by drawing suitable rays to show the position of the object. (2 marks)



2. Name the two defects of a simple cell. (2 marks)

3. Ripples are sent across a pond as a small floating object goes up and down six times in 15 seconds. If the wave crests are 40cm apart, calculate the speed of the waves across the pond. (3 marks)

4. The graph below shows the relationship between the attractive force of an electromagnet and the magnetising current.



Give a reason for the shape of the curves interms of the domain theory. (2 marks)

5. What current is taken by a 60W 240V electric bulb and what is its resistance. (3 marks)

6. The wavelength of red light in vacuum is 7.7×10^{-7}m and its speed in vacuum is 3×10^{8}m/s. What is its length in glass whose refractive index for red light is 1.5. (3 marks)

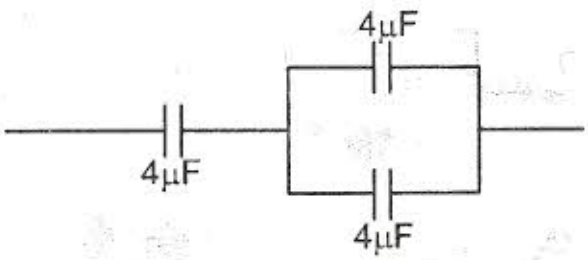
7. Calculate the resistance of a cable of length 6m and diameter 2.0mm if the resistivity of the material of the cable is $2.7 \times 10^{-8}\Omega$m. (3 marks)

8. Arrange the following waves inorder of increasing frequency visible light, Gamma rays, Infra red, Radio waves, U.V radiation, X-rays. (2 marks)

9. Give a reason why mains electricity is transmitted at very high voltages. (1 mark)

10. State **one** reason why a convex mirror is preferred over a plane mirror when used as a driving mirror. (1 mark)

11. The figure below shows three capacitors in a circuit.



Calculate the effective capacitance of the circuit. (2 marks)

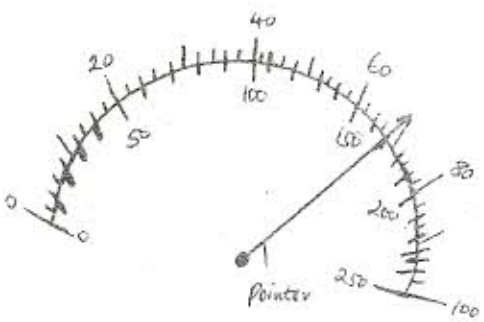
12. When a metal rod is brought near the cap of a negatively charged electroscope, the leave collapse, when the same rod is brought near the cap of a positively charged electroscope the leave still collapse. What is the charge on the electroscope? (1 mark)

SECTION B (55 MARKS)

13. (a) State Ohm's law. (1 mark)

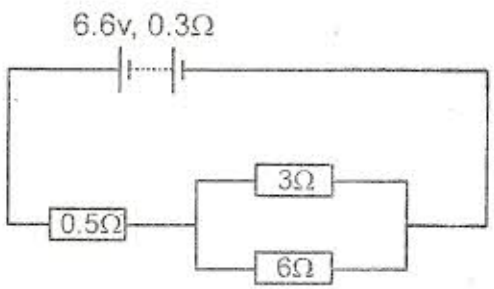
(b) Calculate the resistance of a cable of length 6m and diameter 2mm if the resistivity of the material of the cable is $2.7 \times 10^{-8}\Omega m$. (3 marks)

(c) The diagram below shows a dual scale of ammeter /voltmeter.



What is the reading shown by the pointer for the two scales. (2 marks)

(d) In the circuit shown below, the battery has an emf of 6.6 V and internal resistance of 0.3Ω

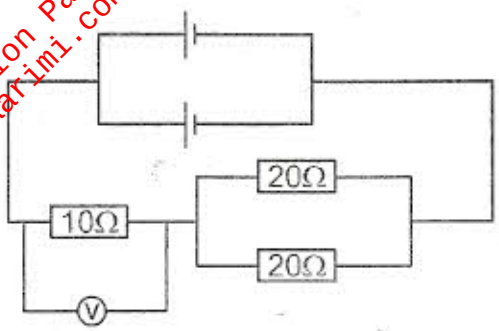


Determine the

(i) Effective resistance. (2 marks)

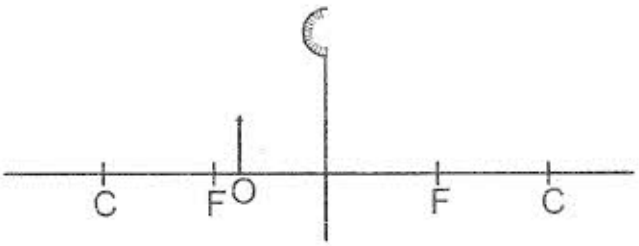
(ii) The total current in the circuit. (2 marks)

(e) The cells shown below have each an emf of 12V and negligible internal resistance.



Determine the reading of the voltmeter. (3 marks)

14. (a) An object O is placed infront of a convex mirror as shown in the figure.



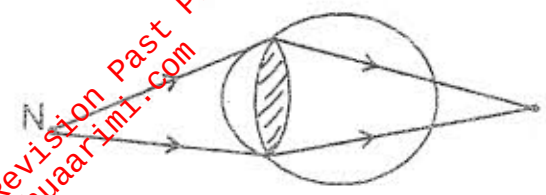
(i) Draw to scale a ray diagram to show the position of the image. (2 marks)

(ii) Determine the magnification of the image. (1 mark)

(iii) State **one** application of a convex mirror (1 mark)

(b) An object placed infront of a convex lens of focal length 10cm produced an image at a distance of 15cm from the lens and on the same side as the object. Determine the position of the object. (3 marks)

(c) The figure below shows a defective eye.

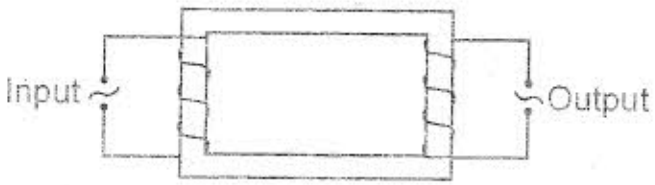


(i) State the cause of the defect. (1 mark)

(ii) What type of lens is used to correct the defect. (1 mark)

(d) State any **two** similarities between the eye and the camera. (2 marks)

15. (a) Figure below shows a step down transformer.



(i) Briefly explain how the transformer works. (2 marks)

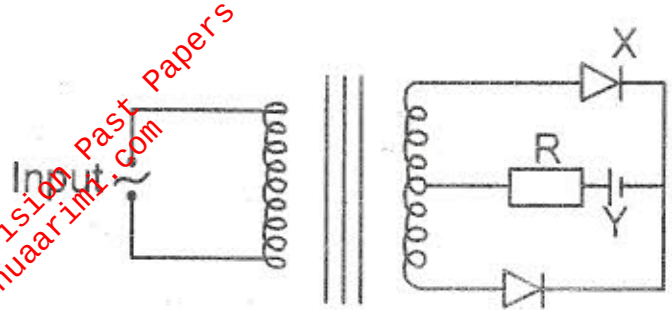
(ii) A power line supplies electrical energy to a transformer at a p.d of 11KV. The transformer supplies the electrical energy to a factory at a p.d of 415V. If the power input to the transformer is 800 KW, calculate the current in the secondary coil if the transformer is 75% efficient. (3 marks)

(iii) The core of the transformer is made of soft-iron and laminated. Give a reason for the

(a) Use of soft-iron. (1 mark)

(b) Lamination of the core. (1 mark)

(b) The figure below shows a smoothing circuit in a full-wave rectifier.



(i) Name the devices marked **X** and **Y** on the diagram. (2 marks)

(ii) On the space provided sketch the p.d output across **R**. (2 marks)

16. (a) The threshold frequency for a metal A is 5.37×10^{14}HZ. When the metal surface is illuminated with a radiation, photoelectrons are emitted with a speed of 7.9×10^{5}m/s. Calculate (plancks constant = 6.63×10^{-34} Js mass of an electron = 9.1×10^{-31} Js)

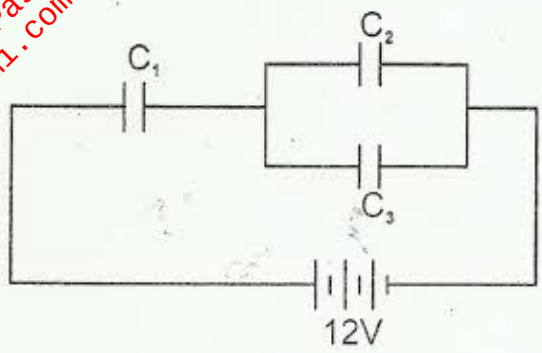
(i) The work function for metal A. (2 marks)

(ii) The kinetic energy of the photoelectrons. (3 marks)

(iii) The frequency of the radiation used. (2 marks)

(b) Give **three** differences between hard and soft X-rays. (3 marks)

17. (a) In the circuit below $C_1 = 4\mu F$, $C_2 = 5\mu F$ and $C_3 = 3\mu F$ and the emf of the cell used is 12V.



Use the circuit to calculate;

(i) The effective capacitance in the circuit (3 marks)

(ii) The charge on the $3\mu F$ capacitor (3 marks)

(iii) The p.d across the $4\mu F$ capacitor. (2 marks)

(b) Give two applications of capacitors. (2 marks)