232/2
PHYSICS
Paper 2
Time: 2 hours

BAHATI GIRLS HIGH SCHOOL
MOCK EXAM

INSTRUCTIONS TO CANDIDATES.

1. Answer **ALL** the questions in the spaces provided after each question paper.
2. Additional papers must not be inserted. All working must be clearly shown where necessary.
3. Candidates will be penalized for recording irrelevant information and incorrect spelling especially of technical terms.
4. All working must be clearly shown where necessary.

FOR EXAMINER'S USE ONLY

| SECTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1	1 - 11	25	
2	12	8	
3	13	15	
	14	10	
	15	10	
	16	12	
TOTAL		80	

This paper consist of 4 printed pages

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

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SECTION A (25 MARKS)

Answer all the Questions in this section.

1. What property of light is illustrated by formation of shadows? (1 mark)

2. The current in a circuit is 48mA. How many electrons each of charge 1.6×10^{-19} coulombs pass a point in one second. (2 marks)

3. The following form part of the electromagnetic spectrum. Visible light, gamma rays, X-rays, radio waves, microwaves. Arrange them in order of increasing wavelength. (2 marks)

4. Distinguish between electromotive force (e.m.f.) and potential difference (p.d.) of a source of current. (2 marks)

5. In the space below draw a diagram to show how the air in a closed pipe vibrates with a frequency of the third overtone. (2 marks)

6. Determine the values of A and Z in the nuclear equation below.

   $$^{238}_{92}U \rightarrow {}^{A}_{Z}X + \text{Beta particles}$$ (2 marks)

7. Distinguish between photoelectric and thermionic emission of electrons. (2 marks)

8. Determine the total energy in the following arrangement of capacitors.
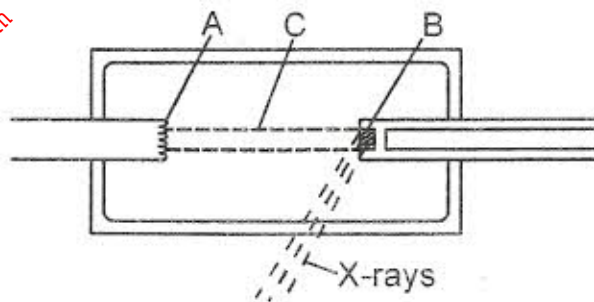
   (3 marks)
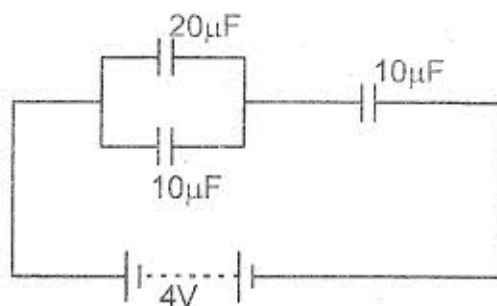
9. A household uses a 1.8kW water heater for 3 hours a day for 31 days. If the cost of electricity is sh 6.70 per kwh, how much will they pay for this consumption? (3 mark)

10. Determine the frequency for an audio signal of wavelength 10^2 metres transmitted from a radio station. (2 marks)

11. Define the term "critical angle". (1 mark)

12. Ada a form 3 girl observes her face in a concave mirror of focal length 90cm. If the mirror is 70cm away, state three characteristics of the image observed (3 marks)

SECTION B (55 MARKS)

Answer All the Questions in this section

13. (a)

(i) The diagram above shows part of an X-ray tube. Name the features labelled.

A

B

C

(ii) State and explain one property of a material that should be used in making part B.

(2 marks)

(b) (i) State two differences between X-rays and cathode rays.

(ii) What is the effect on the wavelength of X-rays when the number of electrons leaving the cathode increases.

(iii) What is the effect on wavelength of X-rays when the p.d. acros the tube is decreased?

(c) Calculate the maximum velocity of electrons that would produce X-rays of frequency 8.0×10^8 H$_3$ if only 20% of their kinetic energy is converted to X-rays. (Take Planks constant to be 6.63×10^{-34}Js)

14. Suppose your are provided with the following apparatus.
   - Metre rule
   - Lens on lens holder
   - Cardboard with cross-wire
   - White screen
   - Source of light

(a) (i) Sketch a diagram to show an arrangement of the apparatus that can be used to obtain various object distance (U) and their corresponding image distance. (v)

(3 marks)

(ii) Describe the experiment that can be done to determine the focal length of the convex lens using the lens formula and the apparatus above. (4 marks)

(iii) Anita a form 4 student drew a graph of $\frac{1}{U}$ against $\frac{1}{V}$ and obtained the axes intercepts as 2.5×10^{-2} cm and 2.3×10^{-2} on respectively. Use this values to determine the focal length (f) of the lens used. (3 marks)

(iv) Determine the power of the lens in (iii) above. (2 marks)

(b) A defective eye focuses a distant object as shown in the figure below.
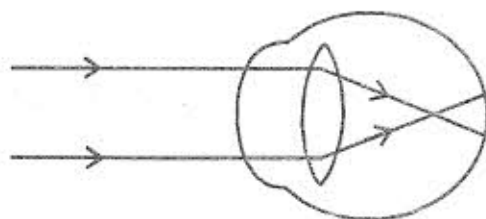
(i) State the defect. (1 mark)

(ii) Suggest a suitable lens to correct the defect. (1 mark)

(iii) Draw a suitable diagram to show the correction of the defect. (2 marks)

15. (a) Explain the term "Mutual induction" (1 mark)

(b) State Faraday's Law of Electromagnetic induction. (2 marks)

(c) State and explain the energy losses experienced in a transformer. (4 marks)

(d) A transformer is used on a 240V a.c. supply the delivery 12A at 120V to a heating coil. If the transformer is 80% efficient;
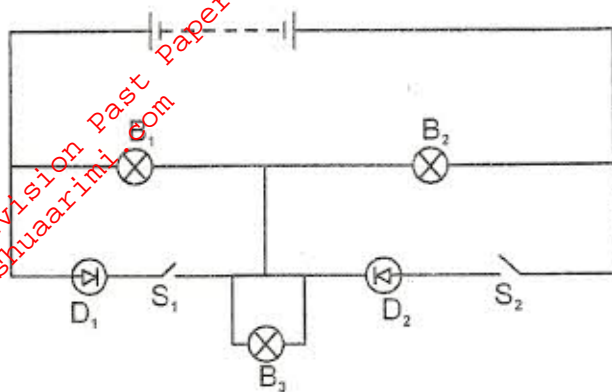(i) What is the current in the primary coil? (3 marks)

(ii) Calculate the energy lost in the transformer. (3 marks)

16. (a) The figure below shows diodes connected in a circuit. (2 marks)

(i) Explain what happens when S_1 and S_2 are closed. (3 marks)

(ii) Explain what happens when only S_2 is closed. (2 marks)

(iii) What is a Zener Diode? Sketch its symbol. (2 marks)

(b) Describe half-wave and full-wave rectification of an a.c. voltage by junction diodes. Use diagrams in your descriptions. (7 marks)