

232/2
PHYSICS
PAPER 2
Time: 2 Hours

**MANG'U HIGH SCHOOL
MOCK EXAM**

Instructions to candidates

- Write your name and index number in the spaces at the top of this page.
- Sign and write the date of examination in the spaces provided
- This paper consists of **TWO** sections: A and B
- Answer **ALL** the questions in section A and B in the spaces provided
- **ALL** working **MUST** be shown.

For Examiner's use only

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 - 13	25	
B	14	17	
	15	11	
	16	14	
	17	13	
	Total	80	

This paper consists of 6 printed pages.

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

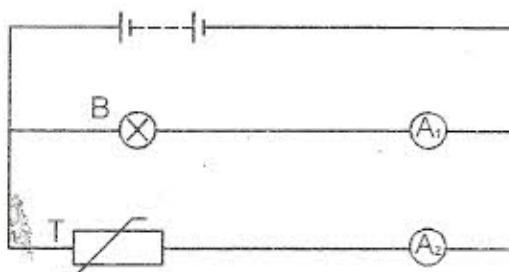
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TURNOVER

SECTION A (25 marks)

Answer ALL the questions in the spaces provided

1. Explain what happens when the cap of a charged electroscope is connected to the cap of an uncharged electroscope using a copper wire. (2 marks)
2. A small object lies at the bottom of a pool of water at a depth of 1.5m. Given that the velocity of light in water is 2.25×10^8 m/s, determine the vertical displacement of the object. (Take the velocity of light in air as 3×10^8 m/s). (2 marks)
3. The distance between a pinhole and the screen of a pinhole camera is 10cm. When the camera is placed 60m away from a tree, a sharp image 3cm high of the tree is formed on the screen. Determine the height of the tree. (2 marks)
4. The diagram below shows a thermistor T and a bulb B connected to two identical ammeters A_1 and A_2

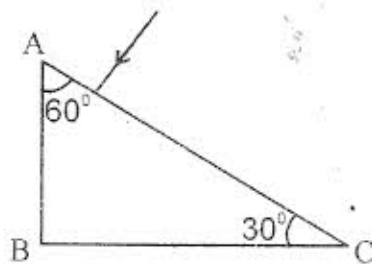


When the switch is closed both ammeters indicate the same reading initially. However as current flows for some time, A_2 increases and A_1 decreases. Explain this observation. (2 marks)

5. Fill in the blank spaces with the names or uses of the electromagnetic radiations. (2 marks)

Type of radiation	Use
	Sending information between satellites
Microwaves	
	Sterilizing medical equipment
Ultra violet	

6. Explain briefly how the following leads to energy being lost in a transformer. (2 marks)
- (a) Flux leakage.
- (b) Hysteresis losses
7. What is meant by the **fundamental frequency** (f_0) of a musical instrument? (1 mark)
8. The work function of tungsten is 4.52eV. Find the cut-off potential when tungsten is illuminated with light of wavelength 2.5×10^{-7} m. (Planck's constant = 6.62×10^{-34} Js, speed of light = 3×10^8 m/s and electronic charge = 1.6×10^{-19} C) (3 marks)
9. Give a reason why power is transmitted at high voltage a long the national grid. (1 mark)
10. The figure below shows a ray of light incident on the surface AC of a right -angled glass prism ABC. The critical angle of the glass is 42° . Complete the diagram to show the path of the ray until it leaves the prism. (3 marks)

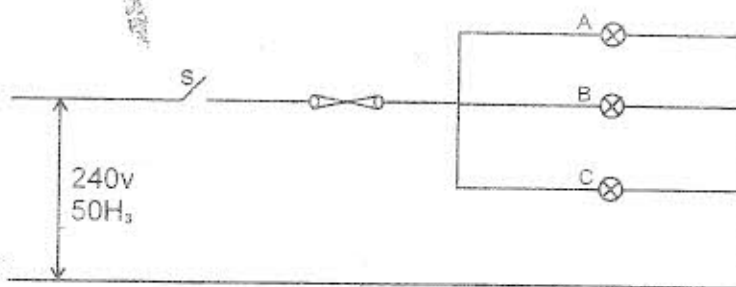


11. An electric heater is rated 15A, 240V. It is used every day for 40 minutes. Calculate the cost of running it per month at Ksh.6.95 per unit (2 marks)
12. The poles of permanent magnets used in electric motors and moving coil instruments are curved. Give a reason for this. (1 mark)
13. Tritium is a radioactive element with a half-life of 12.2 yrs. If the activity of a particular sample of tritium is measured as 800 counts/second, how long will it take the activity of the sample to reduce to 100 counts/second? (2 marks)

SECTION B: (55 marks)

Answer All the questions in the spaces provided

14. (a) The figure below is a wiring system for three identical lamps A, B and C. A and B are each marked 240V, 100W.



- (i) Identify component E. (1 mark)
- (ii) State one property component E must have (1 mark)

(b) When the circuit is closed, all three lamps work and the current through E is 1.45A. Calculate the:

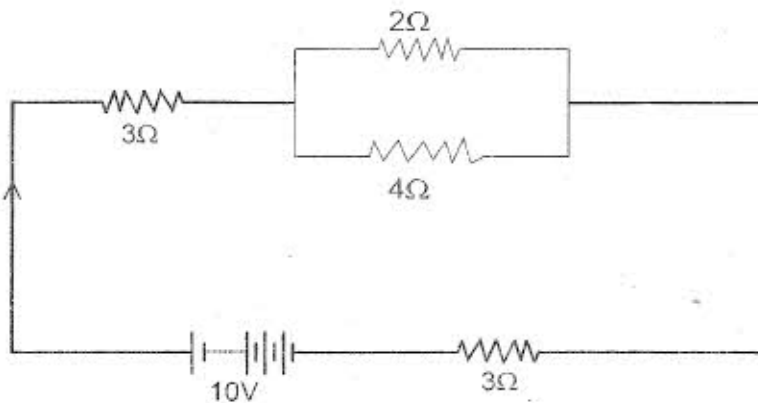
(i) Power of lamp C (3 marks)

(ii) Resistance of the filament of lamp A (3 marks)

(c) An electrician checked the main supply to the lamps using a test meter connected to a cathode ray oscilloscope. He found that the maximum p.d was 250V at a frequency of 50Hz. On the grid below, draw the trace the electrician obtained for a duration of 0.08 seconds. (Y - gain is set at 125V/div) (4 marks)

(d) State two advantages of using a cathode ray oscilloscope as a voltmeter. (2 marks)

(e) The figure below shows three capacitors connected between two points A and B and connected to a 100V supply.



Calculate the energy stored in the 4μF capacitor (3 marks)

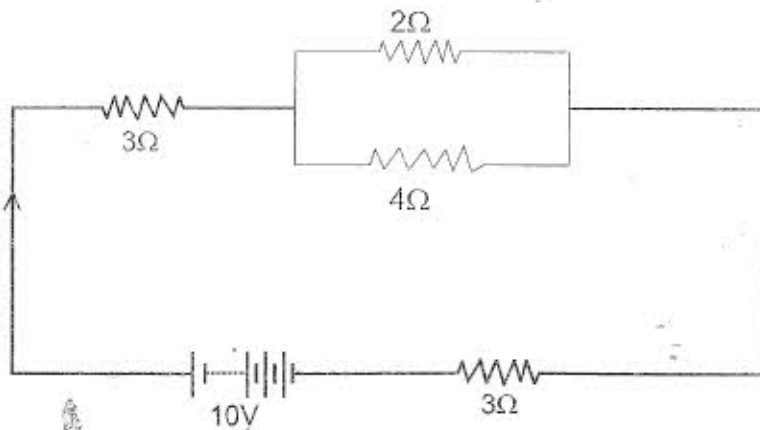
15. (a) You are required to determine the resistance per unit length of a nichrome wire X. You are provided with a d.c. power supply, an ammeter and a voltmeter. Draw a circuit diagram to show how you would connect the circuit (3marks)

(b) (i) State Ohm's law (1mark)

(ii) A filament lamp or a thermistor are Ohmic devices to a certain level. Explain (1mark)

(c) (i) Explain why moving coil meters are unsuitable for use in alternating voltages (1mark)

(ii) Four resistors are connected to a 10V d.c. supply as shown in the figure below



Calculate,

(I) The effective resistance in the circuit (2marks)

(II) The current through 4Ω resistor (3marks)

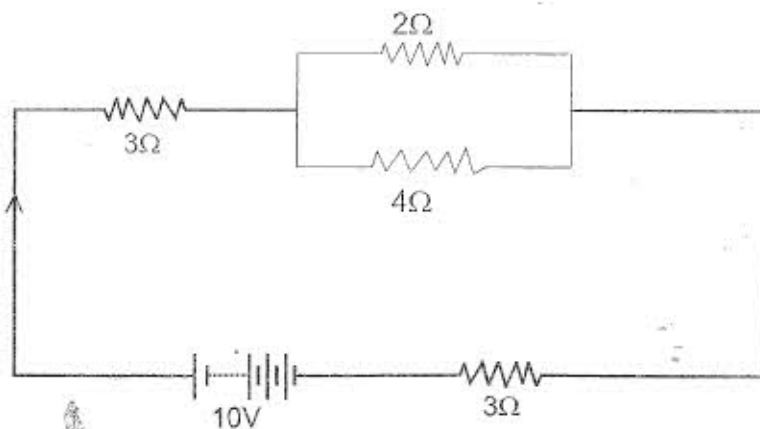
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16. (a) (i) What do you understand by the term **radioactive decay**? (2 marks)

(ii) What are **isotopes**? (2 marks)

(b) Distinguish between nuclear **fusion** and **fission** (2 marks)

(c) A manager of a canning company has at his disposal sources emitting alpha, beta and gamma radiations to use in determining whether or not a tin can is completely filled with pineapples. Which one would you advise him to use and why? (2 marks)

(d) The table below shows the results of an experiment to determine the half-life of a radioactive source.

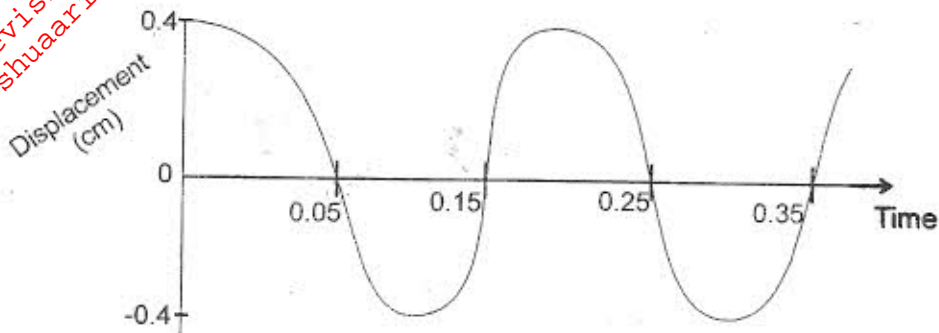
Time (minutes)	0	20	40	60	80	100	120
Counts per second	10000	7420	5340	3960	3060	2190	650

By plotting a graph of counts per second against time in minutes, determine the half-life of the source. (6 marks)

17. (a) Distinguish between a stationary and progressive wave

(2marks)

(b) The figure below shows a displacement time graph of a wave. The velocity of the wave is 40cm/s



Determine the:

(i) Period

(1mark)

(ii) Wave length

(1mark)

(iii) Frequency

(1mark)

(c) (i) The diagram shows a wave front in a ripple tank moving from a deeper part to a shallower part of the tank. AB is the boundary.



Complete the diagram to show the nature of wave after passing through the boundary

(3 marks)

(ii) What are the quantities that change in c (i) above

(2marks)

(d) State three conditions necessary for a stationary wave to be formed.

(3 mark)