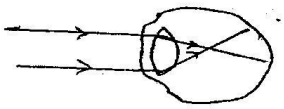
KENYA HIGH SCHOOL MOCK 2020
PHYSICS PAPER 2

SECTION A: (25 MARKS)

1. What property of light is suggested by the formation of shadows (1 mark)

(b) The figure below shows how a distant object is focused on a defective eye



Suggest the nature of the defect and suitable lens to correct the defect (2 marks)

2. State with a reason a suitable metal that is used as a filament in an electric lamp (2 marks)

3. Name one type of electromagnetic radiation that
   (a) Kills cancerous cells

   (b) Ionises air

   (2 marks)

4. State two conditions to be satisfied for total internal reflection of light to take place (2 marks)

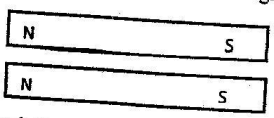
5. (a) State one effect that would be observed when water waves pass from deep water to shallow water
   (1 mark)

   (b) State the condition for a minimum to occur in the interference process of waves
   (1 mark)

6. Explain why alternating voltage is preferred to direct voltage in the national grid transmission system
   (1 mark)

7. When a candle flame is brought near the cap of a changed electroscope, the electroscope discharges. Explain this observation
   (2 marks)

8. The figure below shows two magnets placed such that the like poles are on same side



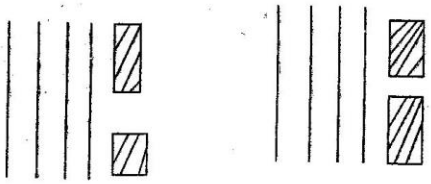
Sketch the magnetic field pattern and indicate any neutral points (2 marks)

9. Sketch a ray diagram to show the image formed when a convex lens is used as a simple microscope (2 marks)

10. State two ways in which polarization reduces the p.d across a simple cell (2 marks)

11. Explain why, in general good conductor of electricity are also good conductor of heat (1 mark)

12. Figures a and b below show two wave fronts approaching opening of different sizes



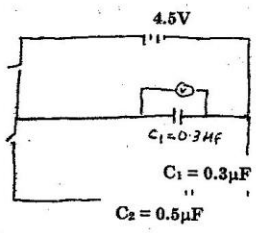
Sketch the appearance of the waves after passing the opening (2 marks)

13. A soldier slanding some distance from a wall blow a whistle and hears its echo 1.8 second later. How far is the wall from the solder(speed of sound in air is 330m/s)

Attempt all the questions in this section in space provided

SECTION B

14. (a) The figure below shows a circuit where a battery of 4.5V switches A and B, two capacitors c1 =0.3μF and C2 =0.5μF and a voltmeter are connected



(i) Determine the charge on C1 when switch A is closed and switch B is open (1 mark)

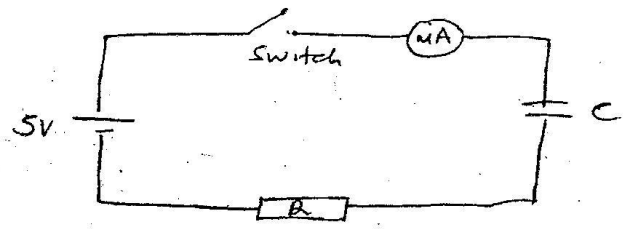
(ii) What is the effective capacitance C1 of the circuit (1 mark)

b) State what is observed on the voltmeter in the circuit when
(i) Switch A is closed and switch B is open (1 mark)

(ii) Switch A is closed and opened and then switch B closed (1 mark)

(iii) Explain the observation made in (b)(ii) above (1 mark)

(c) The following figure shows a circuit consisting of a resistor and a capacitor that may be used to charge a capacitor.



i) State the observations made on the milliameter when the switch is closed. (1mk)

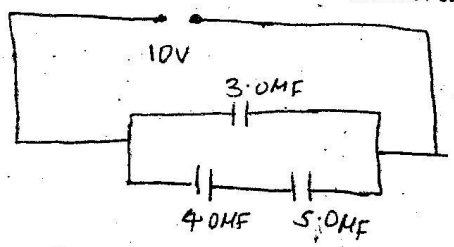
ii) Explain the observation made in (c) (i) above. (1mk)

(d) The circuit in the figure above is left on for sometime. State the value of the p.d across
(i) The resistor R (1 mark)

(ii) The capacitor C (1 mark)

(e) Sketch a graph of potential difference V across R against time t, for a changing capacitor (1 mark)

The following figure shows three capacitor connected to a 10v battery

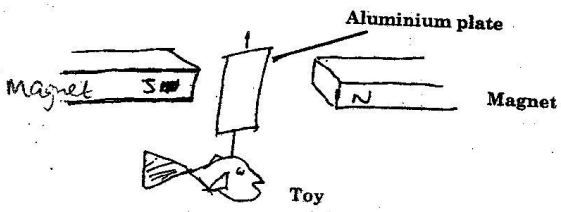


Determine

(i) The combined capacitance of the three capacitors (1 mark)

(ii) The charge on the 5.0 μF capacitor (1 mark)

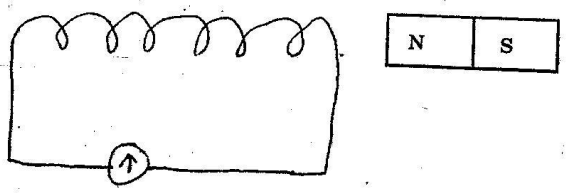
15 a (i) A piece of aluminium plate is placed between two magnet and a toy suspended below the magnet shown



Explain why the galvanometer deflates when the toy is moved (1 mark)

(ii) Name the effect which caused deflection on the galvanometer in 21(a) i above (1 mark)

(b) A bar magnet is moved into a coil with many turn as shown below



(i) State and explain what happens to the galvanometer needle when the magnet Slowly enters the coil

(1 mark)

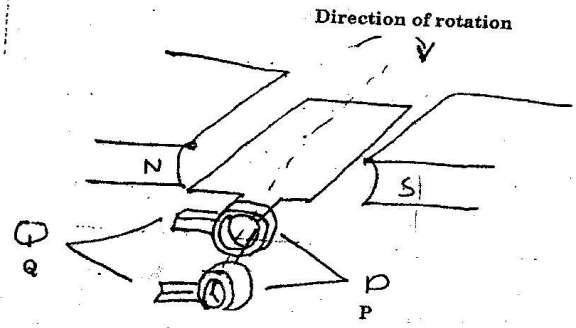
(ii) Remains at rest inside the coil

(1 mark)

(iii) Is rapidly withdrawn from the coil

(1 mark)

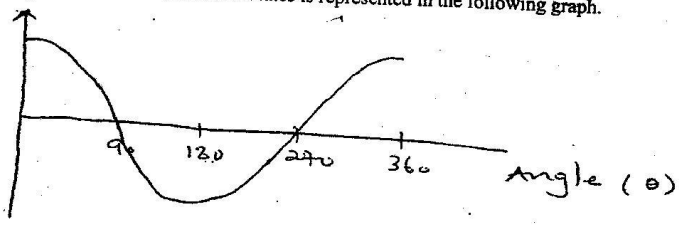
(c) The figure below shows a simple electric generator



(i) Name the parts labeled P and Q

(1 mark)

(ii) The e.m.f generated when the coil rotates is represented in the following graph.



(c) Give reasons for the changes in the e.m.f as the coil rotates from 0° to 90° and from 90° to 180°

(2 marks)

(d) The primary coil of a transformer has 1200 turns and the secondary coil has 60 turns

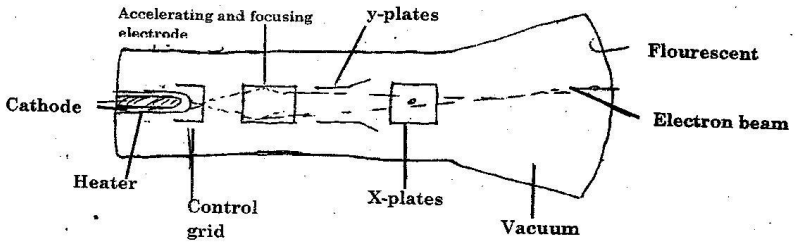
The transformer is connected to a 240v a.c source
Determine

(i) The output voltage (2 marks)

(ii) The output current when the primary coil has a current of 0.5 A. Assume there are no energy losses (2 marks)

16. (a) State two applications of cathode ray oscilloscope (2 marks)

(b) The diagram below shows a cathode ray tube (CRT) of a cathode ray oscilloscope(CRO)



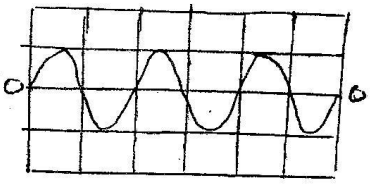
(i) Explain how electrons are produced in the tube (3 marks)

(ii) Explain how the control grid controls the brightness of the spot on the screen (2 marks)

(iii) Why is it necessary to earth the screen (2 marks)

(iv) It is possible for x-rays to be produced in this tube. Explain (2 marks)

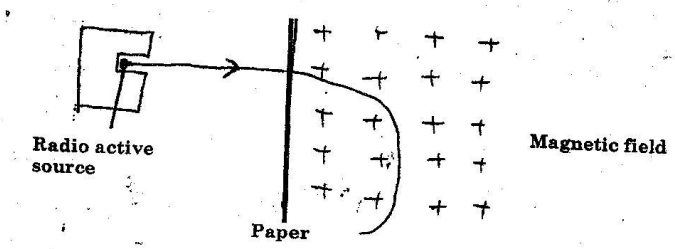
(c) The diagram below shows the appearance of a signal on a CRO screen



Sketch the appearance of the signal if the p.d of the source is doubled and the frequency halved

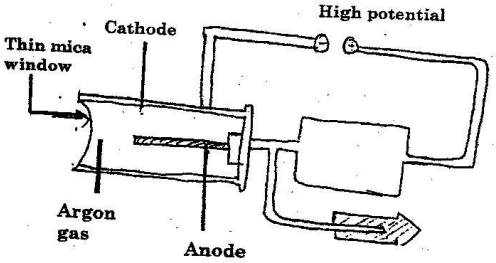
(2 marks

17. (a) The figure below show the path of radiation from a radioactive source after entering a magnetic field. The magnetic field is directed perpendicularly to the plane of a paper shown.



Identify the radiation and give a reason for your answer (1 marks)

(b) The figure below shows a geiger –Muller tube (G-M)



(i) Give a reason why the mica window is made thin (1 mark)

(ii) State the effect of the radiation on the low pressure gas inside the tube (1 mark)

(iii) Explain how the large discharge current is created (1 mark)

(iv) Explain how radiation entering the tube through the mica window is detected in the tube (1 mark)

(v) What is the purpose of the halogen vapor (1 mark)

(c) State the effects on the electrons emitted by photoelectric effect when

(i) The intensity of incident radiation is increased (1 mark)

(ii) The frequency of the incident radiation is increased (1 mark)

(d) The maximum wavelength of light required to cause photoelectric emission on a metal Surface is 8.0×10^{-7} m. The metal surface is irradiated with light of frequency 8.5×10^{14} HZ

Determine

(i) The threshold frequency (2 marks)

(ii) The work function of the metal in electron volts (2 marks)

(iii) The maximum kinetic energy of the emitted electrons
$V = 16 \times 10^{-19}$, $c = 3.0 \times 10^{8}$m/s, $h = 6.62 \times 10^{-34}$ (2 marks)

18 (a) Sketch a current- voltage characteristic graph of a junction diode (p-n junction) with a forward bias connection (2 marks)

(b) p-type and n – type semiconductor are made from pure semi- conductor by a process known as doping

(i) What is meant by doping (1 mark)

(ii) Explain how the doping process produces a n-type semiconductor (2 marks)

(c) Draw a circuit diagram to distinguish between forward and reverse bias modes of a p-n junction diode (2 marks)