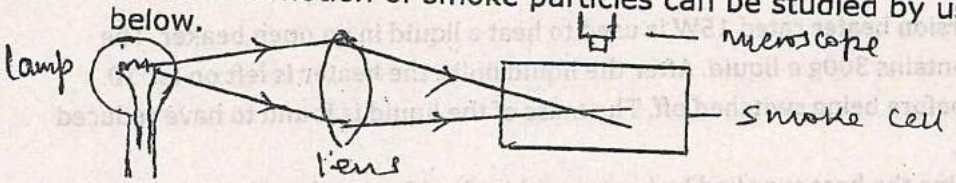
SECTION B: 55 MARKS

12. Bowman's motion of smoke particles can be studied by using the apparatus show below.



(a) Explain the role of the smoke particles, lens and microscope in the experiment (3mks)

(b) State and explain what kind of motion is observed within the smoke cell (2mks)

(c) State what will be observed if the smoke cell is kept in a very cold environment and the experiment repeated (1mk)

(d) Explain briefly why liquids have constant volumes but no constant shapes (2mks)

(e) Compare the motion observed on smoke in smoke cell with what would be observed with dust particle suspended in water and viewed with a powerful microscope. (2mks)

13. (a) Define the term specific latent heat of vaporization of a substance. (1mk)

(b) An immersion heater rated 15W is used to heat a liquid in an open beaker. The beaker contains 300g o liquid. After the liquid boils, the heater is left on for 10 minutes before being switched off. The mass of the liquid is found to have reduced to 296.5g.

i) Determine the heat supplied by heater within the 10 minutes of boiling. (3 mks)

ii) Determine the specific latent heat of vaporization of the liquid. (3 mks)

iii) Explain why this method of determination of latent heat of a substance may not be accurate. (2 mks)

14. (a) State the archimede's principle. (1 mk)

(b) A rectangular block of cross-sectional area of $0.08m^2$ s immersed in a liquid of density $1200kg/m^3$. The top and lower surfaces of the block are 20cm and 80 cm below the surface of liquid respectively.

i) Determine the downward force on the top surface of the block. (3 mks)

ii) Find the upward force on the lower surface of the block. (3 mks)

iii) Calculate the upthrust on the block. (2 mks)

c) Explain why bodies in circular motion undergoes acceleration even when the speed is constant (1mk)

d) A particle moving along a circular path of radius 5cm describes an arc of length 2cm every second. Determine

i) Its angular velocity (2 mks)

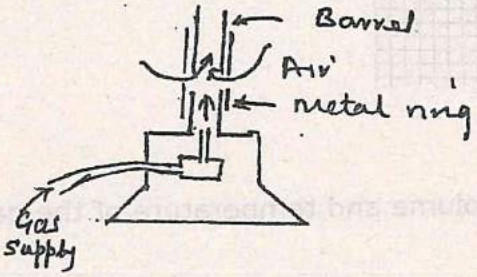
ii) Its periodic time (2 mks)

iii) Number of evolutions per second (1 mk)

e) A stone of mass 40g is tied to the end of a string 50cm long and whirled in vertical circle at 2 revolutions per second; calculate the maximum tension in the string. (3 mks)

15. (a) A liquid if flowing though a tube of different cross-sectional areas A_1, A_2 and A_3 with velocities V_1, V_2 and V_3 respectively. (2 mks)

b) The figure below shows a Bunsen burner is operation with air hole open



i) Explain how air is drawn into the barrel when the gas supply is opened. (2 mks)

ii) State the purpose of metal ring. (1 mk)

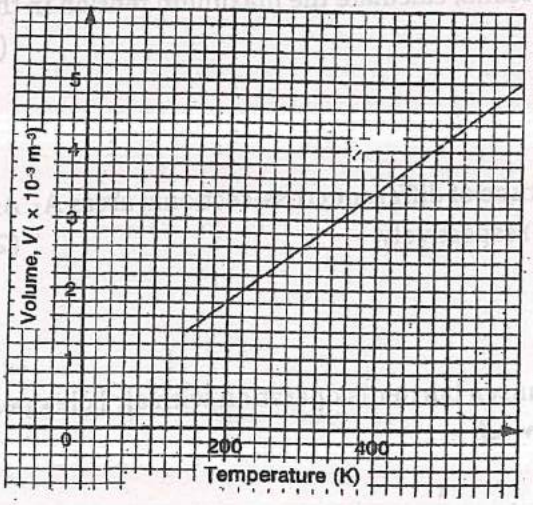
c) A pipeline has 15cm diameter to one point and 7.6cm diameter at another point. If the speed of water in the wider section is 1.2m/s. Determine

i) Speed of water in narrow section (3 mks)

ii) Rate of discharge (2 mks)

16. (a) Define the term absolute zero temperature (1mk)

(b) A mass of a gas was put in a container whose one end was closed with a movable piston. The temperature of the gas was gradually changed while the pressure was held constant. The values of volume at different temperatures were noted. The graph below shows the volume against temperature for the gas.



(a) State the law that relates the volume and temperature of the gas as shown on the graph above. (1mk)

(b) Given that PV=0.831T where P is the pressure of the gas, determine the value of P (2mks)

(c) A tank contains a gas at pressure of 8×10^5 pa and a temperature of 288K. The gas is heated until its pressure rises to 8×10^6pa. Find the new temperature of the gas given that the volume is constant. (3mks)

(d) Using Kinetic theory of matter, explain why, the pressure of a gas rises when volume is reduced (2mks)

MANG'U HIGH SCHOOL

NAME: .....

ADM No.: ..... CLASS: .....

232/2
PHYSICS
PAPER 2
2 HRS
PRE - MOCK
MARCH

INSTRUCTIONS TO CANDIDATES

(i) Write your name and admission number in the spaces provided above.
(ii) This paper consists of **TWO** Sections: **A** and **B**.
(iii) Answer **ALL** questions in Section A and B in the spaces provided.
(iv) All working **MUST** he clearly shown in the spaces provide in this booklet.
(v) Mathematical tables and Electronic calculators may be used.
(vi) This paper consists of **9 printed pages**. Check the question paper to ascertain that all pages are printed.

SECTION A: 25 MARKS

Answer ALL questions in the spaces provided on the question paper.

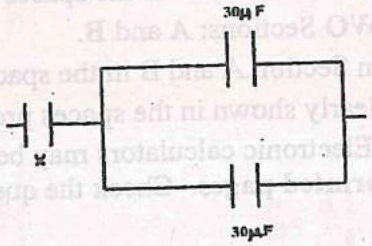
1. Photo electrons emitted by a certain metal surface constitute a "Photo current". State the effect of increasing the intensity of illumination on the magnitude of the "photo current" (1mk)

2. Sketch a displacement – time graph for a wave with an amplitude of 1m and a frequency of 5HZ (3 mks)

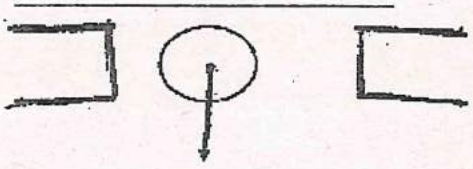
3. State two differences between the eye lens and the lens of a camera. (2 mks)

4. Define polarization as used in simple cells and state how it can be minimized. (2 mks)

5. The figure below shows an arrangement of three components. If the total capacitance of the capacitors is 5μf, calculate the value of x. (3 mks)



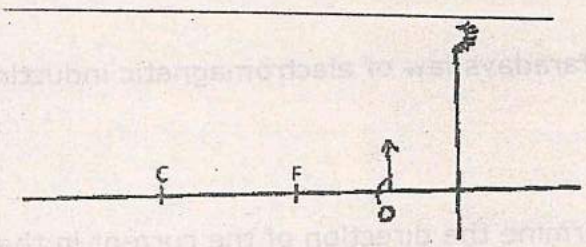
6. The figure below shows a wire in a magnetic field. When a current is switched on to flow through the wire, it moves as shown by the arrow. Draw and indicate the direction the magnetic field. (2 mks)



7. An accelerating potential of 2kV is applied to an X-ray tube. Calculate
   i) The kinetic energy of the electrons emitted (3 mks)

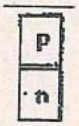
   ii) The velocity of these electrons (take the charge on an electron to be 1.6×10^{-19} C and the mass of an electron to be 9.0×10^{-31} Kg) (2 mks)

8. An object O is placed in front of a concave mirror and on the principal axis, as shown in the figure **below**. Complete the light ray diagram to locate the position of the image. (3 mks)



9. You are given three resistors of values 5Ω, 8Ω and 12Ω. Show in circuit diagram how you would connect them so as to give an effective resistance of 9.8Ω. (3 mks)

10. The figure below shows a block diagram of a p-n junction diode



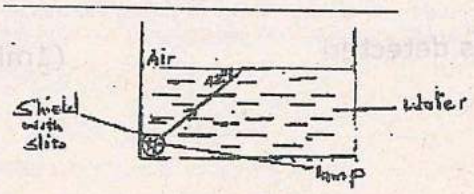
11. On the same diagram, show how a cell may be connected to make it reverse biased

SECTION B (55 MARKS)

Answer ALL questions in the spaces provided on the question paper

12. (a) (i) State snell's law (1 mk)

ii) The diagram below shows a transparent tank containing water. An electric lamp covered with shield which has narrow slit is fixed at one corner of the tank. A light ray from the slit reaches the water surface at an angle of 42o as below $n_w = 1.33$

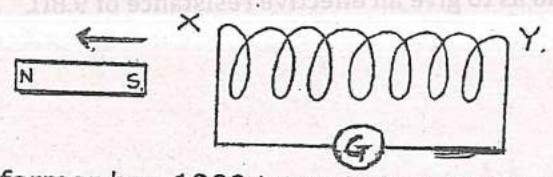


iii) Determine the angle of refraction for the ray (2 mks)

(iv) Determine angle of indence for which the angle of refraction is 90° (2mks)

(b) (i) State faradays law of electromagnetic induction (1mk)

(ii) Determine the direction of the current in the coil in the set up below. Label the polarity at the points marked X and Y (2mks)



(iii) A transformer has 1000 turns in its primary coil, which is connected to a 250V a.c supply. The secondary coil is connected to an ammeter via a 100 Ohm resistor. Determine the number of turns in the secondary coil of the ammeter reads 1.5A (3mks)

13. (a) The figure below is part of the electromagnetic spectrum in order of increasing wavelength

A	B	C	Visible light	Infrared radiation	D	E

(i) How are waves B produced (2mks)

(ii) State two uses of the waves (2mks)

(iii) Explain how are infrared waves detected (1mk)

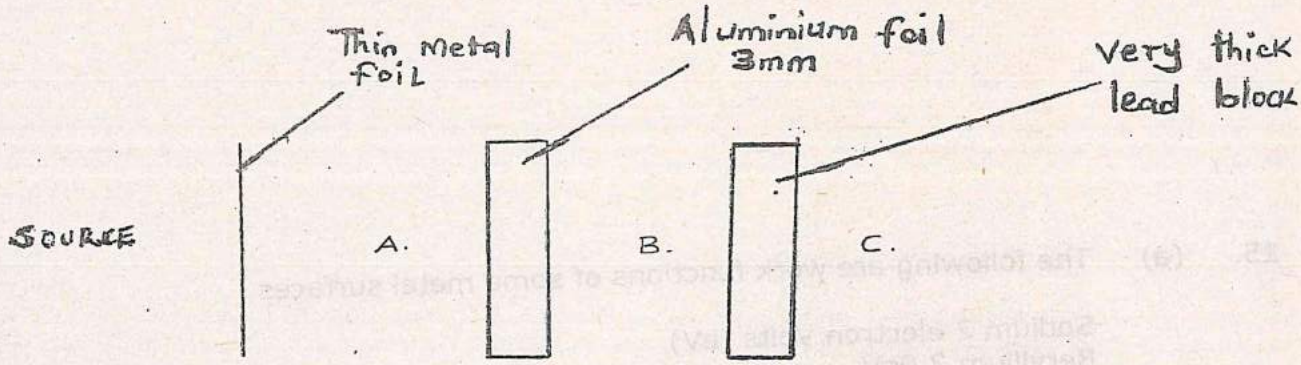
(b) (i) State the reason why the speed of sound is greater in a solid than in air? (1mk)

(ii) An echo sounder produces a pulse and an echo is received from the seabed after 0.4 seconds. If the speed of sound in water is 1500m/s. Calculate the depth of the seabed. (2mks)

14. (a) What is meant by background radiation (1mk)

(b) A 32 g sample of a radioactive substance was reduced to 2 g in 96 days. How much would remain after another 96 days. (3mks)

(c) Americium-241, strontium -90 and cobalt-60 are known sources of alpha, beta particles and gamma rays respectively. All the three sources are placed in front of the obstacles shown below



I) An attempt is then made to detect the particles/radiations at points A,B and C using a Geiger-Muller. Which particle(s)/radiations are detected at points (3mks)

A _____ B _____

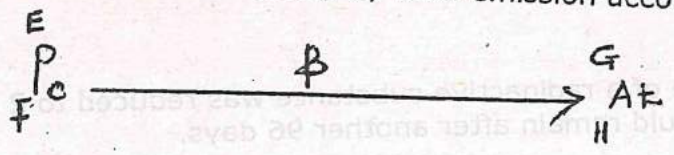
C _____

(II) State two dangers of radioactive emissions (2mks)

(d) Radium (Ra) 226 decays by alpha emission to Radon (Rn). The atomic number of Ra is 88.

(i) Write down an equation to show this decay (2mks)

(ii) Rn is radioactive and decays by alpha emission to polonium (Po) while Po can decay by beta emission according to the equation



Determine the values of (3mks)

E , F, G

15. (a) The following are work functions of some metal surfaces

Sodium 2 electron Volts (eV)
Beryllium 3.9eV
Magnesium 2.8eV

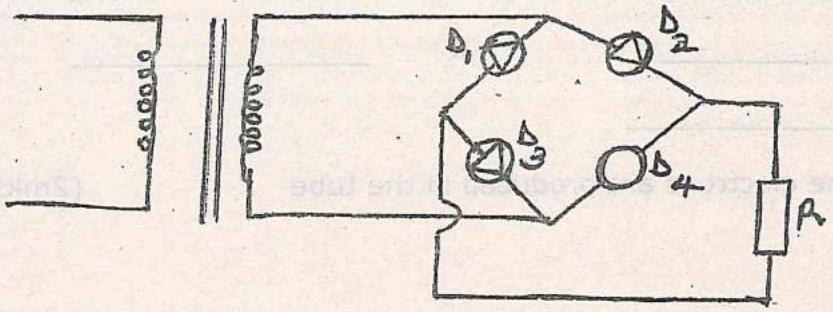
(i) Define 'work function' of a surface? (1mk)

(ii) Find work function of magnesium in joules (1mk)

($e=1.6 \times 10^{-19}c$)

(iii) Determine the threshold wavelength for Beryllium (3mks)

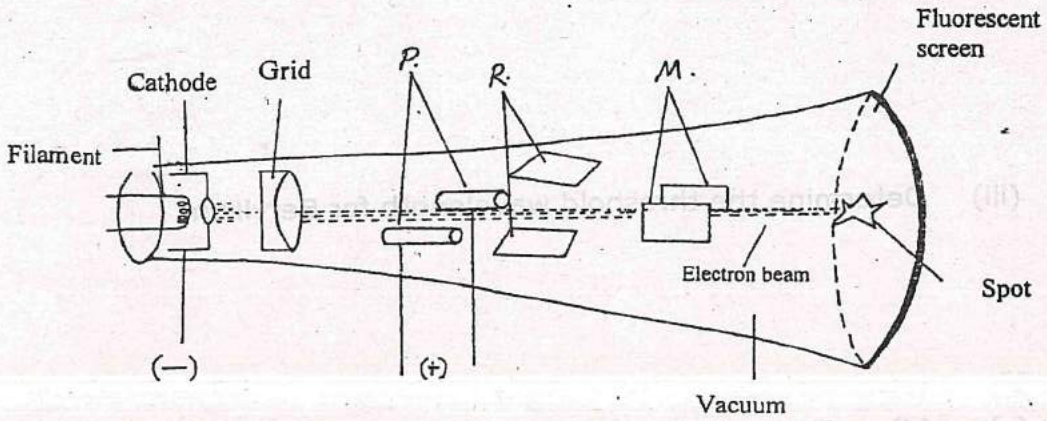
(c) (i) Fix adiode in the circuit to show full wave rectification (1mk)



(ii) Explain how doping produces a p-type semiconductor. (3mks)

16. (a) Define the term thermionic emission. (1mks)

(b) The figure below shows the main components of a cathode ray tube. Use it to answer the questions that follow



(i) Name the parts labelled P,R,M (3mks)

P _____ R _____

M _____

(ii) Explain how the electrons are produced in the tube (2mks)

(iii) State and explain the function of the grid (2 mks)

(iv) State and explain what would be observed on the screen if an a.c.voltage is connected across the y- plate (1mk)

(v) State how the deflection system of a television differs from that of a C.R.O. (1mk)

MANG'U HIGH SCHOOL

NAME: .....

CLASS: ..... **ADM NO**..... **KCPE MARKS:** .....

232/3
PHYSICS PRACTICAL
PAPER 3
PRE MOCKS
MARCH
TIME: **2 ½ HOURS**

INSTRUCTIONS TO CANDIDATES

(a) *Write your name and index number in the spaces provided above.*
(b) *Sign and write the date of examination in the spaces provided above.*
(c) *Answer ALL the questions in the spaces provided in the question paper.*
(d) *You are supposed to spend the first 15 minutes of the 2½ hours allowed for this paper reading the whole paper carefully before commencing your work.*
(e) *Marks are given for a clear record of the observations actually made, their suitability, accuracy and the use made of them.*
(f) *Candidates are advised to record their observations as soon as they are made.*
(g) *Non-programmable silent electronic calculators may be used.*
(h) *This paper consists of 8 **printed pages**.*
(i) *Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.*

Question 1

You are provided with the following apparatus:

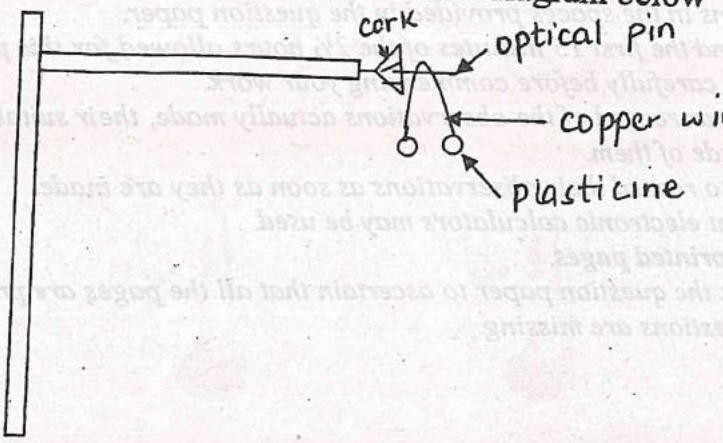
- micrometer screw gauge
- clamp
- boss
- stand
- optical pins
- Copper wire
- protractor
- Two pieces of plasticine
- cork

Procedure

1) Measure the diameter of the wire using the micrometer screw gauge

d=.....cm. (1mk)

2) Set up the apparatus as shown in the diagram below



b) Bend the wire in the middle so as to make an angle of 40°. Attach the two small pieces of plasticine at both ends of the bend as shown in the diagram.

c) Place the bent wire on the optical pin and give a small horizontal displacement. Note the time for 10 complete oscillations and record in the table below.

d) Repeat the procedure above for other values of Θ and complete the table below (8mks)

Angle Θ°	Time t for 10 oscillations (s)	Period T (s)	Frequency f (Hz) =1/T	$f^2(Hz)^2$	$\cos\left(\frac{\theta}{2}\right)$
40^0					
60^0					
80^0					
100^0					
120^0					

i) On the graph paper provided, plot a graph of f^2 (y-axis) against $\cos\frac{\theta}{2}$ (5mks)

ii) Determine the gradient S of the graph(3mks)

iii) The equation for the oscillation of the wire is given by the formula:

$$f^2 = \frac{150}{4\pi^2 L} Z \cos\left(\frac{\theta}{2}\right)$$

Given that the length of the wire L 15cm find the value of Z. (3mks)

1. Question 2

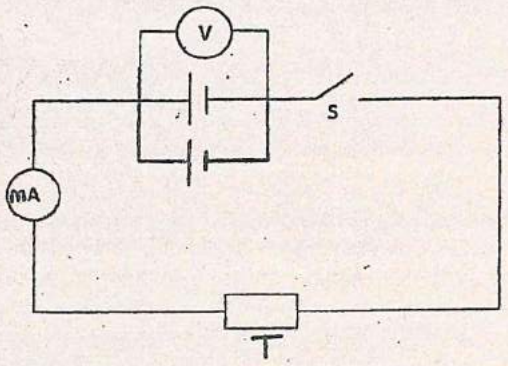
You are provided with the following apparatus

- A mounted wire labeled N.
- A voltmeter
- A milliammeter
- A switch
- Two dry cells and two cell holders.
- Six connecting wire with at least two crocodile clips.
- Four 1000Ω resistors labelled T.
- A diode.

Procedure.

1. Set up the apparatus as shown below.

(a)(i) Connect the above apparatus as shown in the circuit diagram below with the switch S open



(ii) With the switch S open record E the voltmeter reading

E=_____ (1mk)

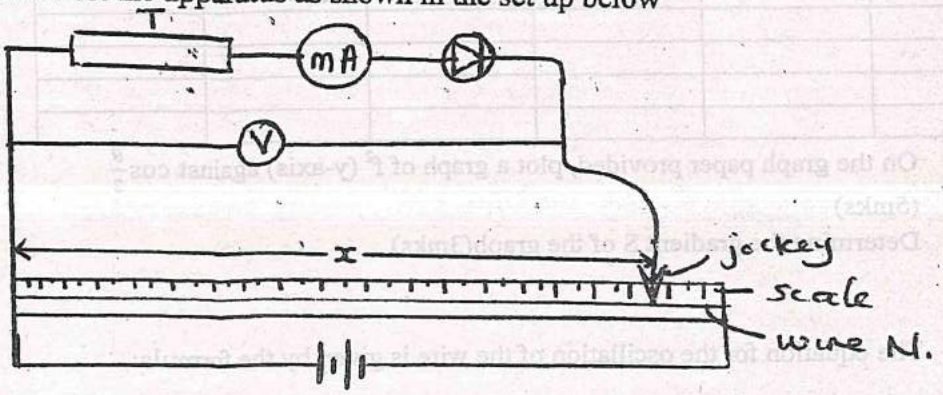
(iii) Close the switch and record V, the voltmeter reading and I, the ammeter reading

V=_____ (1mk)

I=_____ (1mk)

(iv) Given that: E-V=Ir. Find r for the dry cell (3mks)

2. Now set the apparatus as shown in the set up below



i. Close the switch and adjust the length x by moving the jockey along the length of the wire mounted on the metre scale till the value of x is 0cm. record the values on the Milliammeter and the voltmeter;
Milliammeter.....A (1 mk
Voltmeter.....A (1 mk)

ii. Repeat the experiment by now using x=10cm and note the readings on the milliammeter and voltmeter.

iii. Repeat ii. For other values of x and fill the table below

Distance (x(cm)	0	10	20	30	40	50	60	70	80
Current I (mA)									
p.d (V)									

6 mks

iv. By using values obtained, plot a graph of current I against p.d. (5 mks)

v. Find from the graph the value of current when p.d is 0.35V. (1 mk)

MANGU HIGH SCHOOL

312/1
GEOGRAPHY
PAPER 1
PRE MOCK EXAM
TIME: 2¾ HOURS

INDEX NO. _____ **NAME:** _____
CANDIDATES SIGN: _____ **DATE:** _____

Kenya Certificate of Secondary Education

PRE MOCK EXAMINATIONS

Geography
Paper 1
2 ¾ Hours

INSTRUCTIONS TO CANDIDATES

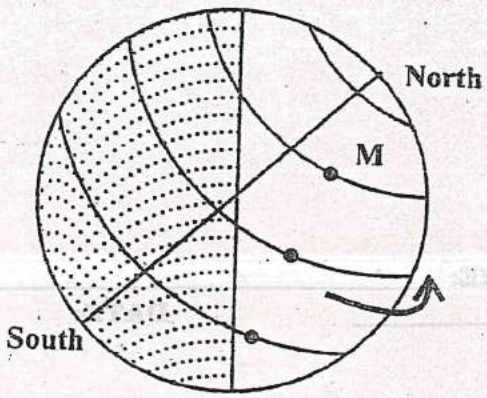
- This paper has **two** sections: **A** and **B**
- Answer **ALL** questions in section **A.**
- Answer question 6 and any other two questions from Section B.
- In section **B** answer **question 6 (six)** and any other **two** questions.
- All answers **MUST** be written in the Answer Booklet provided.
- This paper contains **7 printed pages.**
- Candidates should check the question paper to ascertain that all pages are printed as indicated

Turn Over

SECTION A- 25 MARKS
Answer ALL the questions in this section

1. a) Name the branches of geography. (3 mks)
   b) Give two dates in a year during which the number of hours of darkness is equal in both north and south pole (2 mks)

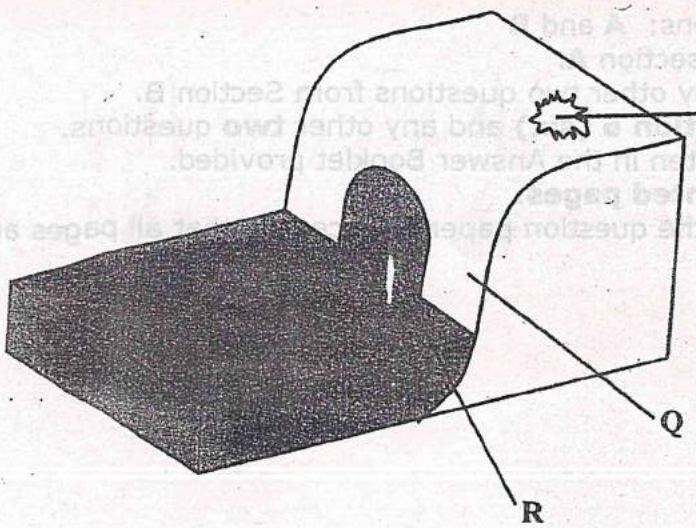
2. The diagram below represents the earth on its axis. Use it to answer question (2).



   i) Name the latitude marked M. (1 mk)
   ii) What is the angle of inclination of the earth's axis from its orbit? (1 mk)
   iii) State three effects of the rotation of the earth. (3 mks)

3. a) State the conditions considered in choosing a suitable site for a weather station. (2 mks)
   b) Name the weather recording instrument that are placed in a Stevenson's screen. (2 mks)
   c) Give two reasons why weather forecasting is important. (2 mks)

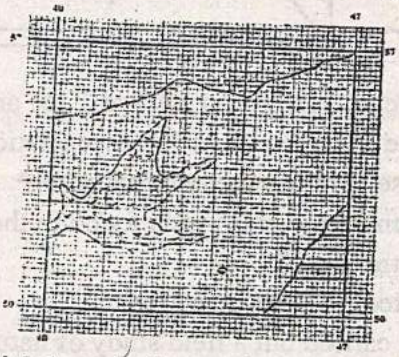
4. i) The diagram below represents some coastal features. Name the features marked P,Q and R. (3 mks)



   ii) State two conditions necessary for the formation of a beach. (2 mks)

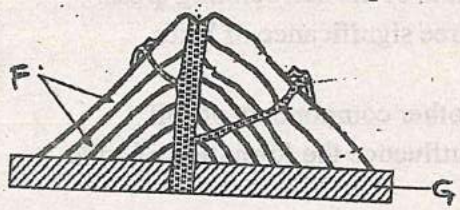
5. a) Distinguish between a Wadi and a Mesa. (2 mks)
   b) Name two features formed by water erosion in deserts. (2 mks)

6. Study the map of Belgut (1:50,000) sheet 117/3 provided and answer the following questions
   (a) A straight all weather road is to be constructed from Kebenet junction to Kakibei school
      (i) What is the length of the road? Give your answer to the nearest 100m. (2 mks)
      (ii) Calculate the bearing of the principal air photo point in grid square 3957 from the bridge in grid square 4255. (2 mks)
      (iii) Calculate the area to the north east of the Kericho – Muhoroni/ Kisumu all – weather road. Give your answer in square kilometres. (2 mks)
   (b) The square below represents the area in the map extract bounded by Easting 40 and 47 and Northing 50 and 57. Identify and name the features marked J, K, L and M. (4 mks)



   (c) (i) Explain three factors which have influenced the distribution of settlement in the area covered by the map. (6 mks)
      (ii) Citing evidences from the map, give two agricultural activities carried out in the area covered by the map (4 mks)
   (d) Describe the drainage of the area covered by the map. (5 mks)

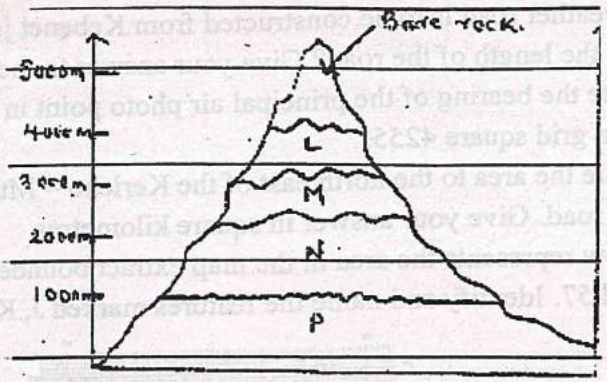
7. (a) (i) Define the term vulcanicity (2 mks)
      (ii) State two types of vulcanicity (2 mks)
   (b) (i) Using well labeled diagrams, differentiate between a lopolith and a Laccolith (4 mks)
      (ii) The diagram below shows a complex volcanic cone



      I. Identify the parts marked F and G (2 mks)
      II. Describe how the feature is formed (5 mks)
      III. Give two examples of the feature in East Africa (2 mks)
   (c) Define the following terms
      (i) Fumaroles (1 mk)
      ii) Solfatara (1 mk)
   (d) Explain three ways in which volcanic mountains positively influence human activities. (6 mks)

8. (a) (i) What is natural vegetation? (2 mks)
      (ii) Describe how the following factors influence the distribution of Vegetation.
         I. Biotic factors (3 mks)
         II. Edaphic factors (3 mks)

(b) The diagram below represents zones of natural vegetation on a mountain in Africa. Use it to answer the questions below it.



(i) Name the vegetation zones marked L, M and N. (3 mks)

(ii) Describe the characteristics of the vegetation marked P (3 mks)

(iii) Give two uses of the vegetation marked P. (2 mks)

(iv) Name the temperate grasslands found in the following countries

I. South Africa (1 mk)

II. United States of America (1 mk)

(c) Form four students carried out a field study of natural vegetation within their county.

(i) Give two reasons why it would be important for them to seek permission from the school administration. (2 mks)

(ii) How would they identify the different types of vegetation? (3 mks)

(iii) State two problems they might have encountered during their field study (2 mks)

9. (a) (i) What is a lake (1 mk)

(ii) Give three sources of water in lakes (3 mks)

(b) With aid of well labeled diagrams describe how a corrie lake is formed. (8 mks)

(c) (i) State three reasons why some lakes in the rift valley have fresh water (3mks)

(ii) Explain how lakes modify the climate of the surrounding areas. (4 mks)

(d) Citing examples of lakes explain three significance of lakes. (6 mks)

10. (a) (i) Define the term soils (2 mks)

(ii) Apart from humus, name three other components of soil (3 mks)

(b) Explain how the following factors influence the formation of soils

I. Topography (4 mks)

ii. Time (2 mks)

(c) The diagram below represents a well-developed soil profile, use it to answer following questions

(i) Describe the characteristics of horizon B (3 mks)

(ii) State three ways in which vegetation protects soil from erosion (3 mks)

(iii) Name two types of soil as classified by texture (2 mks)

(d) (i) Explain how the following farming practices may lead to soil fertility

I. Mixed farming (2 mks)

II. Mulching (2 mks)

(i) Identify two types of soil degeneration. (2 mks)