Name: ..... Index no: .....

232/2 Candidate's signature.....

PHYSICS Date.....
Paper 2
2 Hours

March 2013

ALLIANCE GIRLS HIGH SCHOOL

Kenya Certificate of Secondary Education- Trial Examination

PHYSICS
2 Hours

Instructions to Candidates

1. *Write your name and index number in the spaces provided above.*
2. *Sign and write the date of examination in the spaces provided above.*
3. *This paper consists of **TWO** Sections: **A** and **B**.*
4. *Answer **ALL** the questions in section **A** and **B** in the spaces provided.*
5. *ALL working **MUST** be clearly shown.*
6. *Non-programmable silent electronic calculators and **KNEC** mathematical tables may be used.*
7. ***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***

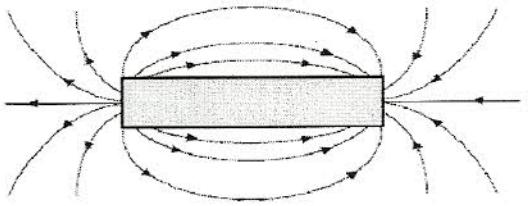
FOR EXAMINER'S USE ONLY

Section	Question	Maximum Score	Candidate's Score
A	1-13	25	
B	14	11	
	15	12	
	16	10	
	17	11	
	18	11	
	TOTAL	**80**	

*This paper consists of 13 printed pages.Candidates should check to ensure that no page is missing and all the pages are printed as indicated**TURN OVER***

SECTION A:25 marks

1.The diagram shows some magnetic field lines around a bar magnet.Indicate the polarity of the magnet (1mk)



2.The length of a pinhole camera is 20cm. Determine the height of a storey building 300m away from the pin hole if the image formed on the screen of the pin hole camera is 2.5cm high (3mks

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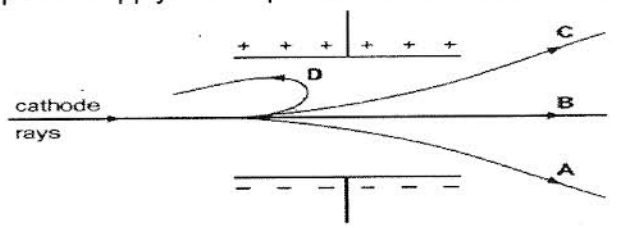
3.A beam of cathode rays passes between two parallel metal plates connected to a high-voltage d.c. power supply.Which path does the beam follow (1mk)



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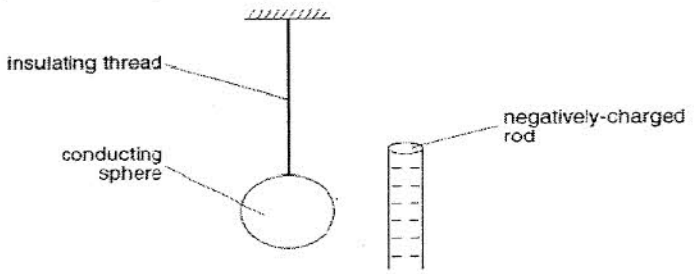
4.Thefigure below shows the negatively-charged rod placed near to a conducting sphere. The sphere is suspended by an insulating thread.



On the figure show the distribution of charges on the sphere. (1mk)

5.The conductivity of a metallic conductor decreases with increase in temperature whereas the conductivity of a semi-conductor increases with increase in temperature. Explain (2mks)

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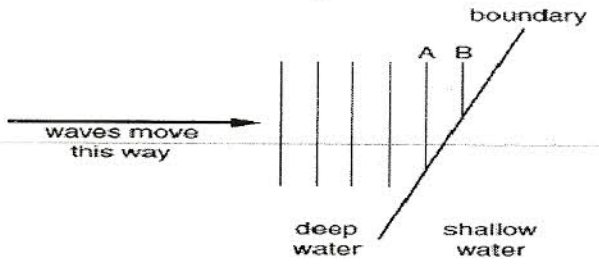
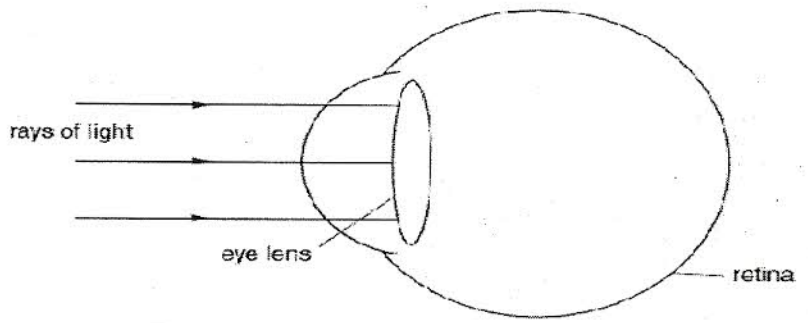
6.The figure below shows identical waves moving towards the boundary at an angle.



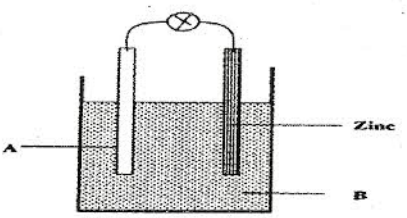
On the figure draw carefully the remainder of waves A and B, to show how they move after the boundary (1mk)

7.The figure below shows a short-sighted eye.



Rays of light from a distant star are parallel as they reach the lens of the eye. continue the rays to show their paths inside the short-sighted eye until they strike the retina. (2mks

8.The figure below shows the set up for a simple cell.



a) Name the electrode **A** and the solution **B** (1mk)

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b) State **one**reason why the bulb goes off after a short time (1mk)

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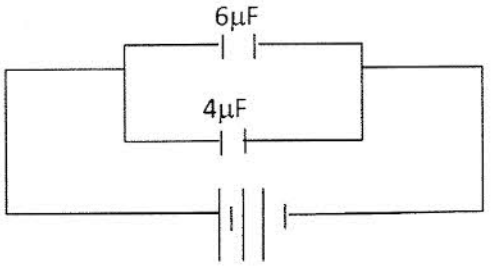
9.The diagram shows capacitors in parallel connected to 4V battery



Calculate the total capacitance (2mks)

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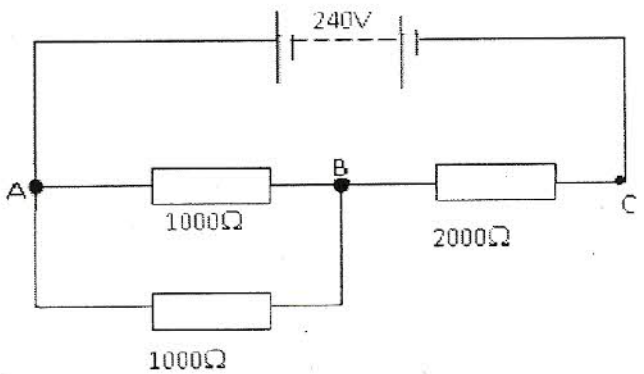
10.Three resistors are connected as shown at the figure below.



Determine the potential difference between A and B (3mks)

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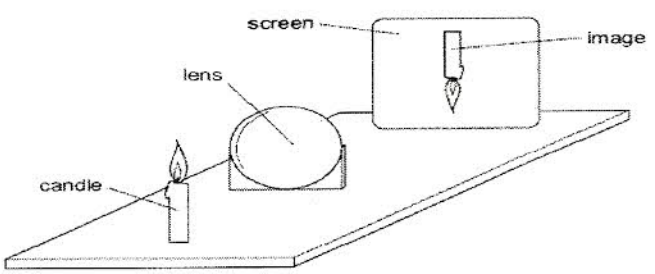
11.A thin converging lens is used to produce, on a screen, a focused image of/ a candle.



What two adjustments can be made on the set up so that an upright image is obtained (2mks)

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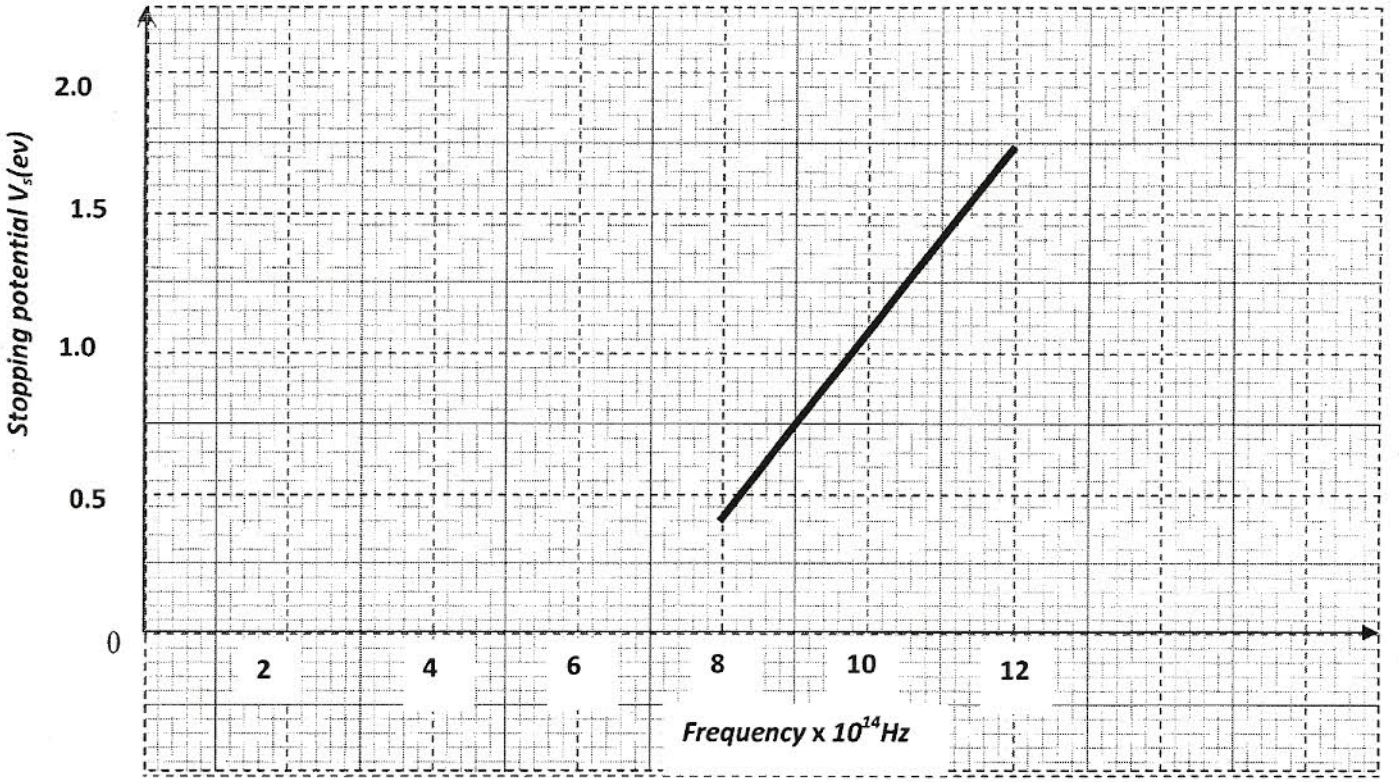
12.The graph below shows the relation between the stopping potential, Vs and the frequency of radiation when a certain surface is illuminated with light of different frequencies



From the graph determine the work function of the metal surface. (h= 6.63 x 10^{-34}Js) (2mks

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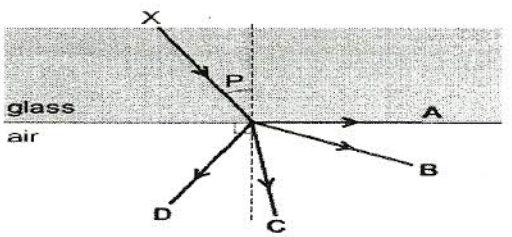
13.The diagram shows a ray of light travelling from X. AngleP is 42° ,and the ray takes path A.



(i).Calculate the refractive index ,n, of glass (2mks)

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(ii) If the angle P is reduced to 40° which ray represents the path taken by ray X (1mk)

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SECTION B: 55marks

14.(a) Define the term half life as used in the study of radioactivity (1mk)

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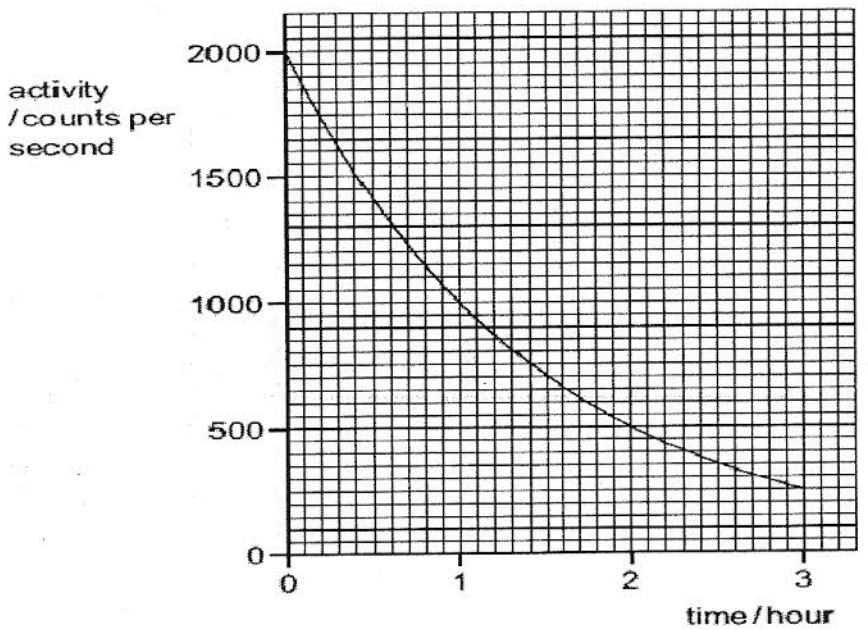
(b)The graph shows the activity of a radioactive source over a period of time.



Use the graph to find the half -life of the source (2mks)

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(c)(i)..A mineral is radioactive. In October 1957 the mineral had an activity of 80,000becquerels. In October 2007 its activity was 40,000 becquerels. Calculate the half-life in years of the mineral. (2mks)

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(ii) Predict the month and year when the activity of the mineral will be 20 000 becquerels.(1mk)

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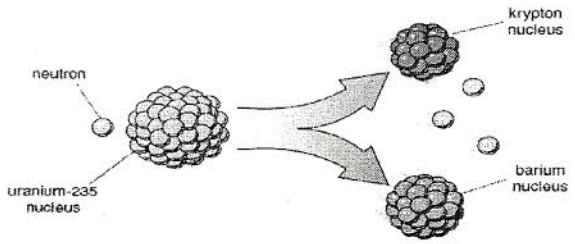
(d).The figure below illustrates a neutron hitting a uranium-235 nucleus



The uranium-235 nucleus splits into a nucleus of barium (Ba) and a nucleus of krypton (Kr) and three neutrons are released.

(i)State the name of this process. (1mk)

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(ii)This process may be represented by a nuclear equation. An incomplete version of this equation is shown below.

$$^{235}_{92}U + {}^{1}_{0}n \longrightarrow {}_{56}Ba + {}^{92}Kr + 3\ {}^{1}_{0}n$$

Calculate the nucleon number (mass number) of the barium nucleus. (1mk)

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(e)Some of the waste products from a nuclear power station are radioactive and have very long half-lives.State one safety precaution that is taken when radioactive waste products are handled. (1mk)

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(f) State two applications of radioactivity in medicine (2mks)

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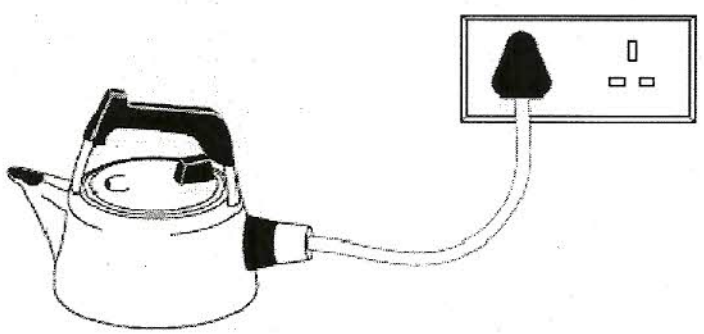
15(a).Electrical heating is used in different ways, for example in an electric kettle.



Give **two** other examples of devices which use electrical heating. (2mks)

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(b) Electricity can be dangerous. Safety features such as fuses are often used.

Give **two** other examples of electrical safety features. (2mks)

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(c) Explain why it is dangerous to touch an electric socket when your hands are wet. (1mk)

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(d) A small object is stuck in an electric socket. Explain why it is dangerous to use a metal screwdriver to remove it. (1mk)

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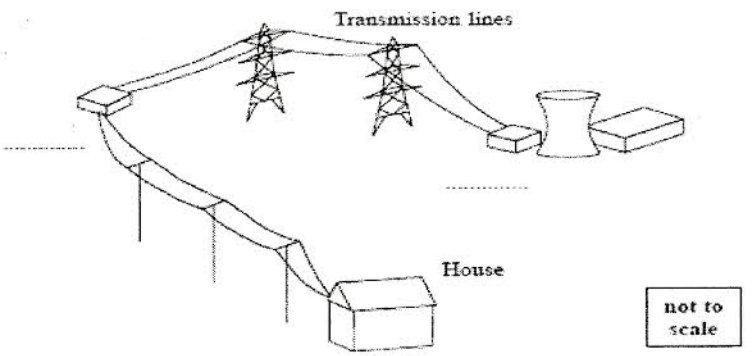
(e).The diagram below shows an electricity generation and transmission system. Step-up and step-down transformers are used.



(i).On the dotted lines label these transformers **U** (step-up) or **D** (step-down).(1mk)

(ii).The current in the transmission line used to supply electrical power to a village is 65 A. The power is transmitted at a voltage of 23 000 Calculate the power supplied to the village.(2mks)

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(f) The transmission line has a resistance of 3.0 Ω Calculate the potential difference across a 3.0 Ω resistor that carries a current of 65 A, (1mk)

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(g) (i) State one advantage of transmitting electrical power at a high voltage. (1mk)

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(ii) Suggest one reason why the mains power supply to the houses in the village is at a voltage much lower than 23 000 V. (1mk

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16.(a). State Faraday's law of electromagnetic induction (1mk)

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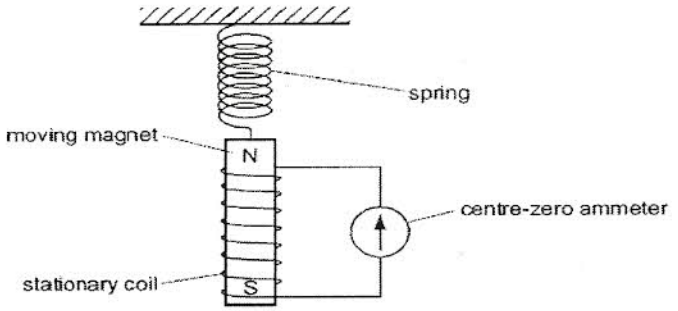
(b). A magnet is suspended from a spring so that it can move freely inside a coil. The coil is connected to a sensitive centre-zero ammeter.



State and explain the observations that would be made when the magnet repeatedly moves slowly up and down. (2mks)

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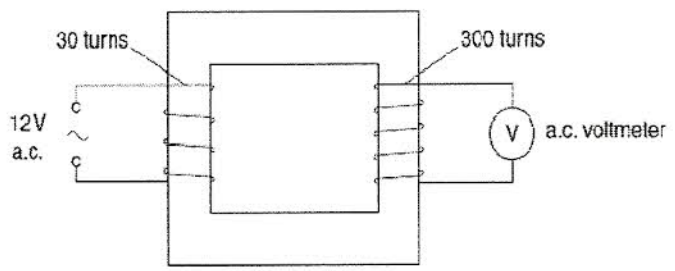
(c)The figure below is a diagram of a transformer.



Calculate the reading on the voltmeter. (3mks)

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(d) State 4 ways through which power is lost in a transformer (2mks)

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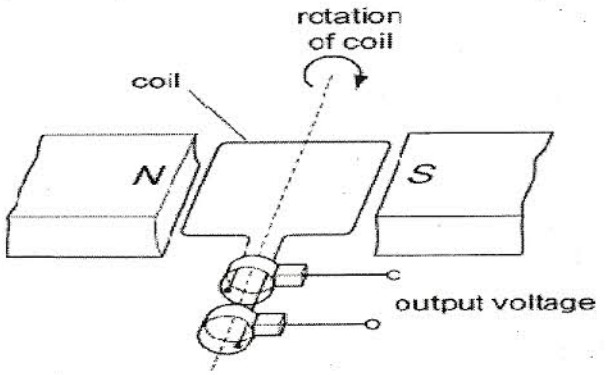
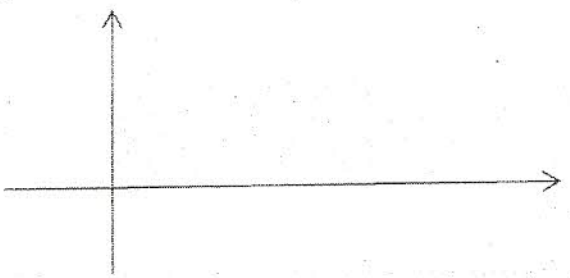
(e).The diagram shows an a.c. generator

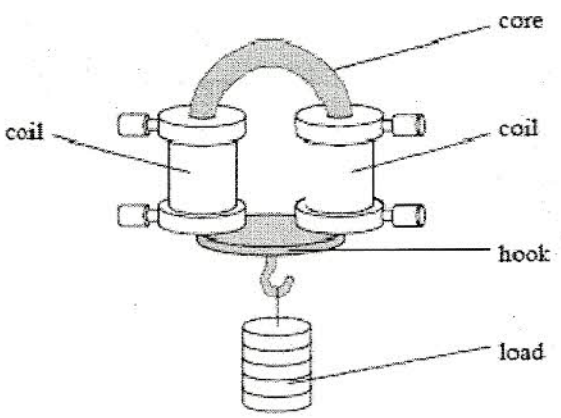


(i).Show on the diagram the direction of induced current when coil is rotating in the direction shown (1mk)

(ii).Sketch a graph to show how the output varies with time when displayed on a CRO screen. (1mk)



17(a).When there is a current in the coils the electromagnet shown below is able to carry small loads from a hook. When the current is switched off the hook and load fall off.



(i) Name a suitable material for the core and the hook. (1mk)

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(ii) Explain why this material is suitable. (1mk)

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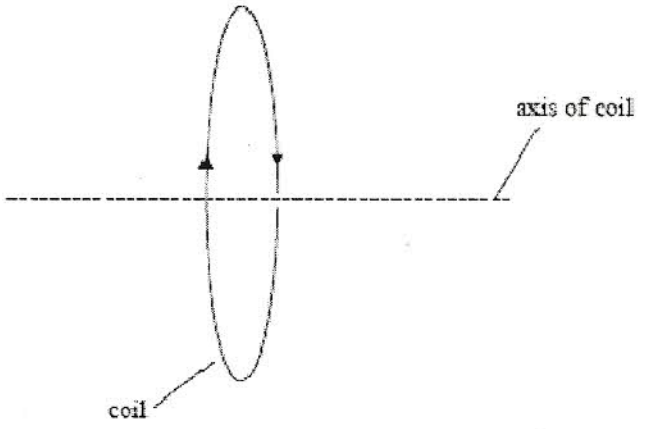
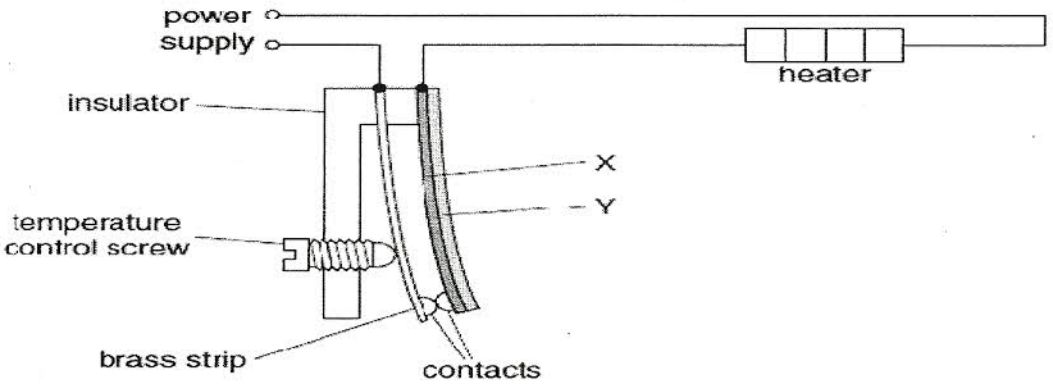
(b).The diagram shows a flat circular coil carrying a current. On the diagram, sketch the magnetic field pattern of the coil. Use arrows to show the direction of the magnetic field lines.



(c).The figure below shows a device called a thermostat, which is being used to control the temperature of the air in a room.



X and Y are strips of two different metals, joined together along their length. Together they are called a bimetallic strip. X expands more than Y for the same temperature rise.
The temperature rises and the bimetallic strip bends.
State

(i) which way the bimetallic strip bends, (1mk)

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(ii) what happens to the contacts, (1mk)

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(iii) what happens to the current in the circuit, (1mk)

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(iv) what adjustment could be made to this thermostat, in order to increase the temperature at which the thermostat operates. (1mk)

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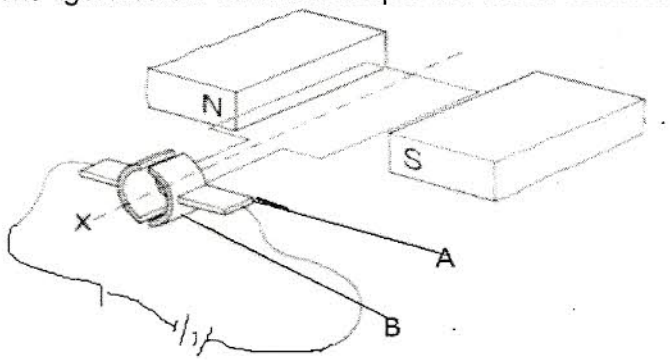
(d).The figure below shows a simple d.c. motor connected to a battery and a switch.



(i) Name of the parts labeled A and B (2mks)

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(iii) State two things which could be done to increase the speed of rotation of the coil. (2mks)

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18.(a) State the difference between a longitudinal and a transverse wave (2mks)

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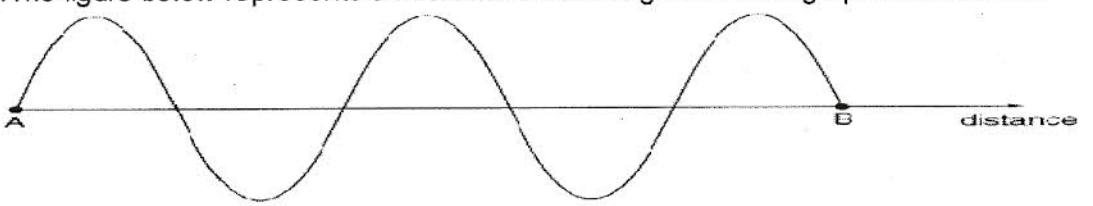
(b).The figure below represents a microwave travelling in air through points A and B.



The distance between A and B is 40 cm.

(i)State the speed of microwaves in air. (1mk)

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(ii)Determine the wavelength of the microwave shown above (1mk)

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(iii)Describe how microwaves are used in the transmission of television signals by satellite. (3mks)

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(d) Complete the table below

Radiation	**Detector**	**Application**
X-ray		
	Thermometer with black bulb	
		To detect forgeries

(3mks)

(e).Arrange the following electromagnetic waves in order of decreasing wavelength (1mk)

Radio waves,visible light, gamma rays,microwaves,

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