***NAME……………………………..* INDEX NO……………….. SCHOOL…………......... CANDIDATE’S SIGN……………..….... DATE……………….………………………**

**232/2**

**PHYSICS**

**PAPER 2**

**(THEORY)**

**­TIME: 2 HOURS**

**JULY/AUGUST**

**EXCEL EXAMINATION - 2018**

***Kenya Certificate of Secondary Education***

**PHYSICS**

**PAPER 2**

**(THEORY)**

**2 HOURS**

**INSTRUCTIONS TO THE CANDIDATES:**

* *Write your name, index number, class and admission number in the spaces provided above.*
* *Sign and write the date of examination in the spaces provided above.*
* *This paper consist of* ***TWO*** *sections;* ***A*** *and* ***B****.*
* *Answer* ***ALL*** *the questions in section* ***A*** *and* ***B*** *in the spaces provided.*
* ***ALL*** *working* ***MUST*** *be clearly shown.*
* *Mathematical tables, electronic calculators and slide rules may be used.*
* Take acceleration due to gravity = 10m/s².

**For Examiner’s Use Only**

|  |  |  |  |
| --- | --- | --- | --- |
| **Section** | **Question** | **Maximum Score** | **Candidate’s Score** |
| **A** | **1-13** | **25** |  |
| **B** | **14** | **11** |  |
| **15** | **09** |  |
| **16** | **12** |  |
| **17** | **14** |  |
| **18** | **09** |  |
|  | **TOTAL** | **80** |  |

**SECTION A: 25 MARKS; ANSWER ALL QUESTIONS IN THIS SECTION**

1. The figure below represents an object **O** placed in front of a plane mirror **M.**

E

**O** .

**M**

Using rays, locate the position of the image as observed by the eye E. (2mks)

1. The figure below shows a negatively charged rod brought slowly near the cap of a positively charged leaf electroscope.

+ + + + + + + +

-\_\_

+

State what is observed and explain your observation (3mks)

1. State how local action can be minimized in a simple cell. (1mk)
2. Differentiate between a magnet and a magnetic material in terms of domains’ theory (2mks)
3. The figure below shows an object placed in front of a concave mirror. By use of correct ray diagrams, locate the position of the image (2mks)

C F

1. A conductor carrying current is placed in the magnetic field and moves in the direction shown.

P O Q

Indicate on the diagram the polarities of P and Q. (1mk)

1. Distinguish between mechanical waves and electromagnetic waves. (1mk)
2. Critical angle of a material is given to be 24.40. calculate the speed of light in the material given the speed of light in vacuum is 3.0x108 m/s. (3mks)
3. State two reasons why prisms are preferred in optical instruments rather than plane mirrors. (2mks)
4. Below is an incomplete electromagnetic spectrum.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Radio wave | A | Infrared | visible | ultraviolet | B | Gamma |

1. State one use of radiation A (1mk)
2. How are waves B produced (2mks)
3. The following is part of radioactive decay series.

Pa

234

b

Th

a

90

U

238

92

α β

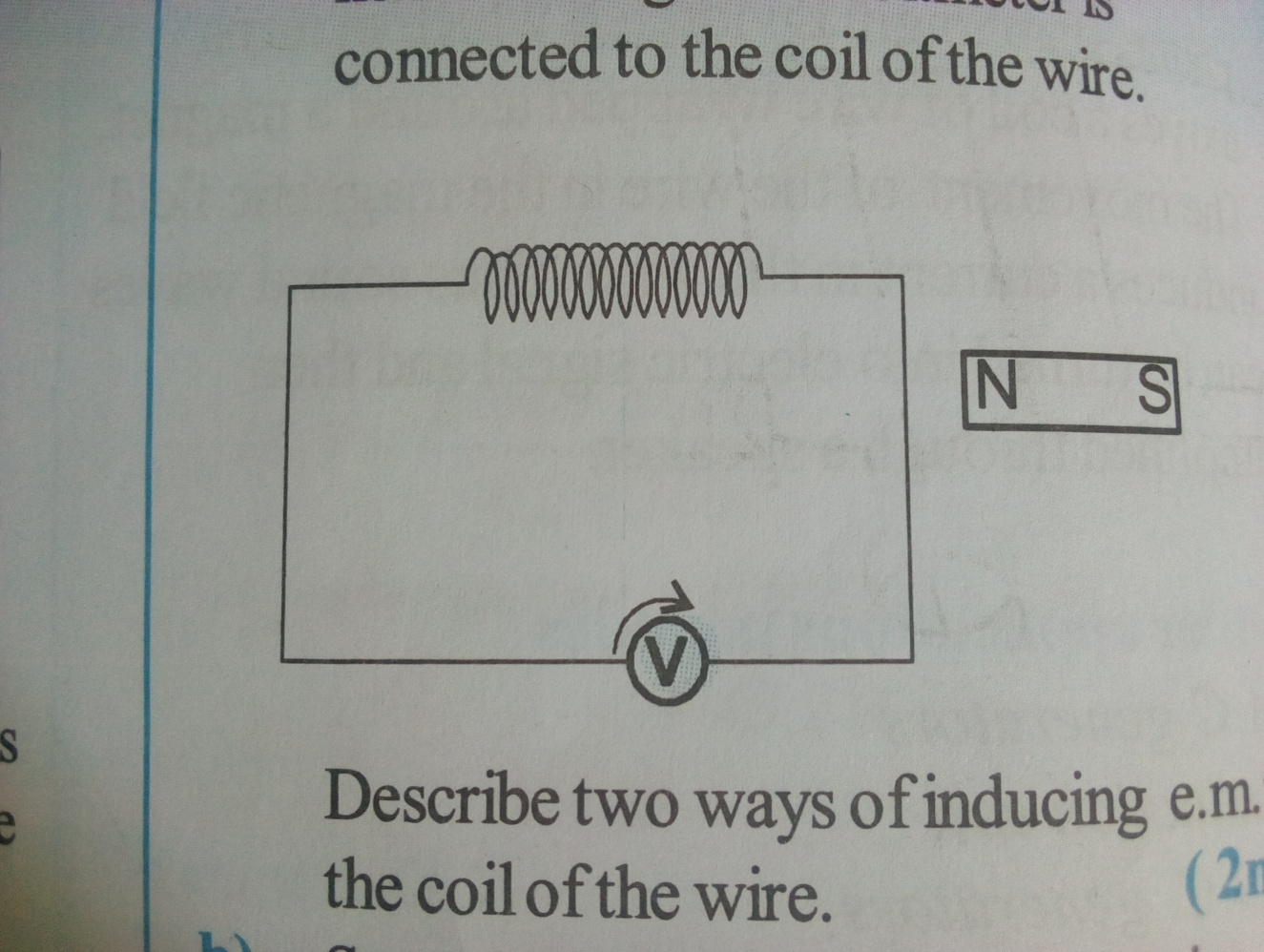
Determine the values of a and b. (2mks)

1. State one cause of power loss during transmission of electricity (1mk)
2. Distinguish between n-type semi conductor and p-type semi conductor. (2mks)

**SECTION B: 55 MARKS; ANSWER ALL QUESTIONS IN THIS SECTION**

1. a) state Lenz’s law (1mk)

b) The figure below shows a coil of wire next to a magnet. A voltmeter is connected to the coil of the wire.



Describe two ways of inducing e.m.f in the coil of the wire (2mks)

c) A transformer is designed to supply current 5A at a potential difference of 50V to a motor from an a.c supply of 240V. if the efficiency of the transformer is 80%, calculate;

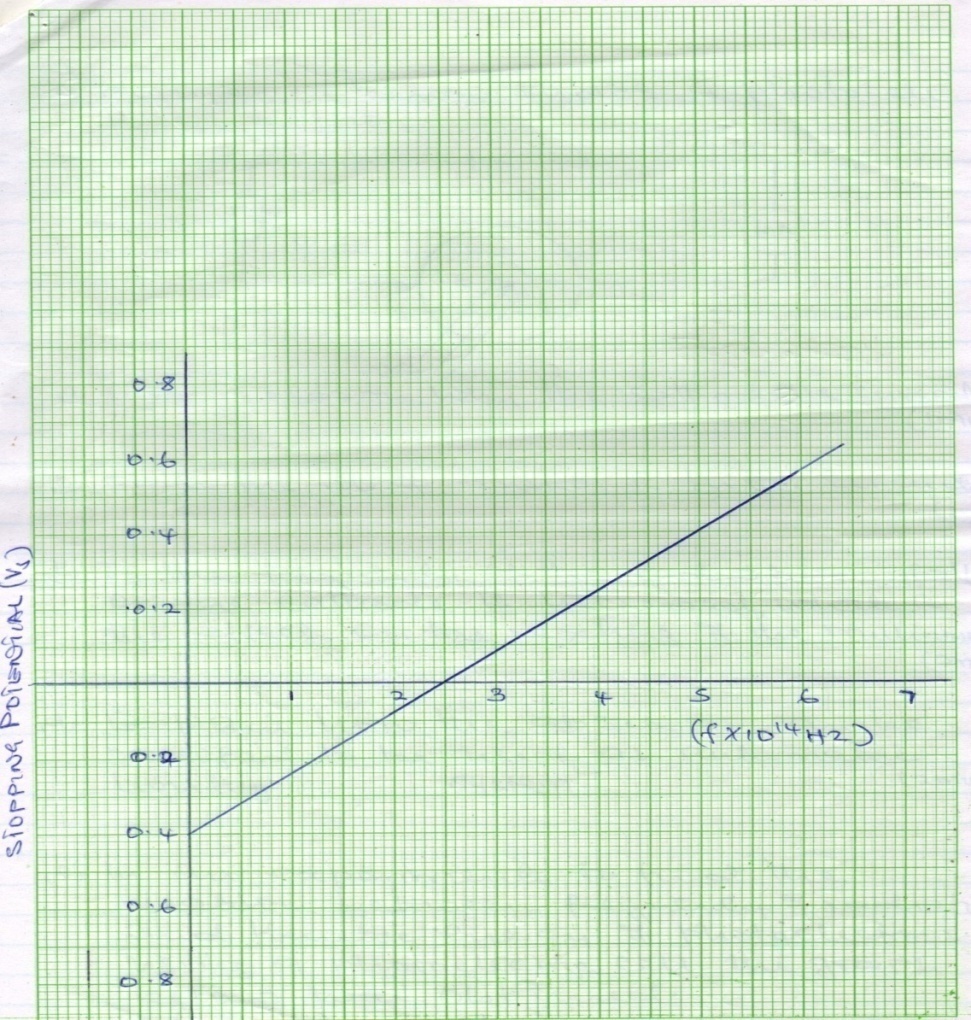
i) The power supplied to the transformer (3mks)

ii) The current in the primary coil (2mks)

d) Give 3 structural features in a transformer design which help in achieving high efficiency (3mks)

1. a) State what is meant by the term photoelectric effect (1mk)

b) The figure below shows a graph of stopping potential against frequency

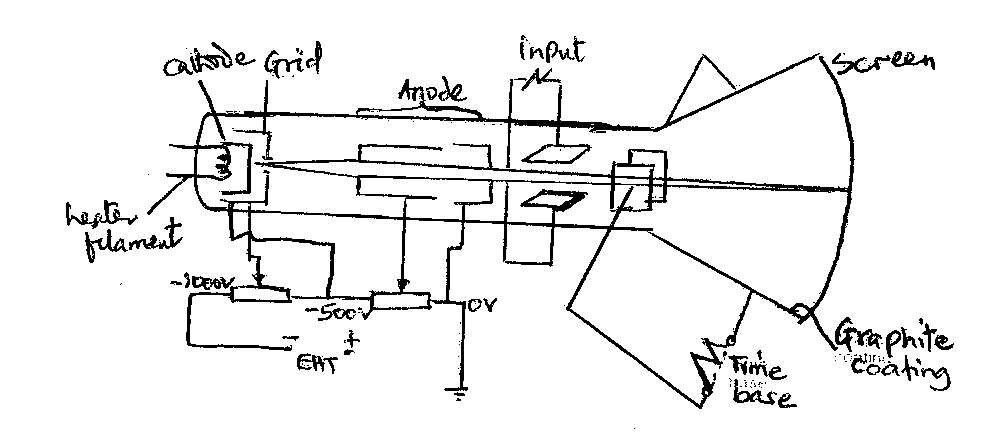


From the graph, determine;

1. threshold frequency (1mk)
2. the plank’s constant (3mks)
3. The work function of the metal in joules. (3mks)

c) Give the energy conversion which occurs in a photocell (1mk)

1. . a) The figure below shows the main features of a CRO.



1. describe how the electrons are produced (2mks)
2. state and explain the function of the grid (1mk)
3. State what would be observed on the screen if an a.c voltage is connected across the y plate. (1mk)
4. Give the reason why it is possible to have a wider screen in the TV set than the CRO. (2mks)

b) State two advantages of using a CRO as a voltmeter (2mks)

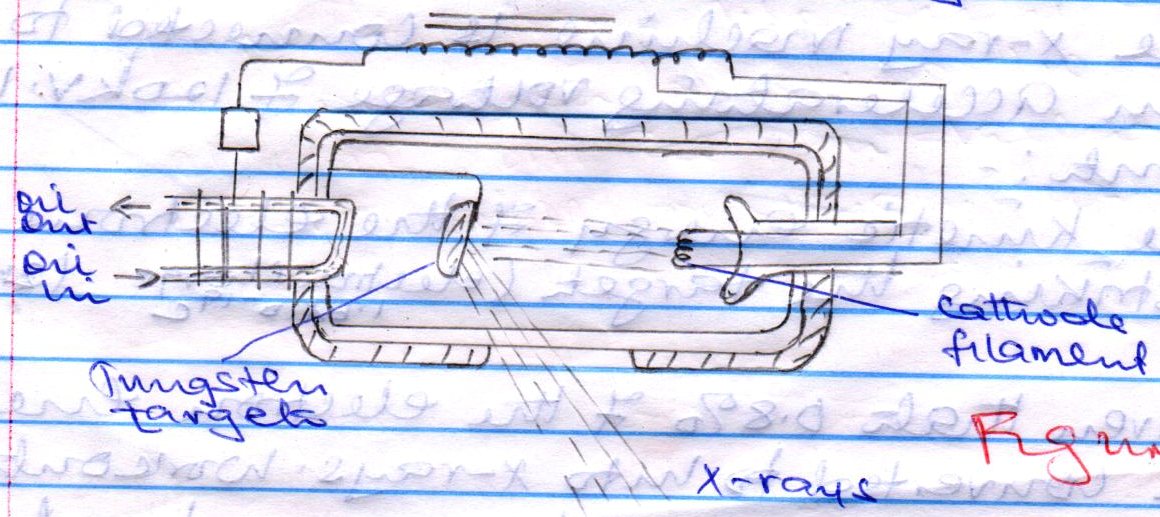
c) Given that in the figure below, the time base control is set as 1ms/div and the y gain as 50V/div.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

O

Determine the following;

1. the frequency of the ac signal (2mks)
2. the peak voltage of the input signal (2mks)
3. a) The figure below shows the structure and circuit of x-ray tube.



1. explain how the electrons are produced by the cathode filament (2mks)
2. explain how the electrons reach the target at the desired speed (1mk)
3. Target is made of tungsten. Give a reason why tungsten is preferred (1mk)
4. A lot of heat is produced in this machine. Briefly explain how heat loss is enhanced (1mk)
5. Give a reason why the target must rotate while in use (1mk)
6. The tube must be evacuated. Give a reason for evacuation. (1mk)
7. State a reason for surrounding the machine with lead shield. (1mk)

b) The x-ray machine is connected to an accelerating voltage of 120kV. Work out;

i) The kinetic energy of electrons striking the target (e=1.6x10-19C ) (3mks)

ii) Given that 0.8% of electron energy is converted to x-ray, work out the minimum wavelength of the x-rays produced. (take h=6.63x10-34, c= 3.0x108m/s) (3mks)

1. a) State how increasing the distance of separation affect the capacitance of the parallel plate capacitor (1mk)

b) A 5F capacitor is charged to a potential difference of 200V and isolated. It is then connected to 10F capacitor. Find;

i. the resultant potential difference across combination (3mks)

ii) Energy stored before connection (2mks)

1. total energy of the capacitors after the connection (2mks)

c) State one application of the capacitors (1mk)