Name ..... Index No. .....

School .....Candidate's signature .....

Date .....

232/2

PHYSICS ADM No. …….
Paper 2

July/August 2018
Time 2 hours

FORM FOUR END OF SECOND TERM EXAM

Kenya Certificate of Secondary Education

PHYSICS

Paper - 232/2

July/August 2018

Time: 2 hours

INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the spaces provided above.
2. Sign and write the date of the examination in the spaces provided above.
3. This paper consist of two section A and B.
4. Answer **ALL** questions in section A and B in the spaces provided.
5. All working must be clearly shown in the spaces provided in this booklet.
6. Non-programmable, silent electronic calculators and **KNEC** mathematical tables may be used.

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 - 13	25	
B	14	10	
	15	13	
	16	11	
	17	11	
	18	10	
TOTAL SCORE		80	

This paper consists of 8 printed pages

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

SECTION A (25 marks)
Answer ALL questions in this paper

1. The diagram below shows two parallel mirrors M_1 and M_2, and a ray of light incident on one mirror as shown below. Trace the ray of light when it strikes the mirrors. (2 marks)

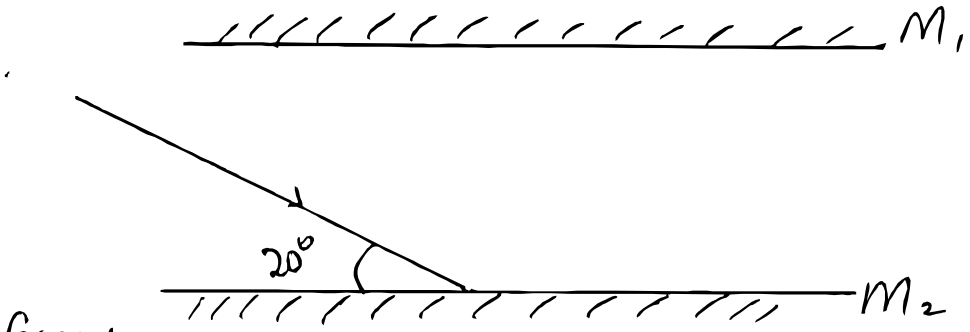

figure 1

2. You are provided with a charged electroscope, an insulator and conductor. Describe how you would use these apparatus to distinguish the insulator from conductor. (2 marks)

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3. State the reason for topping up a lead-acid accumulator with distilled water. (1 mark)

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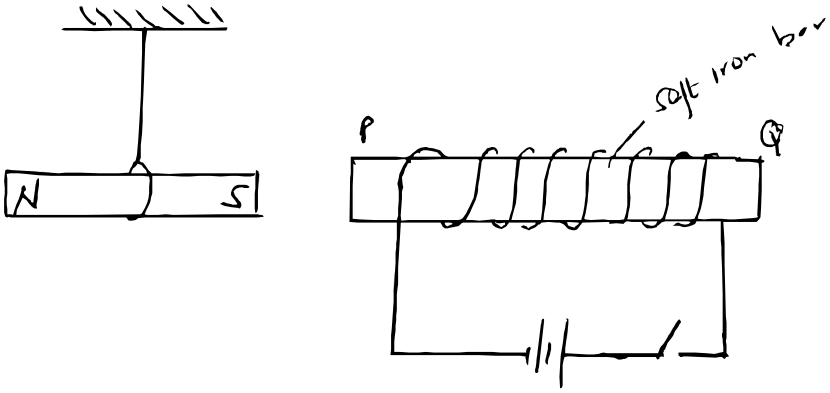
4. Fig 2 below shows a soft iron bar PQ placed in a coil near a freely suspended magnet.

Fig 2



Explain what is observed when the switch is closed. (2 marks)

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5. The equation below represents a nuclear reaction in which two deuterium nuclei fuse to form Helium and X.

$$^{2}_{1}H + ^{2}_{1}H \longrightarrow ^{3}_{2}He + ^{a}_{b}X$$

a) Determine the values of a and b (1 mark)

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b) Identify X (1 mark)

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6. a) In the production of x-rays, state how the penetration power can be increased. (1 mark)

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b) Differentiate between thermionic emission and photoelectric emission. (1 mark)

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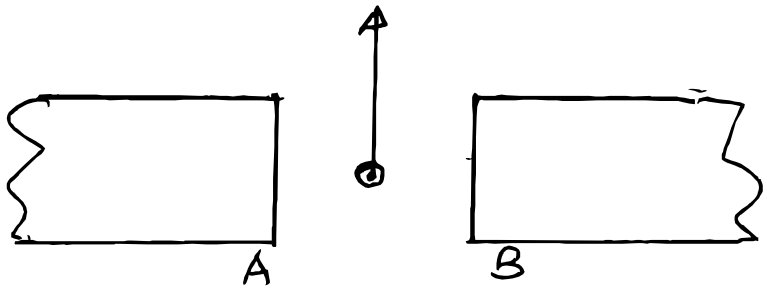
7. The figure 3 below shows a section of a flexible wire carrying current perpendicularly out of the paper.

Fig 3



The wire moves in the direction shown as current pass through it.

i) Name the polarities of the magnets A and B. (1 mark)

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ii) Explain the behaviour of the flexible wire. (1 mark)

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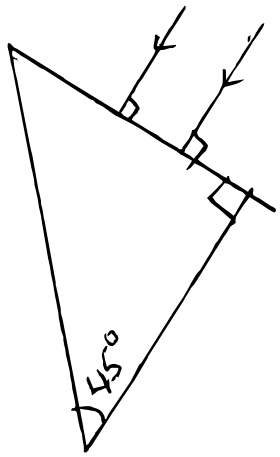
8. Figure 4 below shows two rays of light incident normally on face PQ of a glass prism, whose critical angle is 42°.

Fig 4



Complete the diagram to show the paths of the two rays as they pass through the prism. (2 marks)

9. A ship in an ocean sends out ultra sound whose echo is received after 3 seconds. If the wavelength of the ultra sound in water is 7.5 cm, and frequency of the transmitter is 20KHZ, determine the depth of the ocean. (3 marks)

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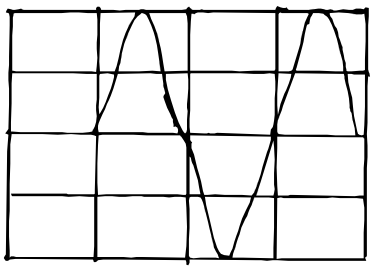
10. Draw a circuit diagram to show a p-n junction diode in the reverse bias mode. (1 mark)

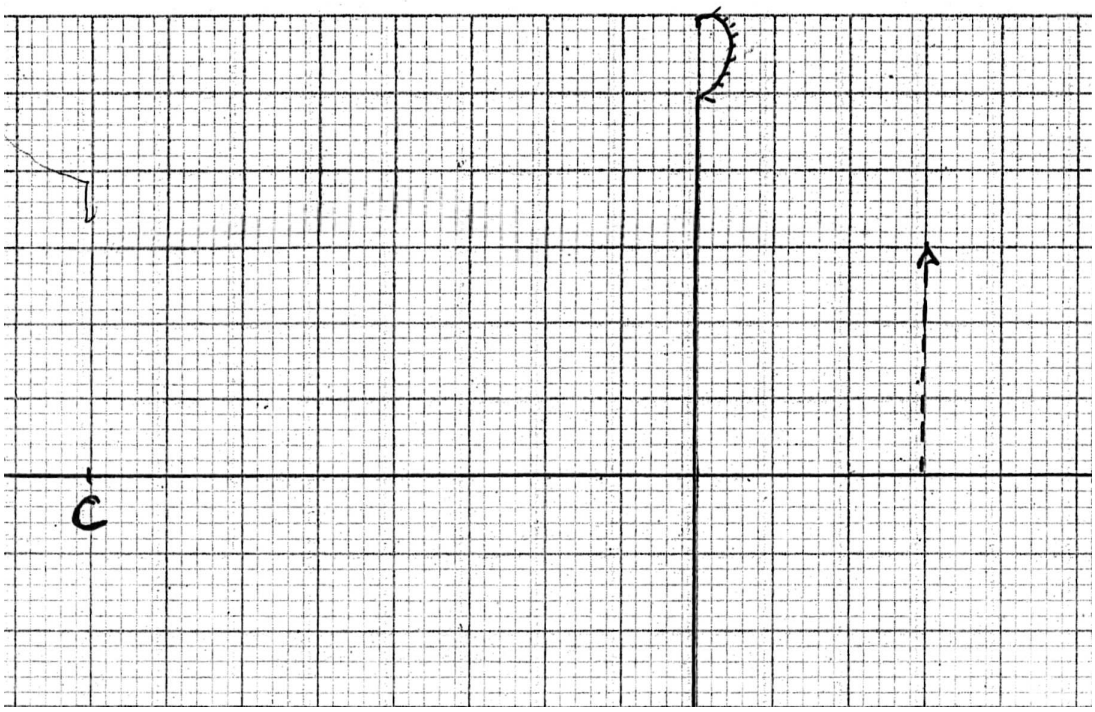
11. Fig 5 below shows the trace of a signal on the C.R.O. Given that the time base setting is 100ms/div, determine the frequency of the signal. (2 marks)

Fig 5



12. The figure 6 below shows the image of an object formed by reflection in a concave mirror. C is the centre of curvature of the mirror.

Fig 6



Use ray diagram to locate the object. (2 marks)

13. The table below shows part of the electromagnetic wave spectrum in order of **decreasing** wavelength.

A	B	Infra red	Visible light	C	D

λ

i) How are wave C produced. (1 mark)

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ii) State one use of the wave D. (1 mark)

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SECTION B (55 marks)

14.a) The figure 7 shows a displacement-time graph for a progressive wave.

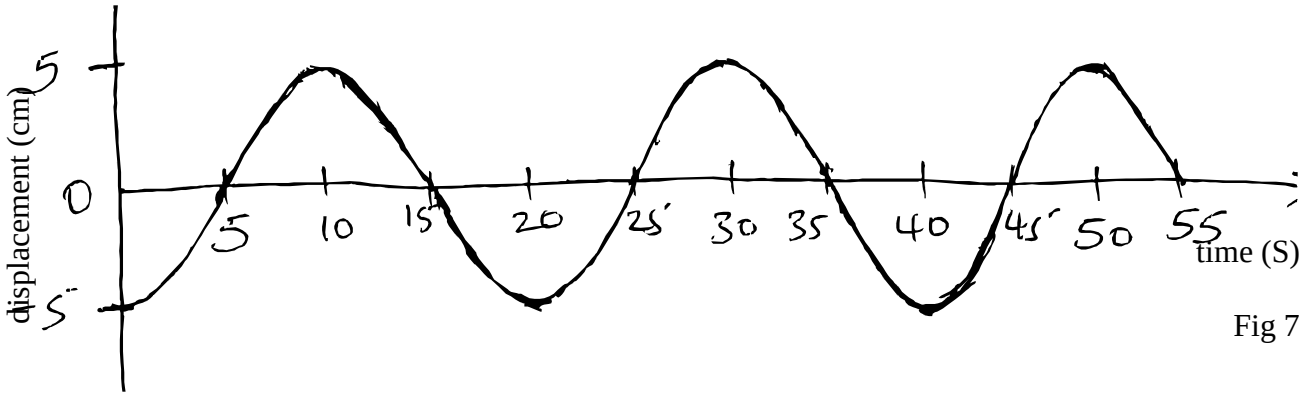

Fig 7

i) State the amplitude of the wave. (1 mark)

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ii) Determine the frequency of the wave. (3 marks)

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iii) Given that the velocity of the wave is $20ms^{-1}$, determine its wavelength. (3 marks)

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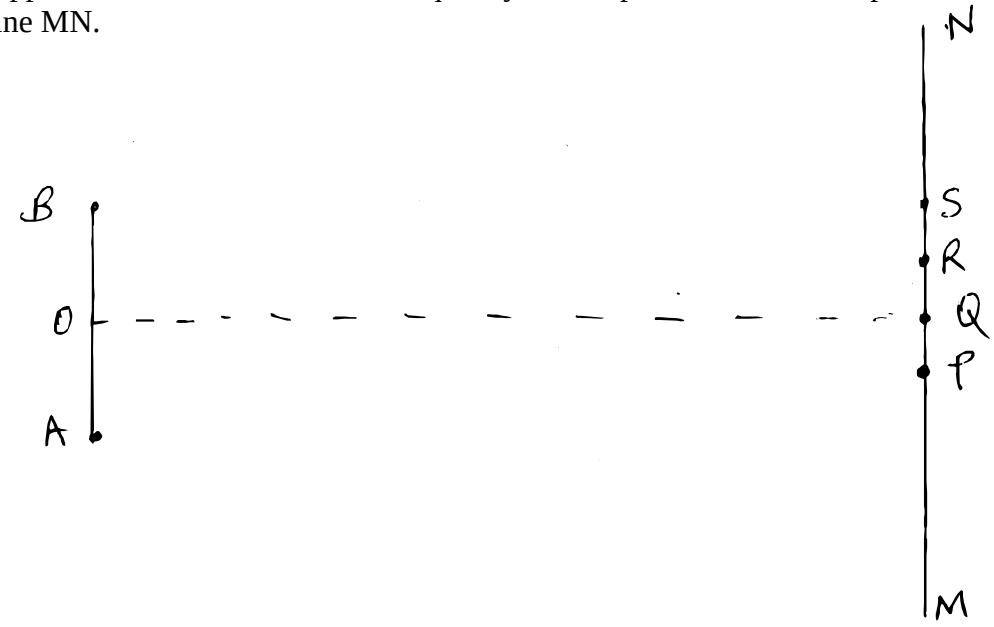
b) Figure 8 shows two identical dippers A and B vibrating in water in phase with each other. The dippers have the same constant frequency and amplitude. The waves produced are observed along line MN.

Fig 8



It is observed that the amplitudes are maximum at points Q and S, and minimum at points P and R.

i) Explain why the amplitude is maximum at Q. (1 mark)

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ii) State why a mplitude is minimum at R. (1 mark)

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iii) State what would happen if the two dippers had different frequencies. (1 mark)

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15.a) State one application of photoelectric effect. (1 mark)

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b) The figure 9 below shows an arrangement used to investigate photo electric effects.

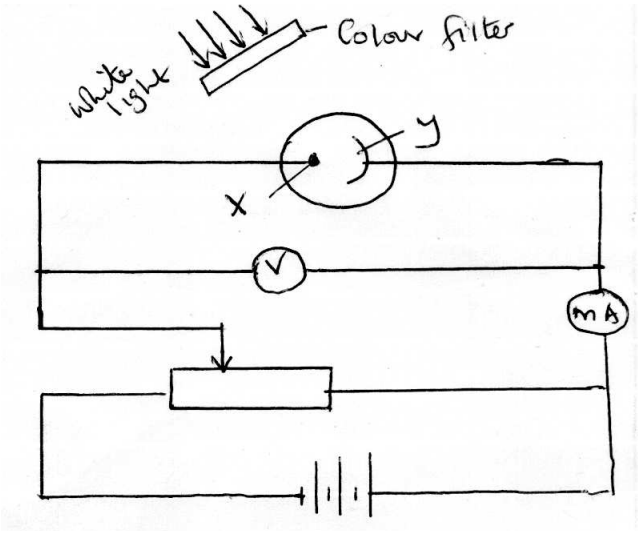

Fig 9

i) Name the parts X and Y (2 marks)

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ii) State two measurable quantities in this setup. (2 marks)

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iii) State how the intensity of light affects the photo current. (1 mark)

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c) i) Define the term doping. (1 mark)

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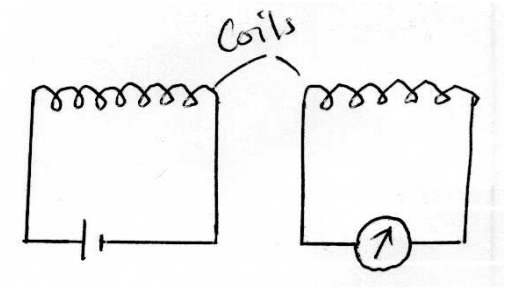
ii) The figure 10 below shows two circuits close to each other.

Fig 10



When the switch is closed, the galvanometer shows a reading then returns to zero. When the switch is open, the galvanometer shows a reading in the opposite direction and then returns to zero.

Explain these observations. (3 marks)

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d) A transformer is connected to a 12.0V, 30.0W lamp form the 240V main. If the transformer is 75% efficient. Determine the mains current (3 marks)

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13.a)i) Using a suitable diagram show how a convex lens may be used as a simple microscope. (3 marks)

ii) Using your diagram in a(i) above, determine the magnification of your lens. (2 marks)

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b) i) An object is placed 14.0cm in front of a convex lens of focal length 6.0cm. On the grid provided, draw a ray diagram to locate the image. (Use a scale 1cm rep 2cm.) (3 marks)

ii) Determine the image distance. (1 mark)

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c) Figure 11 shows a human eye with a certain defect.

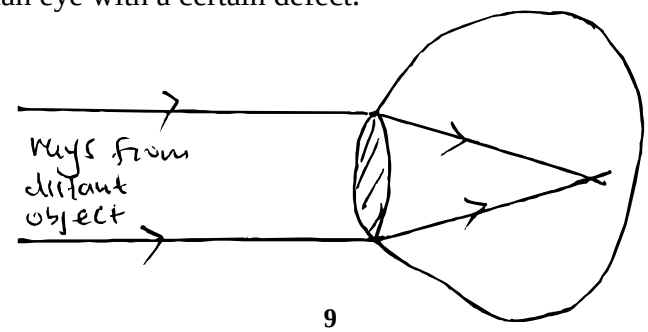

Fig 11

i) Name the defect. (1 mark)

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ii) On the same diagram, sketch the appropriate lens to correct the defect and sketch rays to show the effect of the lens. (1 mark)

17. a) State Ohm law. (1 mark)

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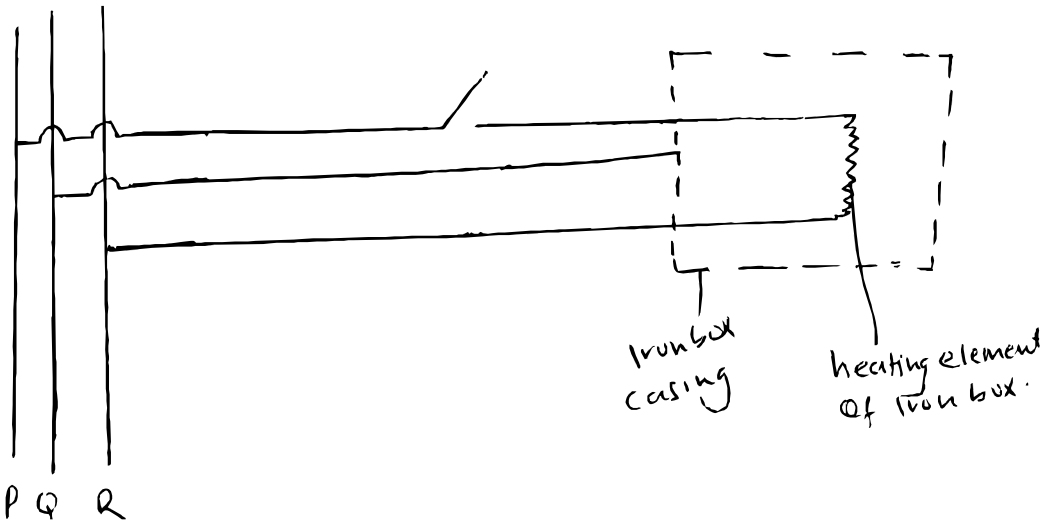
b) Figure 12 shows the electric wiring of an electric iron box.

Fig 12



Identify wires P and R (2 marks)

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b) The heating element of the iron box in (a) above is made of a wire of resistance 28.8Ω and is connected to a 240V mains supply. Determine

i) the power rating of the iron box. (3 marks)

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ii) the current flowing in the circuit. (2 marks)

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iii) the cost of using the iron box for half an hour for 30 days if cost per unit is Kshs 12.50. (3 marks)

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18. X-rays are used for detecting flaws in metal cylinders.

a) State with a reason the type of x-rays used. (2 marks)

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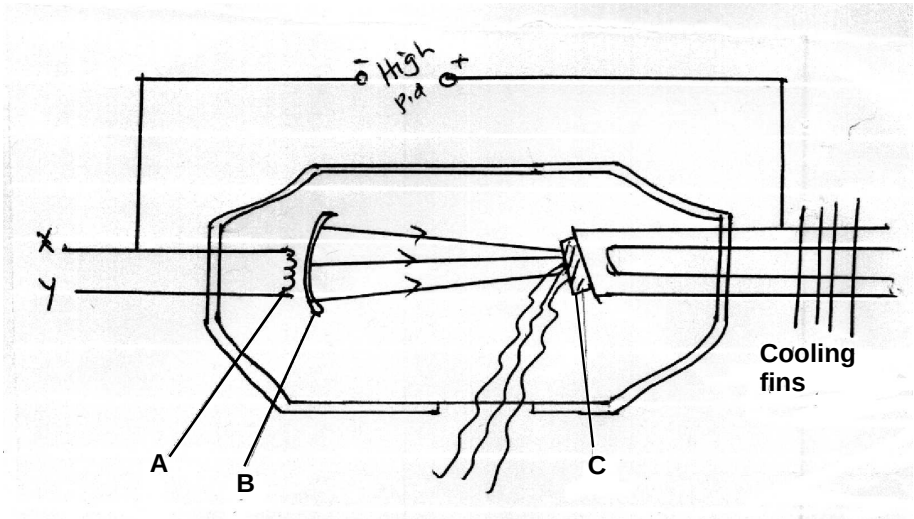
b) Figure 13 shows the features of an x-ray tube.

Fig 13



i) Name the parts labelled A and C. (2 marks)

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ii) State the function of the part labelled B. (1 mark)

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iii) Explain the effect of increasing the p.d. between X and Y. (2 marks)

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c) In a certain X-ray tube, an accelerating p.d. of 10KV is used. If all the energy of the emitted electrons hitting the target goes to produce x-rays, determine the frequency of the x-rays produced. (Plank's constant $h=6.63 \times 10^{-34}$Js and the change of an electron $e = 1.6 \times 10^{-19}$C) (3 marks)

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