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

School …………………………………………... Candidates Sign: …………....…….

Date: ……………………………….

232/2
PHYSICS
Paper 2
July / August 2013
Time: 2hours

SUPA JET – JULY 2013
Physics paper 2
July / August 2013

INSTRUCTION TO CANDIDATES
- Write your name, index number and school in the spaces provided.
- This paper consists of TWO sections: I and II.
- Answer ALL questions in section I and II in the spaces provided.
- ALL workings MUST be clearly shown.
- Mathematical tables and electronic calculators may be used.

FOR EXAMINERS USE ONLY

QUESTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
A	1 – 14	25	
B	15	14	
	16	13	
	17	15	
	18	13	
TOTAL		80	

This paper consists of 10 printed pages.
Candidates should check the question paper to ensure that all the
Pages are printed as indicated and no questions are missing.

SECTION A (25MARKS)

1. State ONE similarity and ONE difference between a camera and a human eye. (2 marks)

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2. A narrow beam of electron in a cathode ray oscilloscope (C.R.O) Strike the screen producing a spot. State what is observed on the screen if low frequency a.c. source is connected across the y-input of the C.R.O. Give reason for your answer. (2 marks)
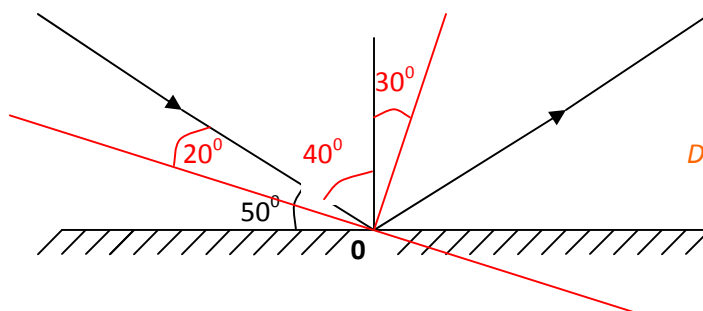
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3. The figure below shows a ray of light incident on plane mirror at point O.

Drawing 1 mark and

The mirror is rotated clockwise through an angle 30^0 about an axis perpendicular to the paper at O. Determine the angle through which the normal is rotated. (Show your working by drawing)   (2 marks)

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4. With the aid of a diagram, explain why convex mirrors is preferred for use in supermarkets for surveillance to plane mirrors.   (2 marks)

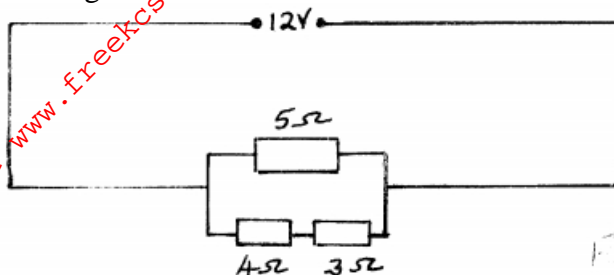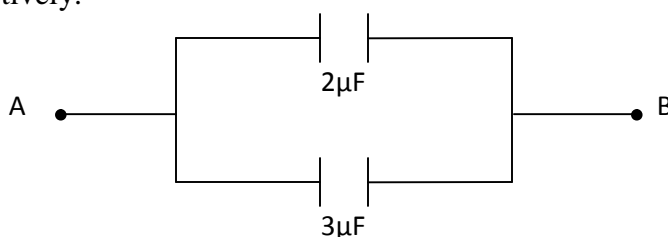5.   Figure 1. is a circuit diagram of three resistors connected to a 12V battery.

Figure 1

Determine the potential difference across the 3Ω resistor.   (2 marks)

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6. The figure below shows part of the circuit containing two capacitors of 2μF and 3μF respectively.

Determine the p.d across AB given that the total charge in the capacitors is 1×10^{-4} Coulombs.
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7. State the energy transformation that takes place in a hydroelectric power station. (2marks)

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8. Name ONE type of electromagnetic radiation that ionizes air.   (1 mark)

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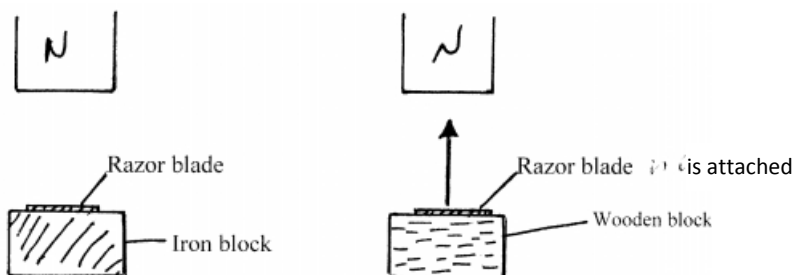
9. A 60W bulb is used continuously for 36 hours. Determine the energy consumed. Give your answer in joules. (2 marks)

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10. Two similar razor blades were placed one on a wooden block and the other on an iron block as shown in figure 5.

(a)   (b) Fig. 5

It was observed that the razor blade on the wooden block was ………………to the magnet ……….the razor blade on iron block was not. Explain.

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11. The force on a conductor carrying current in a magnetic field can be varied by changing among others the magnitude of the current. Name 3 other factors that can be changed to vary the force . (3marks)

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12. Figure 3 is an incomplete diagram showing paths of two rays which enter the pupil of the eye from a small object immersed in water. Sketch lines in the diagram to show a possible true position of the object and its apparent position in the eye. (2 marks)
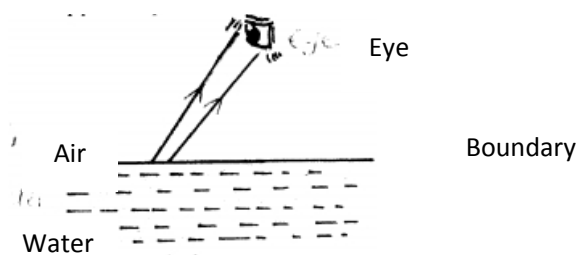

Figure 3

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13. One of the defects of a simple cell is local action explain how this defect is corrected (2marks)

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SECTION B (55 MARKS)

14. Figure 6 below shows an x-ray tube

Fig. 6
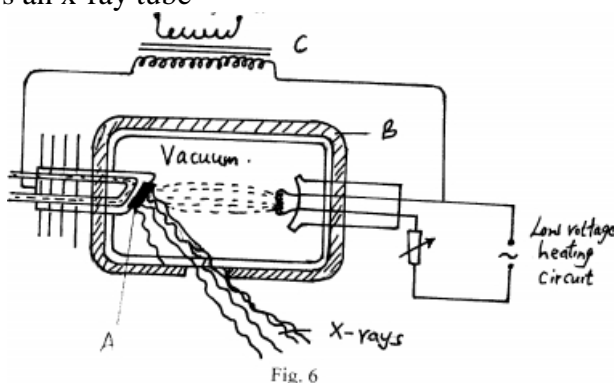
(a) i) Name the elements used in making the parts labeled A and B. (2 marks)

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ii) Explain the use of the part labeled C. (2 marks)

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iii) Explain how the x-rays are produced. (3marks)

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iv) Why is the x-ray tube evacuated? (2 mark)

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(b) The penetrating power of x-rays is normally varied depending on the intended use. Explain briefly how this is done. (2 marks)

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(c) The energy of x-ray is 1.989×10^{-14} joules. Given that the speed of light is 3.0×10^{8} m/s and plank's constant is 6.6×10^{-34} Js, find the wavelength of the x-rays. (3 marks)

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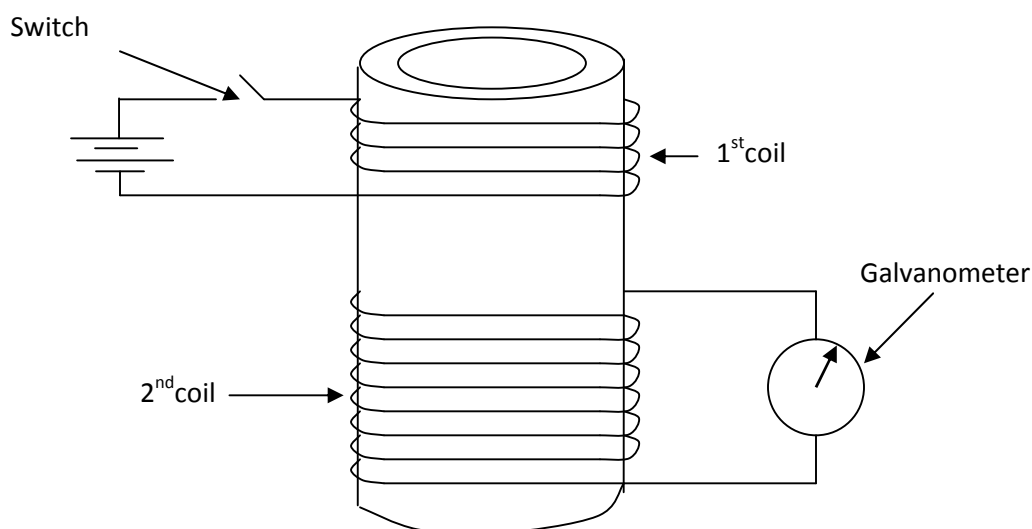
15. (a) A student wound two coils on a cardboard tube as shown below.

(i) Explain what happens when the switch is closed. (1 mark)

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(ii) What would happen if the experiment were repeated but this time a soft iron is put inside the cardboard tube? Explain. (2 marks)
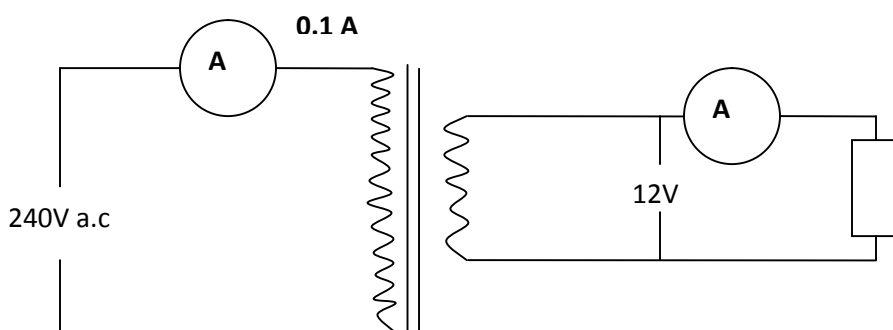
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(b) The figure below shows a transformer used to step down power for use by an electrical appliance.

(i) Calculate the input power to the transformer from the mains. (1 mark)

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(ii) Assuming there is no power losses in the transformer; calculate the reading in the ammeter on output part. (2 marks)

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(iii) What would be the output power if the transformer had been 80% efficient? (2 marks)

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(iv) What would be the reading on the ammeter on the output part had the transformer been 80% efficient? (2 marks)

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(c) One way in which power is lost in a transformer is hysteresis. Explain how it is minimized. (2marks)

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16. 1n an experiment to find the relationship between frequency of radiation and kinetic energy of photoelectrons in a photoelectric device, the following graph was obtained.
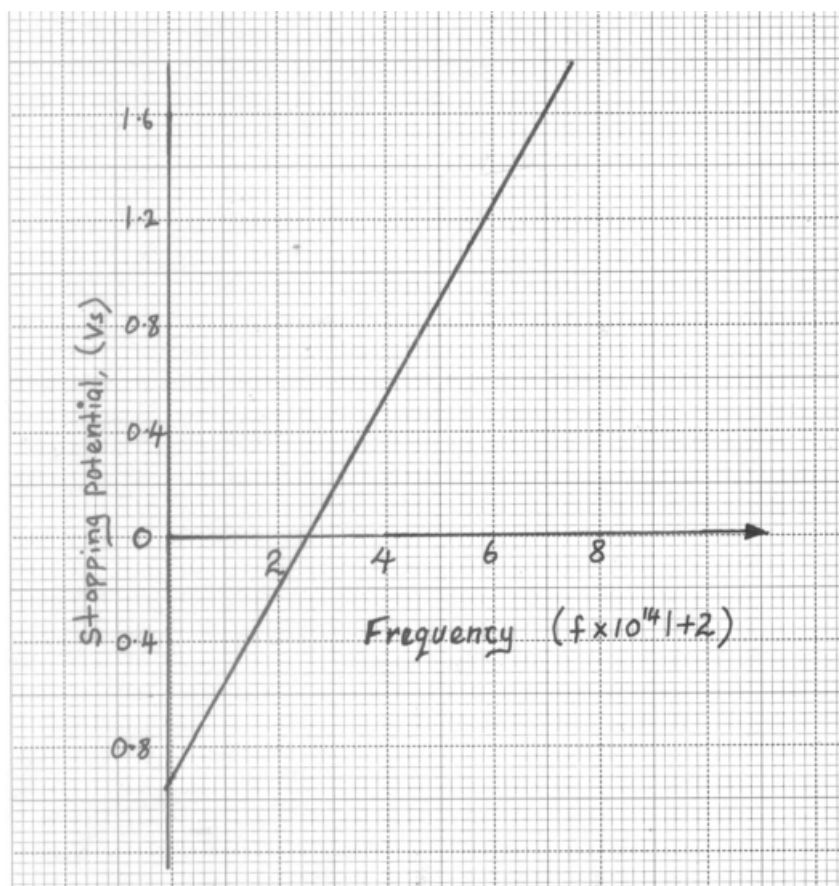

Fig. 7

Use the graph to answer the following questions,
a) (i)   Determine the threshold frequency.   (1 mark)

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   (ii) Find the plank's constant h.   (3 marks)
         (Take the charge of an electron to be 1.6×10^{-19} C)

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   (iii) Calculate the work function of the metal in joules.   (2 marks)

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(b) The threshold frequency of sodium is 4.8×10^{14} Hz. Calculate the work function of
    sodium. *(Take the plank's constant to be 6.6×10^{-34} JS)*   (2 marks)

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(c) The figure 8 below shows a bridge rectifier.
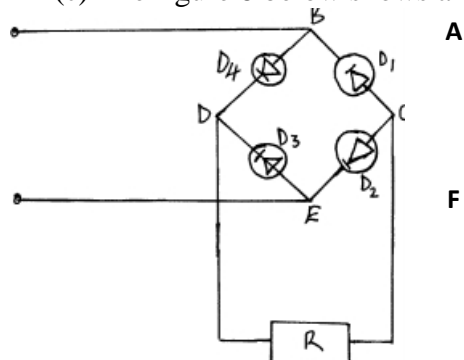
Figure 8

i) Define the term rectification. (1 mark)

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ii)   Describe how the illustrated rectifier works. (4 marks)

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iii) State the modification that can be made on the arrangement to improve the quality of the output. (1 mark)

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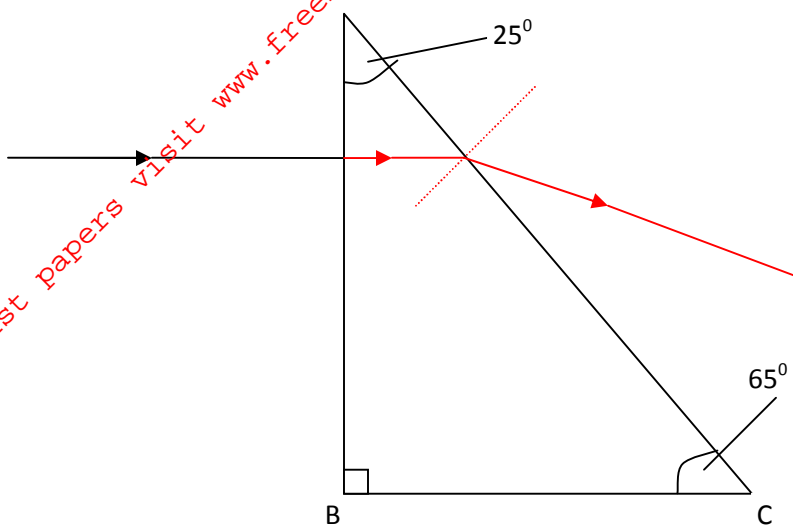
iv) Sketch on the ares below how the improved output is displayed on a C.R.O screen.
(1mark).

17. (a) The diagram below shows a glass prism and an incident ray striking the face marked AB

(i) Indicate on the diagram the path of the emergent ray   (1 mark)

(ii) Calculate the angle of refraction (r) of the resultant ray given the refractive index of glass is 1.5   (3 marks)
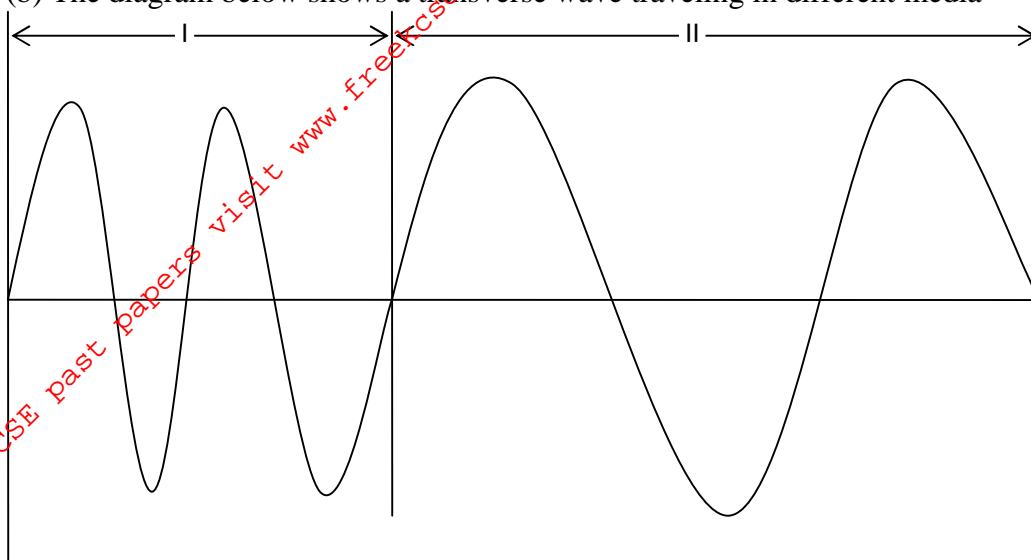
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(iii) Find the angle through which the ray is deviated.   (1 mark)

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(b) The diagram below shows a transverse wave traveling in different media

(i)   Name any two changes that the waves undergo in moving from medium I to medium II.   (2 marks)

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(ii)   State with reason which of the two media is denser   (2 marks)

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(iii)   Differentiate between transverse progressive and longitudinal progressive wave.   (2 marks)

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(c) Suppose you have the following appliances for use in your home.

Appliance	Power Rating (w)	Time used in hours per day
Cooker	4000	1
TV set	150	3
Electric kettle	2000	½
Radio	300	6

What is the cost to be made in a month of 30 days? If one unit is Ksh 6.65 (2 marks)

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