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

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

Date .....

LANJET JOINT EVALUATION
DEC 2022
FORM FOUR
PHYSICS

Paper -232/2-
Time: 2 hours

INSTRUCTIONSTO CANDIDATES

- *Write your name and index number in the spaces provided*
- *This paper consists of two sections, A and B*
- *Answer ALL the questions in the spaces provided*
- *All working must be shown clearly in the spaces provided in this booklet*
- *Mathematical tables and electronic calculators may be used*

FOR EXAMINER'S USE ONLY

Section	Question	Maximummarks	Candidate's score
A	1-10	25	
B	11	14	
	12	15	
	13	14	
	14	12	
	Total score	80	

PHYSICS PP2
SECTION A (25)

1. state laws of reflection (2 marks)

✓ The incident ray the normal and the reflected ray at the point of incidence all lie on the same plane ✓1
✓ The angle of incidence equals the angle of reflection.

2. distinguish between real and virtual image (2mark)

Real image is the image that can be formed on the screen while virtual image is the image that cannot be formed on the screen. ✓1

3. an object is placed 30cm from a concave mirror of focal length 20cm. calculate the magnification (2marks)

$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

$\frac{1}{20} = \frac{1}{30} + \frac{1}{v}$

$\frac{1}{v} = \frac{1}{20} - \frac{1}{30} = \frac{1}{60}$

$v = 60\text{cm}$ ✓1

$M = \frac{v}{u} = \frac{60\text{cm}}{20\text{cm}}$

$= 3$ ✓2

4. A small electromagnetic is used for lifting and releasing a small steel ball is made as shown below.

a) Explain why soft iron is better material to use for the core (2marks)

Iron is a soft magnetic material ie it can be easily magnetised and easily demagnetised. ✓1 ✓1

b) In order to lift a slightly larger ball, it is necessary to make a stronger electromagnetic. State three ways in which the electromagnet could be more powerful. (3marks)

- increase the number of turns ✓1
- use soft iron core ✓1
- increase the amount of current ✓1 any three.
- change the shape of the core ✓1

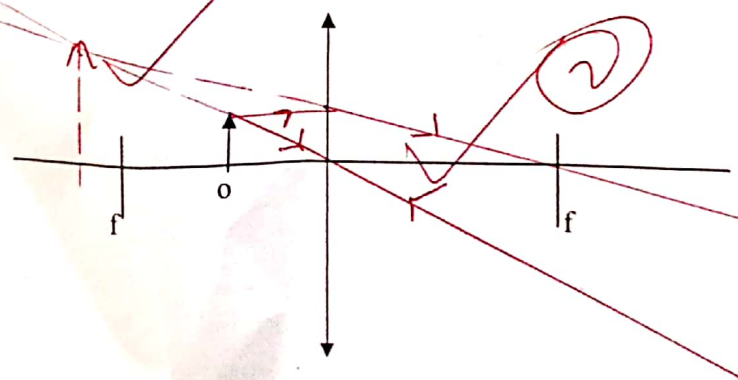
5. State one way in which radio waves can be detected (1mark)

Designed aerials connected to turned circuits, eg in radios and television (1 mark)

6. Define the term lens (1mark)

Is a transparent or a translucent medium which is used to change the direction of a beam of light passing through it

7. (i) The figure below shows a convex lens with an object before it. Draw rays to identify the position of image formed (2marks)



arrows must be shown ✓2

(ii)State one devise in which such a set-up is used (1mark)

In magnifying glasses and the microscope ✓1

8. (a) Define electric current (1mark)

Electric current is a flow of electric charge through a conductor ✓1

(b)A current of 3A passes through bulb B for 4 minutes. Determine the quantity of charge through B. (2 marks)

$Q = It$ ✓1

$3A \times 4 \times 60$ ✓1

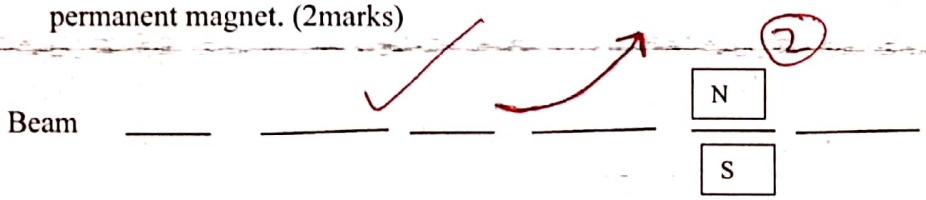
$= 720C$

9. Radioactive substance decayes as shown below

$$^{228}_{92}X \longrightarrow {}^{208}_{82}Y$$

How many alpha and beta particles are emitted? (3mks)

10. The figure below represents a cathode ray beam passing between pole pieces of a permanent magnet. (2marks) ✓2



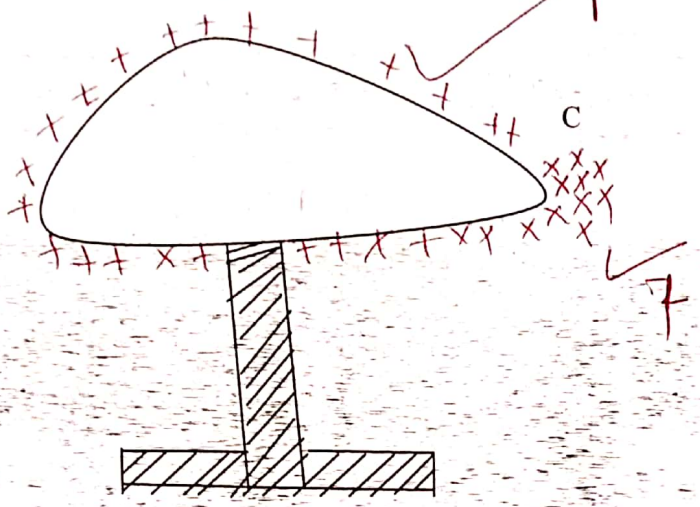
SECTION B (55 MARKS)

9. a)Define capacitance (1mark) ✓1

Is the ability of a capacitor to store charges.

b) State any two ways of decreasing the capacitance of a parallel plate capacitor (2marks)

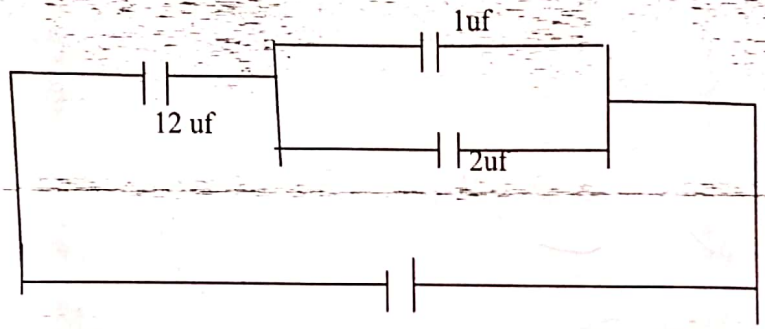
c) The diagram bellow shows a pear shaped charged conductor on an insulating stand. (Charge not shown on the diagram)



he can use negative

Show the charge distribution on the diagram. (2mks)

d) The figure below shows three capacitors A,B and C connected to a battery of e.m.f 12.0V and zero internal resistance



Determine;-

i) The effective capacitance of the circuit (3marks)

$C_p = C_1 + C_2$

$C_s = 1/C_1 + 1/C_2$

$1\mu f + 2\mu f = 3\mu f$

$C_s = 1/3 + 1/12 = 2.45\mu f$

i) The p.d across the 12 uf capacitor (3marks)

$Q = C \cdot V$

$= 12.0V \times 2.4 \times 10^{-6}$

$= 2.88 \times 10^{-5} C$

$V = Q/C = \frac{2.88 \times 10^{-5}}{1.2 \times 10^{-5}}$

$= 3.456V$

ii) Charge stored in the 11uf capacitor (3marks)

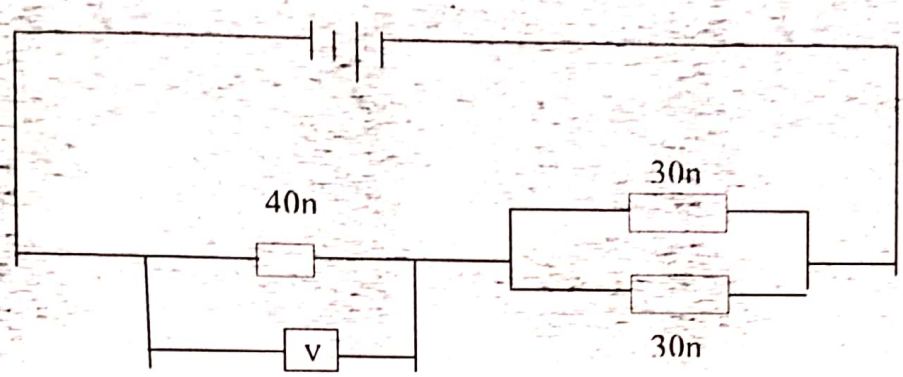
$Q = C \cdot V$

$8.544 \times 1 \times 10^{-6}$

$= 8.544 \times 10^{-6}$

10. a)You are provided with the following;
A cell and holder, a switch, a rheostat, an ammeter, a voltmeter and connecting wires.
Draw a diagram for a circuit that could be used to investigate the variation of the potential difference across the cell with the current drawn from the cell (1mark)

b) The cell in figure has an e.m.f of 2.6V and negligible internal resistance.



Determine the;

i) Total resistance in the current (2marks)

$\frac{1}{30} + \frac{1}{30} = \frac{1}{15}$ $R_B = 15 + 40$

$= 55\,\Omega$

ii) Current in the circuit (3marks)

$V = IR$

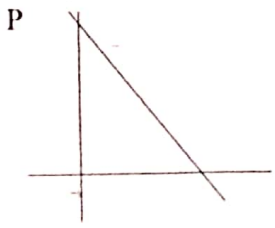
$I = \frac{V}{R} = \frac{2.6V}{55} = 0.04727A$

iii) Reading on the voltmeter (3marks)

$V = IR = 40\Omega \times 0.04727$

$= 1.891V$

c) The sketch bellow shows the p.d a cross a cell for various values of current through a resistance wire

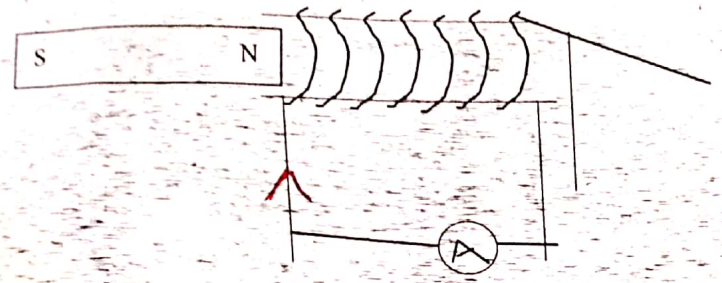


State and explain the significance of p. (2mks)

d)State faraday's laws of electromagnetic induction (1mark) ✓1 (mark)

The magnitude of the induced e.m.f is directly proportional to the rate of change of magnetic FLUX linkage.

e) A bar magnet is moved into a coil of insulated capon wire connect to a center-zero galvanometer as shown below.



Coil

i) Show on the diagram, the direction of induced current. (1mk)

ii) State and Explain what is observed on the galvanometer when the north pole of the magnet is moved into the withdrawn from the coil (2marks)

it is observed that when the north pole of the magnet is moved towards the coil the pointer deflects to the left. When, north pole of the magnet is moved away from the coil the pointer deflects to right.

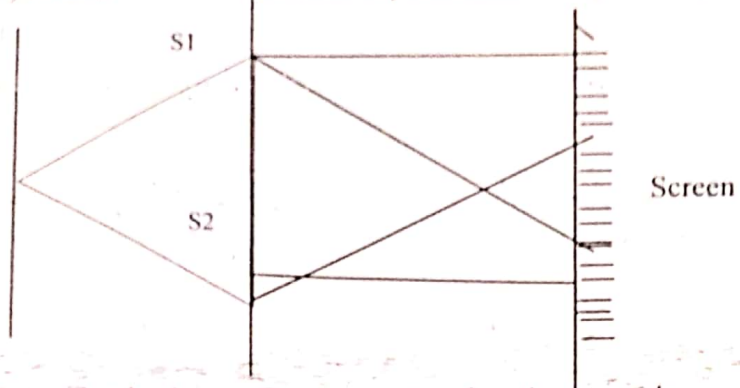
11. a)what is meant by the term work function (1mark)

This is the minimum energy need to remove electron from a metal surface.

b) When the frequency of the illuminating variation is just equal to the threshold frequency of the surface, no photoelectric effect observed. Explain (1mark)

c) A surface whose work function W_o is 2.4eV is illuminated by light of frequency $3.0x10^{15}$#Z. calculate the maximum kinetic energy of the ejected photo electrons ($h=6.63x10^{-34}$Js) (3marks)

d) The figure below shows an experimental arrangement s_1 and s_2 are narrow slits.



State what is observed on the screen when the source is

i) Monochromatic (2mark)

dark and bright fringes are formed on the screen. ✓✓

ii) White light (2mark)

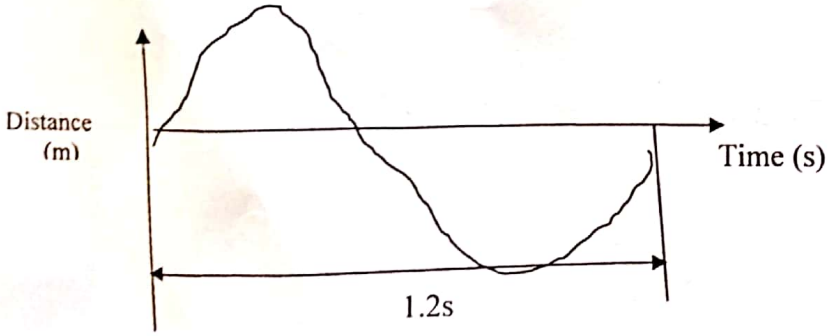
Seven colours of the rainbow is observed on the screen ✓✓

iii) What is the function of s_1 and s_2 (2marks)

- acts as two coherent sources

iv) Distinguish between longitudinal and transverse wire giving examples in each case. (2marks)

e) The figure below shows the displacement -time and displacement –distance graph of a certain wire.



From the diagram, if the speed of the wave is 320m/s, determine the wavelength. (2mks) ✓1

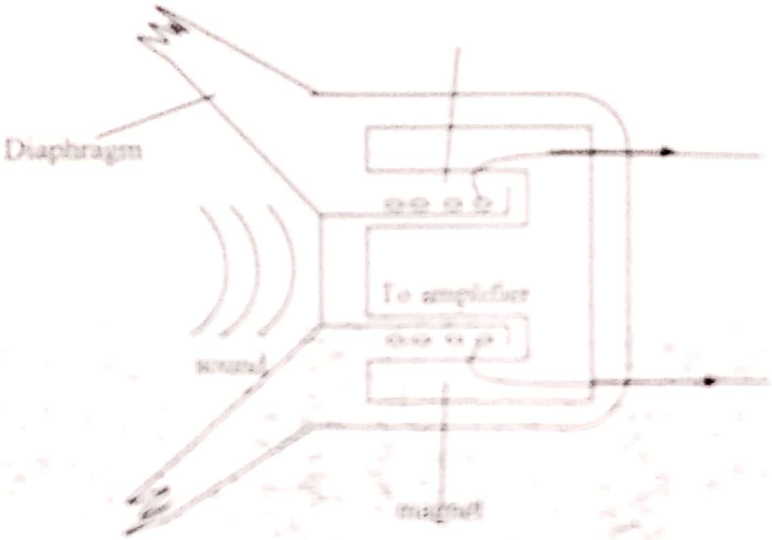
$V = \lambda f \quad \lambda = V/f$ ✓ $f = 1/T = 0.8333 = \frac{320 m/s}{0.833}$

$= 384.15m$

14. a) State the lenz's law of electromagnetic induction. (1mk)

The direction of the induced current is always such that it opposes the change of magnetic flux which produces it.

b) The following figure shows a simple microphone in which sound worn from a person talking cause the diaphragm to vibrate.



i) Explain how a voltage/a current is induced in the coil when the diaphragm vibrates. (2mks)

ii) State two ways in which the induced current in above coil can be increased. (2mks)

c) A transformer with 1200 turns in the primary coil and 120 turns in the secondary coil has 600v applied to its primary circuit from an ac. It is found that when a heater is connected to the secondary circuit, it produces heat at the rate of 800w. Assuming 100% efficiency. Determine the:

i) Voltage in the secondary circuit (2mks)

$$V_s = \frac{V_p \times N_s}{N_p} = 60V$$

ii) The current in the primary circuit. (2mks)

$$V_p I_p = 600$$

$$I_p = 1.5A$$