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

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

 Date........................................................

**LANJET JOINT EVALUATION**

**DEC 2021**

**FORM FOUR**

**PHYSICS**

Paper - 232/2

**Time:** 2 hours

**INSTRUCTIONS TO 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** | **Maximum marks** | **Candidate's score** |
| **A** | 1-12 | 25 |  |
| **B** | 131115 | 11 |  |
| 14 | 11 |  |
| 15 | 13 |  |
| 16 | 8 |  |
| 17 | 10 |  |
|  | **Total score** | 80 |  |

**SECTION A (25 MARKS)**

**ANSWER ALL QUESTIONS**

1. a) State the number of images formed when three objects are placed between two plane mirrors parallel to each other. (1mark)

b) Give a reason why the images formed becomes fainter in successive reflection. (1mark)

2. State two reasons why the earth pin is normally longer than the other pins in a three pin plug. (2marks)

3. a) Explain the effects of pressure on the sound in air. (1mark)

b) Abby stands 190m from high wall and claps his hand, if he hears an each 1.3 seconds later. Calculate the speed of sound in air. (2 marks)

4. The figure (3) below illustrates an eye defect;

i) Identify the defect. (1mark)

ii) State one cause of this defect. (1mark)

iii) In the same diagram, sketch the appropriate ions lens to show the effect of the lens. (2marks)

5. Figure below shows a graph of the variation of strength of a magnet and the magnetizing force for two materials X and Y. Study it and answer the questions below

 x

 y

 Strength

 Of

 Magnet

 Magnetizing force

a) Identify the material that is a soft magnetic material. (1mark)

b) Repulsion and not attraction is considered to be the surest test for the polarity of a magnet. Give a reason for this. (1mark)

6. i) Two liquids A and B have refractive indices of 1.5 and 1.3 respectively. Compare the velocity of light in the two liquids. (1mark)

ii) State the property of sound that causes the formation of echo. (1mark)

7. Figure show a sharp pin fixed on a cap of leaf electroscope. The electroscope is highly charged and then left for some time. Explain why the leaf collapses. (2marks)

 Sharp pin

8. Use the figure below to answer the questions below.

 B

i) Name the part labeled B. (1mark)

ii) Accumulation of bubbles of hydrogen gas around the copper electrode is one of the defects of a simple primary cell. Name the defect. (1mark)

9. The chart shows an arrangement of different parts of the electromagnetic spectrum.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Radio waves | Q | Infrared rays | K | Ultra – violet rays | X - Rays |

i) Name the radiation represented by.

Q (1mark)

ii) State one use of radiation represented by K. (1mark)

10. Figure below shows two parallel thick copper conductors connected to a d.c power supply. A rider made from thin copper wire is placed on the conductor.

 N

 A

 Thick copper

 B

 S

 S Rider

When the switch s is closed, it is observed that the rider experiences motion a long the thick copper wire towards ends A and B. Explain (2 marks)

11. With the aid of a diagram, explain what is meant by two transverse waves being in phase. (2marks)

12. The figure below shows a current carrying wire at right angle to a cardboard. Iron fillings are sprinkled on the card and cord slightly tapped.

 Current flow

 Cardboard

 Wire

Draw and indicate the direction of the magnetic field displayed on the card. (1mark)

**SECTION B**

13. a) i) Define the term electrical resistance. (1mark)

ii) The filament of a heating coil is made using a long and thin write. Explain these observations. (2marks)

b) Figure below shows three resistors. The reading of voltmeter v is 9v. Study the diagram and answer the questions that follow.

 12Ω

 2Ω 5Ω

 4Ω

 V

 Figure (ii)

Determine;

i) The effective resistance. (2marks)

ii) The current through the 5Ω resistance. (2marks)

iii) The potential difference across the 2Ω resistor. (1mark)

c. i) What is meant by the term ‘terminal voltage’ as used in current electricity? (1mark)

ii) A cell supplies a current of 2.0A when connected to a 0.6 Ω resistor and 1.5A when the same cell is connected to 0.9Ω resistor. Find the e.m.f and the internal resistance of the cell. (3 marks)

14. The figure shows a set-up used to study the factors that affect this capacitance of a capacitor. X and Y are metal plates each fixed to an insulated stand. X is given a charge and Y is earthed. Study the set-up and answer the question that follows.

 Electroscope Conductor

 Y

 X

a) Describe how the set-up may be used to investigate the effect of the following on capacitance C. State the observation made on the leaf in each case.

i) Separation distance d, between the plates. (2marks)

ii) Effective area between the plates. (2marks)

iii) Explain how the capacitor gets charged. (2marks)

b) The figure show capacitor A and B connected in series with a battery of e.m.f 4v

 A B

 3µf 6µf

 4v

Determine;

i) The effective capacitance of the circuit. (2marks)

ii) The quantities of charge in capacitor A. (2marks)

iii) The quantity of charge in capacitor. (1mark)

15. When current flows through the coil of a transformer heating occurs in the wires leading to energy losses.

i) Explain why the heating occurs. (1mark)

ii) How can the heating be minimizes? (1mark)

b) The graph below show the relationship between position of rotating coil of a simple a.c generator in angles and the e.m.f generated.

 +

E.M.F generated

 90 180 270

 Angle of rotation

 -

Explain what happens between angles 00 and 900 and between angle 900 and 180. (2marks)

c) The input voltage of a transformer is 240v and its output is 12v. When an 80w bulb is connected across the secondary coil the current in the primary coil is 0.36A. Determine;

i) The ratio Np/Ns of the transformer (where Np is the number of turns in the primary coil and Ns is the number of turns in secondary coil) (3marks)

ii) The power input of the transformer. (2marks)

iii) The power output of the transformer. (1mark)

iv) The efficiency of the transformer. (2marks)

16. a) Figure 14 below shows the waves stating from two coherent sources S1 and S2 .

 S1 ● M

 S2 ●P

i) State the functions of S1 and S2. (1mark)

ii) State and explain what will be observed when the slit separation S1 and S2 is reduced. (2marks)

iii) What would be observed at point P if the waves are light waves? (2marks)

b) The figure below shows a ray of travelling from glass to air.

 Air

 420 Glass

Determine the;

i) Critical angle of the glass – air interface. (1mark)

ii) Refractive index of glass. (2 marks)

iii) Figure below shows a transverse wave.

 0.6

 Displacement (cm)

 0 10 20 30 40

Time (s) x10-2

 0.6

Determine the frequency of the wave. (2marks)

17. a) State two factors that affect photoelectric emission. (2marks)

b) If the work function of nickel is 8.0 x 10-19 Js and that of potassium is 3.68 x 10-19 Js (take the speed of light as 3.0 x 108ms and planks constant h as 6.63 x 10-34Js)

Determine the energy of the incident radiation. (3marks)

c) i) What is rectification? (1mark)

ii) Use a well labeled diagram to explain how a full wave rectification may be achieved by using and two diodes. (2marks)

iii) Define doping and draw the symbol of a p-n junction diode. (2marks)