

PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
JOIN THE REVOLUTION PROGRAM
FORM FOUR PHYSICS PRE-NECTA I (2023)

031/1

Time: 3 hours

July 2023

INSTRUCTIONS

1. This paper consists of section A, B and C with a total of Eleven (11) questions
2. Answer ALL question in section A and B and Two (2) from section C
3. Section A carries sixteen (16) marks, Section B fifty-four (54) marks and section Thirty (30) marks
4. Non-programmable calculators may be used
5. Cellular phones and any unauthorized materials are NOT allowed in the examination room
6. Write your Examination number on every page of your answer sheet provided
7. Where necessary, the following constant may be used:
 - a. Acceleration due to gravity, $g = 10\text{m/s}^2$ or 10N/kg
 - b. Atmospheric pressure $P_a = 102,000\text{N/m}^2$
 - c. Density of water, $\rho_w = 1\text{g/cm}^3$ or $1,000\text{kg/m}^3$
 - d. Density of mercury, $\rho_{Hg} = 13.6\text{g/cm}^3$ or $13,600\text{kg/m}^3$
 - e. Specific heat capacity of water, $C_w = 4,200\text{J/kg K}$
 - f. Speed of sound in air, $v = 340\text{m/s}$
 - g. Pie, $\pi = 3.14$

SECTION A (16 MARKS)

Answer **ALL** questions

1 For each of the items (i) – (x) choose the correct answer from among the given alternatives then write the letter of the correct answer in the answer sheets provided.

i) Which of the following apparatus is used to measure the mass of an object?

- a) Spring balance
- b) Triple balance
- c) Pendulum balance
- d) Hydrometer
- e) Thermometer

ii) A piece of cork of volume 100cm^3 is floating on the surface of water. If the density of the cork is 0.25g/cm^3 , what volume of the cork is immersed in the water?

- a) 100cm^3
- b) 0.25cm^3
- c) 25cm^3
- d) 100.25cm^3
- e) 0.025cm^3

iii) A blue T-shirt absorbs all the colour of the white light the blue T-shirt looks

- a) Red
- b) blue
- c) black
- d) white
- e) cyan

iv) A stone of 2kg falls from a height of 25m above the ground.

Calculate the potential energy

- a) 500J
- b) 279J
- c) 520J
- d) 390
- e) 150

v) A capacitor is used to store electric charge in the form of electric field. Which of the following explains why capacitor is highly employed in most electronic devices and communications?

- a) Capacitors are fabricated
- b) Capacitors are used as filters, smoothers, indicators and clippers
- c) Capacitors are cheap
- d) Capacitors are not complicated in design
- e) Capacitors are small in size

vi) A cube is made with equal lengths of thin copper wire. When the cube is uniformly heated from 200°C to 600°C

- a) It expands the same amount as solid/copper cube of the same size
- b) The shape changes to rectangular one
- c) The lengths of the wires are doubled
- d) The area of each side of the cube is double
- e) The cube will twist

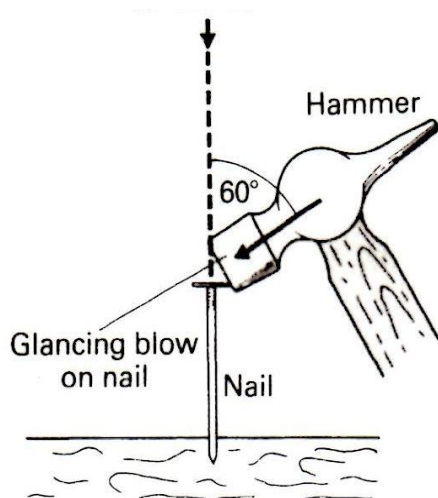
- vii) The zigzag path travelled by an electron from negatively charged
- a) Radar
 - b) Lightning
 - c) Thunder
 - d) Field emission
 - e) Ions
- viii) A spiral spring of natural length 1.50m is extended to 1.505m by a force of 0.80N. What will be its extension when the applied force is 3.20N?
- a) 0.005m
 - b) 6.020m
 - c) 0.020m
 - d) 4.520m
 - e) 1.57m
- ix) The note from a plucked guitar will have a low pitch if the string is
- a) Thick and short
 - b) Thick and slack
 - c) Thin and short
 - d) Thin and long
 - e) Thick and tight
- x) What do we call the temperature scale where 273 represent freezing and 373 represent boiling point of water?
- a) Fahrenheit
 - b) Celsius
 - c) Kelvin
 - d) Absolute
 - e) Angstrom

LIST A	LIST B
i. Stars are giant spheres of hot gases called____	a. Plasma
ii. Large group of stars, dust and gas held together by mutual gravitational forces	b. Galaxy
iii. Attractive force that exists between any two objects that have mass	c. Gravitational force
iv. Gravitational force that exists between the earth and other bodies	d. Gravity
v. Group of stars that form a definite pattern in the sky when viewed from the earth	e. Constellation
vi. Rare unusually high tide	f. Neap tides
	g. Astronomy
	h. Magma
	i. Asteroid or comets
	j. Proxigeon spring tide

SECTION B (54 MARKS)

Answer **ALL** questions

3. Figure below shows a Hammer striking a nail in wood with a glancing (sideways) force. If the force is 60N at 60° to the vertical.



- a) Find the vertical component
 - b) What will happen if the hammer strikes the nail horizontally with a force of 60N
- 4.
- a) i) The boots for soccer and hockey player have studs on their soles. Why?
ii) The force required by man to move his limbs immersed in water is smaller than the force for the same movement in air. Why?
 - b) i) A conical flask with a base of diameter 7.0cm is filled to a depth of 10cm with a liquid of density 840kg/m^3 . Find the total force due to the liquid on the base in Newton's.
ii) Consider a cylinder of cross section A filled with a liquid of uniform density ρ to a height h. a normal force acts on the bottom of the cylinder due to the weight of the liquid inside. Therefore, derive the pressure p exerted by the liquid on the bottom of the cylinder
- 5.
- a) Explain the following:
 - i) A person falling on a cemented floor gets more hurt than falling on a sand floor
 - ii) A hunter moves abruptly backwards on firing a bullet of 1kg his bullet of 10kg

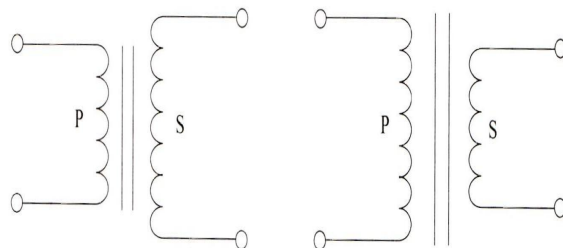
- b) A hydraulic press consists of a pump, load and two cylinders in which the larger cylinder is eight times the diameter of a smaller one. Use a well labelled-sectional diagram of a hydraulic press to determine the value of mechanical advantage of this machine if it is working with efficiency of 90%.
6. a) Use Newton's second law of motion to deduce that, impulse is equal to the change of linear momentum of a body, and explain why it is necessary important to fold our legs when we jump from a height on landing.
b) Explain why it is extremely so easy to raise a cargo in water but extremely very difficult to raise the same cargo in air.
7. a) Differentiate between heat capacity from specific heat capacity. Give two points
b) A form four students at U.B.N secondary school mixed water from two pots of the same mass. One pot is at 250°C and the other is at 350°C . what will be the equilibrium temperature in degree centigrade.
8. a) The velocity of car B relative to car A is 8m/s when the two cars are moving in the same direction and 28m/s when two cars are moving in opposite directions. Determine the velocity of each car
b) i) Why does an object appear coloured when light fall on it?
ii) Explain why the result of mixing blue and yellow paints is very different from that mixing blue and yellow light.

SECTION C (30 Marks)

Answer two questions from this section

9. a) X-rays are said to have harmful effect to human being when used for long time. Explain the effects that x-rays cause to human.
b) i) Describe how x-rays are produced in x-ray tube.
ii) Explain four uses of x-rays in daily life.

10. a) State laws of electromagnetic induction
b) With reason name the following symbols. Hence state the function of each in the national grid of electricity.



Step up transformer symbol

Step down transformer symbol

11. a) Draw a well labelled diagram of cathode ray tube. Hence state two uses of the drawn diagram and two properties of rays produced in it.
b) What are the main purpose of connecting a diode and transistor on various electric devices? (describe for each device)

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