PHYSICS BASIC

19/06/2025

Period: 08:30 Am – 11:30 Am

NESA NATIONAL EXAMINATION AND SCHOOL INSPECTION AUTHORITY

TERM III EXAMINATIONS, 2024-2025

OPTION/TRADE: ANH, ELT, REN, WOT, LSV, PLT, BDC, MAT, AUT, PWO, AGR, FOP, FOR, IND, MMP, CSA, NIT, SWD, WIR, ETE.
LEVEL 4

SUBJECT/EXAM: PHYSICS BASIC

DURATION: 3 HOURS

INSTRUCTIONS TO CANDIDATES:

This Exam paper is composed of Two Sections (A and B). Follow the instructions given below, and answer the indicated questions for a total of 100 marks

Section **A**: Fifteen (**15**) questions, all **Compulsory.** **55marks**

Section **B**: Among the five (**5**) questions, attempt any three (3). **45 marks**

Allowed materials:

- ✓ Geometrical Instruments
- ✓ Silent non-programmable calculators
- ✓ Blue and black pen only.

SECTION A: Attempt All Questions (55 marks)

1. The unit of electric charge is: (3 marks)
   a) Coulomb
   b) Newton
   c) Joule
   d) Watt

2. The quantity that measures the rate of change of velocity is: (3 marks)
   a) Force
   b) Acceleration

c) Displacement
d) Energy

3. Which of the following is the correct expression for Ohm's Law? (4 marks)
   a) V=IRV = IRV=IR
   b) P=IVP = IVP=IV
   c) F=maF = maF=ma
   d) E=mc2E = mc^2E=mc2

4. A wave has a frequency of 50Hz and a wavelength of 6m. Its speed is: (5 marks)
   a) 300 m/s
   b) 8.3 m/s
   c) 600 m/s
   d) 3 m/s

5. The principle of conservation of energy states that: (4 marks)
   a) Energy can be destroyed.
   b) Energy can be created.
   c) Energy cannot be created or destroyed.
   d) Energy is always lost.

6. The acceleration due to gravity on Earth is approximately: (3 marks)
   a) 8.9 m/s²
   b) 9.8 m/s²
   c) 10.8 m/s²
   d) 12.5 m/s²

7. The potential difference across a 10Ω resistor with 2A current is: (3 marks)
   a) 5V
   b) 20V
   c) 0.2V
   d) 12V

8. The kinetic energy of a body of mass 2kg moving at 3m/s is: (4 marks)
   a) 9J
   b) 3J
   c) 6J
   d) 1.5J

9. Which particle is neutral? (3 marks)
   a) Electron
   b) Proton
   c) Neutron

d) Positron

10. The first law of thermodynamics is a statement of: (4 marks)
    a) Conservation of energy
    b) Conservation of momentum
    c) Conservation of charge
    d) Conservation of mass

11. The SI unit of Power is: (3 marks)
    a) Joule
    b) Watt
    c) Newton
    d) Volt

12. If a transformer has 500 turns on the primary coil and 1000 turns on the secondary coil, it is: (3 marks)
    a) Step-down Transformer
    b) Step-up Transformer
    c) Ideal Transformer
    d) Faulty Transformer

13. The force acting on a charge moving in a magnetic field is given by: (4 marks)
    a) F=qEF = qEF=qE
    b) F=qvBsinθF = qvB \sin\thetaF=qvBsinθ
    c) F=mgF = mgF=mg
    d) F=kq1q2r2F = k \frac{q_1q_2}{r^2}F=kr2q1q2

14. Which of the following electromagnetic waves has the highest energy? (4 marks)
    a) Radio waves
    b) Infrared
    c) X-rays
    d) Microwave

15. A radioactive material has a half-life of 2 years. How much remains after 6 years? (5 marks)
    a) 1/8
    b) 1/4
    c) 1/2
    d) 1/16

SECTION B: Attempt Any THREE (45 marks)

16. **Mechanics**
    A body of mass 5kg is pushed with a force of 20N on a frictionless surface.

a) Calculate its acceleration. (2 marks)
b) Find its velocity after 4 seconds. (3 marks)
c) Determine the work done by the force after the body moves 10 meters. (3 marks)

17. **Thermodynamics**
A gas expands at constant pressure of $2x10^5$ Pa from a volume of $0.01m^3$ to $0.03m^3$.
a) Calculate the work done by the gas. (4 marks)
b) If 1000J of heat is added to the system, find the change in internal energy. (4 marks)
c) State the first law of thermodynamics. (2 marks)

18. **Electricity**
A circuit contains a 12V battery connected to two resistors of 4Ω and 6Ω in series.
a) Find the total resistance. (3 marks)
b) Determine the total current in the circuit. (3 marks)
c) Calculate the potential difference across the 6Ω resistor. (3 marks)

19. **Waves and Optics**
A monochromatic light of wavelength 600nm passes through a slit of width 0.1mm producing a diffraction pattern on a screen 2m away.
a) Find the angular position of the first diffraction minimum. (4 marks)
b) Calculate the width of the central maximum. (4 marks)
c) What happens to the pattern if the wavelength is increased? (2 marks)

20. **Modern Physics**
A photon has an energy of 3.2×10^{-19}J.
a) Find its frequency. (4 marks)
b) Calculate its wavelength. (4 marks)
c) Which part of the electromagnetic spectrum does this photon belong to? (2 marks)