

# GENERAL CERTIFICATE OF EDUCATION BOARD

## General Certificate of Education Examination

JUNE 2025

ADVANCED LEVEL

Centre Number	
Centre Name	
Candidate Number	
Candidate Name	

Mobile phones are NOT allowed in the examination room.

### MULTIPLE CHOICE QUESTION PAPER

Duration: One and Half Hours

#### INSTRUCTIONS TO CANDIDATES

*Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.*

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

*Before the examination begins:*

3. Check that this question booklet is headed "Advanced Level – 0780 PHYSICS 1"
4. Fill in the information required in the spaces above.
5. Fill in the information required in the spaces provided on the answer sheet using your HB pencil:  
**Candidate Name, Exam Session, Subject Code and Candidate Identification Number.**  
Take care that you do not crease or fold the answer sheet or make any marks on it other than those asked for in these instructions.

*How to answer the questions in this examination*

6. Answer **ALL** the 50 questions in this Examination. All questions carry equal marks.
7. Calculators are allowed.
8. Each question has FOUR suggested answers: **A, B, C** and **D**. Decide which answer is correct. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen.

For example, if **C** is your correct answer, mark **C** as shown below:

[A] [B] ☒ [C] [D]

9. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
10. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
11. Do all rough work in this booklet, using, where necessary, the blank spaces in the question booklet.
12. **At the end of the examination, the invigilator shall collect the answer sheet first and then the question booklet after. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

Turn Over



## SECTION I (Thirty five questions)

## Question: 1- 35

Directions: Each of the questions or incomplete statements in this section is followed by four suggested answers. Select the best answer in each case.

1. The  $\text{kg m}^2 \text{s}^{-3}$  is the base unit of
  - A Electric current
  - B Power
  - C Planck constant
  - D Energy
2. An aircraft moving through air at a velocity  $v$  experiences a resistive force  $F$ , given by the expression  $F=Kv^2$ , where  $K$  is a constant. The power required to keep the aircraft moving with constant velocity is given by;
  - A  $Kv^2$
  - B  $Kv$
  - C  $Kv^4$
  - D  $Kv^3$
3. Metals have positive temperature coefficients of resistance. This means that their;
  - A resistivity decreases with a decrease in temperature
  - B resistance increases with an increase in temperature
  - C resistivity increases with decrease in temperature
  - D resistance decreases with increase in temperature
4. The Kelvin temperature scale differs from other temperature scales in that it;
  - A does not depend on the property of any particular substance
  - B is most accurate and depends on pressure changes
  - C depends on the expansion of ideal gases
  - D is very easy to establish
5. Which of the following set of physical quantities are all vectors?
  - A Mass, velocity and displacement
  - B Magnetic flux, displacement and momentum
  - C Magnetic flux, electric field strength and velocity
  - D Magnetic flux density, force and momentum

6. Which of the following statements explains the sensation of weightlessness experienced by an astronaut inside a space vehicle?
  - A The astronaut has no acceleration relative to the spacecraft.
  - B There is no gravitational force acting on him.
  - C The acceleration of the astronaut and the spacecraft is very small hence causing the sensation of weightlessness.
  - D The astronaut has no centripetal acceleration.

7. When a road is banked, the centripetal force on a car going round a bend is provided by
  - A frictional force only
  - B normal reaction and frictional forces
  - C normal reaction only
  - D a component of the weight of the car
8. In the circuit of figure 1, the battery has an e.m.f. of 3.00 V and an internal resistance  $r$ .  $R$  is a variable resistor. The resistance of the meter  $M_1$  is negligible and the meter  $M_2$  has an infinite resistance.

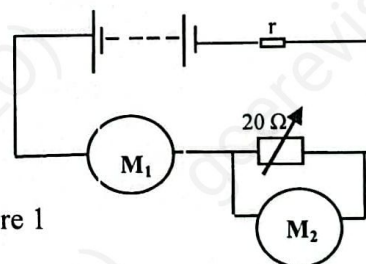


Figure 1

The value of  $r$  and reading of  $M_2$  are respectively

- A  $0.8 \Omega$  and 2.8 V
  - B  $0.5 \Omega$  and 3.0 V
  - C  $0.8 \Omega$  and 3.5 V
  - D  $0.5 \Omega$  and 2.5 V
9. An atom R is excited to an energy level  $E_3$ , from the ground state  $E_0$  by collision with another atom S. Which of the following is correct about their energy transition?
  - A R loses energy to S
  - B S must lose energy to excite R
  - C The spectrum of R is an emission type
  - D S absorbs energy from R

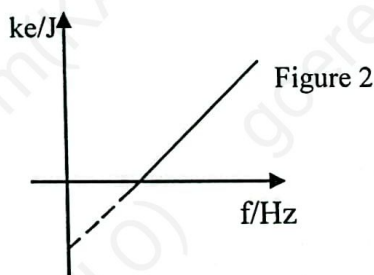


10. Two wires P and Q are made from the same material. Wire Q has twice the diameter and experiences twice the tension of wire P. The wires both obey Hooke's law and have the same original length. If the extension of wire P is  $e$ , what is the extension of wire Q?

A  $2e$   
 B  $\frac{e}{4}$   
 C  $e$   
 D  $\frac{e}{2}$

11. The generation of a back EMF in a coil is due to;  
 A a change in the current of a nearby coil  
 B a steady current through the coil  
 C a changing current in the coil  
 D heating due to current in the coil

12. A metal of work function  $W_0$  is irradiated with monochromatic light of frequency  $f$ . The variation of the maximum kinetic energy,  $ke$ , of an emitted electron, versus the frequency is shown in figure 2:



The gradient and the Y-intercept respectively give:

- A work function and Planck constant  
 B stopping potential and work function  
 C stopping potential and work function  
 D Planck constant and work function

13. Which of the following statements is correct about intrinsic semiconductor?  
 A It has equal number of holes and electrons  
 B Holes are the majority charge carriers  
 C Electrons are the majority charge carriers  
 D Their conduction and valence bands overlap

14. A uniform metre rule is supported on a knife edge placed at the 45.0 cm mark. A weight of 0.30 N suspended at the 10.0 cm mark balances the metre rule horizontally as in figure 3.

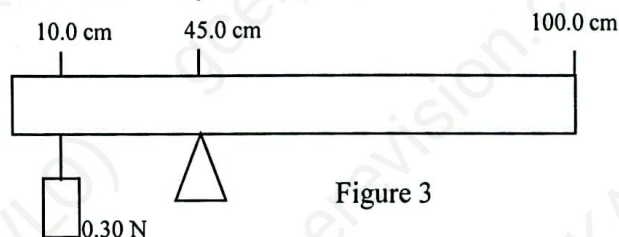


Figure 3

The weight of the metre rule is;

- A 0.24 N  
 B 2.10 N  
 C 54.0 N  
 D 0.21 N

15. If the half-life of an 80  $\mu\text{g}$  sample of  $^{60}_{27}\text{Co}$  is 5 years, how much of  $^{60}_{27}\text{Co}$  is left after 15.9 years?

- A 6.7  $\mu\text{g}$   
 B 10.0  $\mu\text{g}$   
 C 8.8  $\mu\text{g}$   
 D 2.7  $\mu\text{g}$

16. The time taken for a 1200 W heater to boil away 2400 g of water initially at 100  $^{\circ}\text{C}$  is;

- A  $4.5 \times 10^3 \text{ s}$   
 B  $6.7 \times 10^3 \text{ s}$   
 C  $4.5 \times 10^6 \text{ s}$   
 D  $6.7 \times 10^6 \text{ s}$

17. Figure 4 shows a system of two forces.

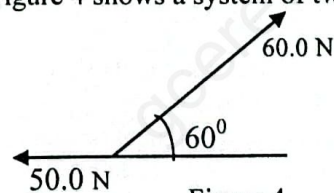


Figure 4

The magnitude of the resultant force is;

- A 95.4 N  
 B 31.9 N  
 C 55.7 N  
 D 131.9 N



A simple DC motor operates on the principle of a torque on a current carrying conductor placed in a magnetic field. Which of the following factors will decrease the torque?

- A Increasing the size of the current
- B Increasing the force on the conductor perpendicular to the magnetic field
- C Using a longer conductor
- D Increasing the force on conductor parallel to the magnetic field

A hammer is used to strike a nail to drive it into a thick wooden slab. Just after striking the kinetic energy of the hammer is converted into;

- A sound only
- B sound and heat
- C sound, heat and kinetic energy of the nail
- D sound, heat and potential energy of the nail

The area under a force – separation curve for two adjacent molecules of a solid signifies the

- A latent heat of sublimation
- B equilibrium spacing
- C Young's modulus of the material
- D breaking force

The graph in figure 5 shows the heating curve for a certain substance, sections AB, BC, CD and DE represent different stages of the heating process.

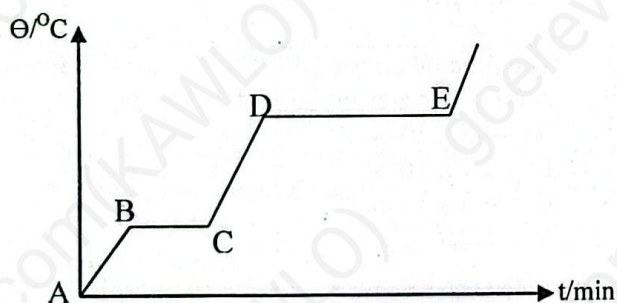


Figure 5

Which of the following statements best accounts for the difference in BC and DE?

- A The specific latent heat of fusion is greater than the specific latent heat of vaporization.
- B The specific heat capacity of the substance in state BC is larger than that of state DE
- C The specific heat capacity of the substance in state BC is less than that of state DE
- D The specific Latent heat of fusion is less than the specific latent heat of vaporization

22. Which of the following photoelectric observations is correctly explained by the classical theory?

- A Photoelectric emission should occur only at and beyond the threshold frequency
- B Maximum kinetic energy of photoelectrons depends only on the frequency of incident radiation
- C The photoelectric current increases with increase ultra violet intensity
- D Photoelectric emission occurs less than 1ns after illumination

23. The graph in figure 6 shows the number of molecules plotted against molecular speeds for two different temperatures of a gas.

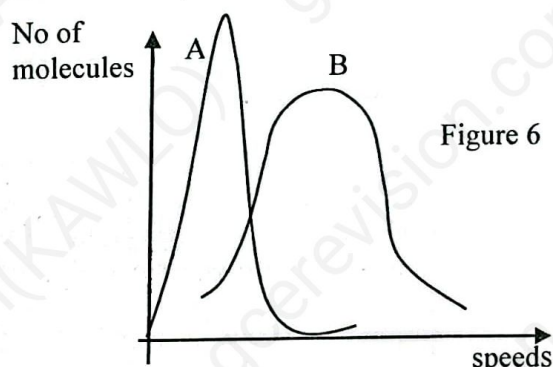


Figure 6

Which of the statements about the Maxwellian distribution curves is true?

- A Curve A depicts that many molecules have most probable speed at high temperature
- B Curve B depicts fewer molecules have high speeds at high temperature
- C Curve A depicts more molecule have low speed at high temperature
- D Curve B depicts that more molecules have high speeds at high temperature

24. Figure 7 shows a pure inductor, L, a capacitor, C, of capacitance  $100 \mu\text{F}$ ; connected in series with a  $1000 \Omega$  resistor.

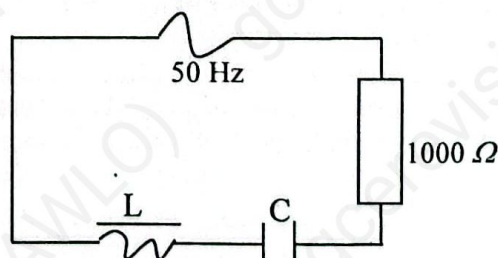


Figure 7

If the resonant frequency for the circuit is  $29.1 \text{ Hz}$ , then the inductance of the inductor L is;

- A  $3.0 \text{ H}$
- B  $0.3 \text{ H}$
- C  $0.03 \text{ H}$
- D  $0.003 \text{ H}$



25. The force acting between a  $+7.00 \mu\text{C}$  and a  $-3.50 \mu\text{C}$  in air placed  $15.0 \text{ cm}$  apart is;  
 A  $9.79 \text{ N}$   
 B  $8.79 \text{ N}$   
 C  $9.99 \text{ N}$   
 D  $7.99 \text{ N}$
- 
26. Which of the following statements about the potential energy of a charged particle is correct?  
 The potential energy of a;  
 A negatively charged particle increases when it moves from a point of lower potential to that of higher potential  
 B negatively charged particle increases when it moves from a point of higher potential to that of lower potential  
 C positively charged particle increases when it moves from to a point of lower potential to that of higher potential  
 D negatively charged particle is zero when it moves to a point of lower potential.
- 
27. A diffraction grating has  $500$  lines per  $\text{mm}$  and is illuminated by a monochromatic light of wavelength  $600 \text{ nm}$ . The total number of images seen on both sides of the normal including the central image is;  
 A  $9$   
 B  $8$   
 C  $7$   
 D  $6$
- 
28. A nitrogen atom ( $\text{N-13}$ ) is transformed into carbon atom ( $\text{C-13}$ ) by the emission of :  
 A neutron  
 B positron  
 C proton  
 D electron
- 
29. Which of the following is **NOT** correct for interference of light from two sources to occur?  
 A The two light beams should be monochromatic  
 B The two light beams should be coherent  
 C The two light beams must come from the same source  
 D The two light beams must maintain a constant phase with respect to each other
- 
30. When a tungsten target is bombarded with high energy electrons, it becomes hot because  
 A x-rays are emitted.  
 B the emitted electrons have high potential power  
 C moving electrons constitute an electric current  
 D some of the kinetic energy of the electrons is absorbed on impact.
- 
31. The truth table below describes a logic circuit with inputs X and Y and output Z. Which of the gates below corresponds to the truth table?
- | X | Y | Z |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |
- A NOT  
 B AND  
 C NAND  
 D NOR
- 
32. A small mass  $m$ , is attached to one end of a spring whose other end is fixed to a support. The mass is made to perform vertical oscillations. This motion can be described as:  
 A force oscillations  
 B damped oscillations  
 C circular motion  
 D resonance
- 
33. An alternating current which has the same effect as a direct current of  $4.5 \text{ A}$  is passed through an LCR series circuit. The root mean square current is;  
 A  $3.2 \text{ A}$   
 B  $6.4 \text{ A}$   
 C  $2.1 \text{ A}$   
 D  $4.5 \text{ A}$
-



34. The circuit in figure 8 shows three capacitors connected across a 4 V battery. The total capacitance of the circuit is;

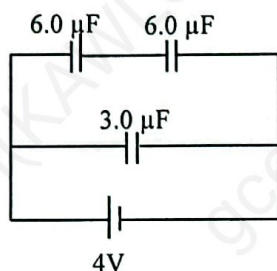


Figure 8

- A 18.0  $\mu\text{F}$   
 B 9.0  $\mu\text{F}$   
 C 6.0  $\mu\text{F}$   
 D 15.0  $\mu\text{F}$
35. Two steel balls P and Q are projected horizontally from the same height above the ground with velocities  $V_1$  and  $V_2$  respectively. If  $V_1 > V_2$ , which of the following statements about the motion of the balls is true?  
 A P takes a longer time to reach the ground  
 B Q reaches the ground first.  
 C P covers a greater horizontal distance than Q  
 D Both balls cover the same horizontal distance

## SECTION II (Ten questions) Multiple Selection

### Questions 36- 45.

Directions: Each question or incomplete statement in this section is followed by three numbered responses. One or two of the responses may be correct. Decide which of the responses is/are correct then choose

- A if 1 and 2 are correct  
 B If 2 and 3 are correct  
 C if 1 only is correct  
 D if 3 only is correct  
 Direction summarised

36. Which of the following responses is/are correct?  
 1. The minimum excitation potential of a monoatomic gas is less than the minimum ionisation potential.  
 2. The energy of a photon is proportional to its frequency.  
 3. The work function of a metal is the quantity of energy given up by an electron after it has been released from a metal by a photon.

6

37. The internal energy of an ideal gas is increased if its;  
 1. pressure is raised, the temperature remaining constant.  
 2. temperature is raised, the pressure remaining constant.  
 3. temperature is raised the volume remaining constant.

38. The accuracy of a measuring instrument can be achieved by using the null deflection method. Which of the following instrument(s) makes use of this method?  
 1. Potentiometer  
 2. Wheatstone bridge  
 3. The cathode ray oscilloscope

39. The current density in a conductor depends on the;  
 1. cross sectional area of conductor  
 2. drift velocity of charge carriers  
 3. number of charge carriers per unit volume

40. Some nocturnal animals are able to detect obstacles by sending out high frequency sound waves. If a bat that flies at a steady speed  $U_0$  locates a stationary obstacle by sending out sound of frequency  $f$  towards the obstacle, which of the following statements is/are correct?

1. The apparent frequency increases as the bat approaches the obstacle.  
 2. There are nodes and antinodes between the line joining the position of the bat and the obstacle.  
 3. The wavelength of the wave decreases as the bat approaches the obstacle.

41. W, X and Y are three liquids with specific heat capacities  $2400 \text{ J kg}^{-1} \text{ K}^{-1}$ ,  $140 \text{ J kg}^{-1} \text{ K}^{-1}$  and  $3800 \text{ J kg}^{-1} \text{ K}^{-1}$ , respectively. Which of the explanations is/are true?

A	B	C	D
1 and 2	2 and 3	1 only	3 only

1. Y is the best cooling substance because it has the highest value of specific heat capacity  
 2. X is the best thermometric substance because it has the smallest value of specific heat capacity  
 3. W is a better heat absorber than Y



42. Which of the following phenomena provides evidence for the wave nature of electromagnetic radiation?

1. Photoelectricity
2. Interference
3. Diffraction

43. Which of the following will increase the sensitivity of a liquid in glass thermometer?

1. Using a transparent tube.
2. Using a coloured liquid
3. Using a tube with a narrow bore

44. Which of the following is/are correct about a charged metal sphere?

1. The electric field strength within the metal is greatest.
2. The electric field strength varies directly with separation from the surface.
3. The electric flux on the surface is constant.

45. A satellite orbiting a planet at a distance  $R$  from the centre moves at constant speed,  $v$ . Which of the following statements is/are correct?

1. The force on the satellite is directed towards the centre.
2. Its velocity changes and the acceleration is  $v/R^2$
3. There is no velocity change since the speed is constant.

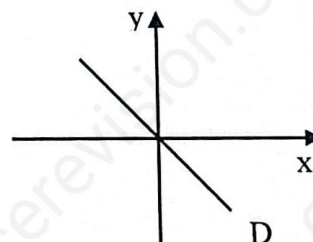
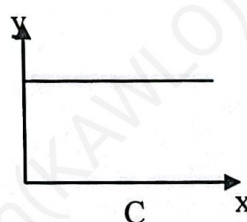
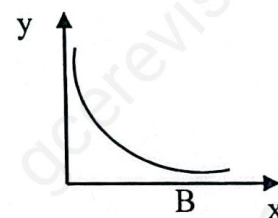
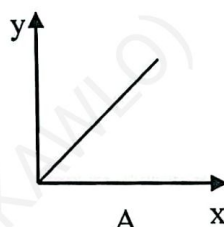
### Section III (five questions)

Questions 46- 50

Directions: Each of the questions (46-50) has a set of four graphs A-D. Which of the graphs in each question best fits the relationship between  $x$  and  $y$ ?

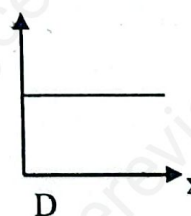
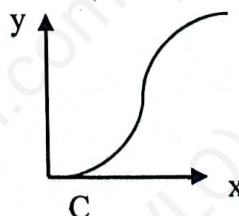
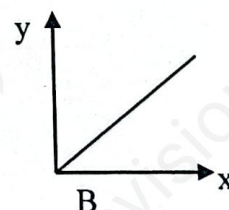
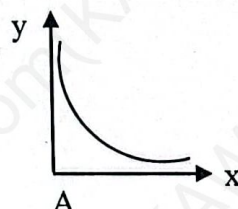
46.

y	x
Acceleration for a body undergoing SHM	Displacement



47.

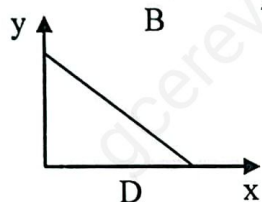
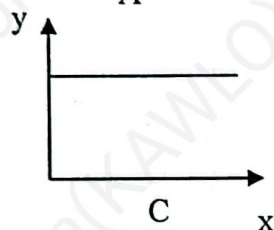
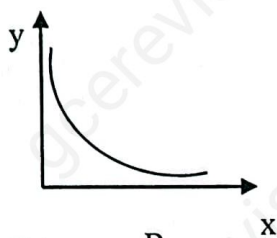
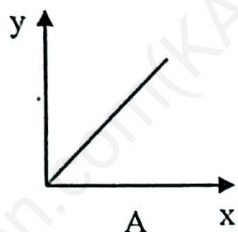
y	x
Intensity of sound from a moving source towards a stationary observer	Distance of source from observer



Turn Over

48.

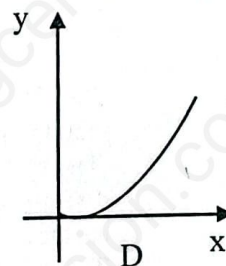
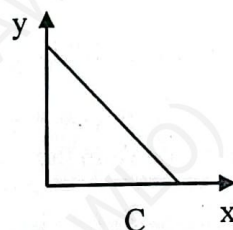
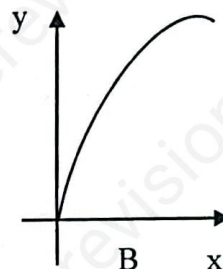
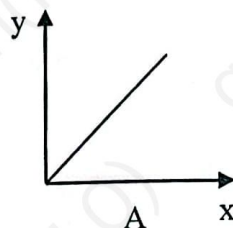
y	x
Electric Potential inside a charged sphere	Distance from the centre of the sphere



8

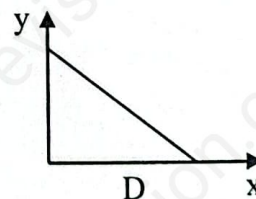
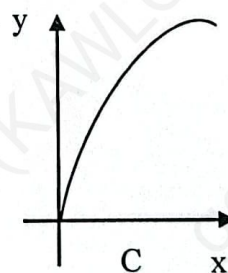
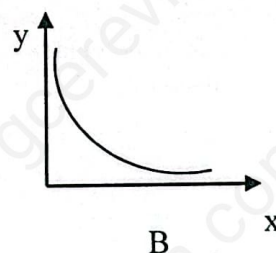
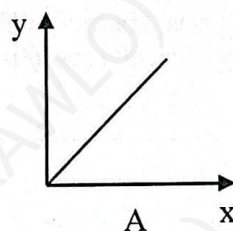
49.

y	x
Current through a filament lamp	Voltage across the lamp



50.

y	x
Gravitational field strength inside the earth	Distance from the centre of the earth



**STOP**  
**GO BACK AND CHECK YOUR WORK**