



TECHNO INDIA GROUP PUBLIC SCHOOL

MOCK TEST-2 (2025-2026)

CLASS-XII

Subject Code **042**

Roll No.

--	--	--	--	--	--	--

Candidates must write the code on the title page of the answer-book.

PHYSICS

Time allowed : 3 hours

Maximum Marks : 70

General Instruction:

- There are 33 questions in all. All questions are compulsory.
- This question paper has five sections : Section A, Section B, Section C, Section D and Section E.
- All these sections are compulsory.
- Section A** contains sixteen questions, twelve MCQ and four Assertion Reasoning based of 1 mark each. **Section B** contains five questions of two marks each. **Section C** contains seven questions of three marks each. **Section D** contains two case study –based questions of four marks each and **section E** contains three long answer questions of five marks each.
- There is no overall choice. However , an internal choice has been provided in one question in section B, one question in Section C, one question in each CBQ in Section D and all three questions in Section E. You have to attempt only one of the choices in such questions.
- Use of calculator is not allowed.
- You may use the following values of physical constants where ever necessary.
[i] $c = 3 \times 10^8 \text{ m/s}$ [ii] $m_e = 9.1 \times 10^{-31} \text{ kg}$ [iii] $m_p = 1.7 \times 10^{-27} \text{ kg}$
[iv] $e = 1.6 \times 10^{-19} \text{ C}$ [v] $\mu_0 = 4\pi \times 10^{-7} \text{ T m A}^{-1}$ [vi] $h = 6.63 \times 10^{-34} \text{ Js}$
[vii] $\epsilon_0 = 8.854 \times 10^{-12} \text{ C}^2 \text{N}^{-1} \text{m}^{-2}$
[viii] Avogadro's number = 6.023×10^{23} per gram mole.

SECTION A

[1 × 16 = 16]

Section A consists of 16 questions of 1 mark each.

1.	Ratio of kinetic energy of two particles is 1 : 2 having same momentum. Find ratio of their de Broglie wavelength (A) 1 : 2 (B) $\sqrt{2}:1$ (C) 4 : 1 (D) 1 : 1	[1]
2.	If two spheres of ratio of radius 1 : 2 rubbed with each other, smaller spheres acquires q_1 charge and bigger acquires q_2 charge, if $q_1 = 6\mu\text{C}$ then $q_2 =$ (A) $-6\mu\text{C}$ (B) $-12\mu\text{C}$ (C) $-3\mu\text{C}$ (D) zero	[1]
3.	The potential difference between A and B as shown in figure is (A) 1V (B) 2V (C) 3V (D) 4V	[1]

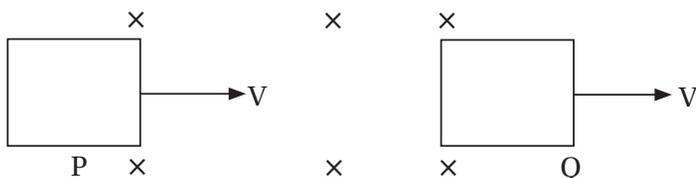
12.	An infinitely long rod lies along the axis of concave mirror of focal length f . The near end of the rod is at a distance $x > f$ from the mirror. Then the length of the image of the rod is (A) $\frac{f^2}{x+f}$ (B) $\frac{f^2}{x}$ (C) $\frac{xf}{x-f}$ (D) $\frac{f^2}{x-f}$	[1]
13.	The electric field in an EM waves is $E = 10 \sin(2\pi \times 10^{15} t) \text{ Vm}^{-1}$. If this EM waves falls on a metal with a work function 1.6 eV, the maximum kinetic energy of the photo electrons emitted nearly (A) 2.5 eV (B) 1.4 eV (C) 0.8 eV (D) 4.1 eV	[1]

ASSERTION-REASON BASED QUESTIONS (14-16):

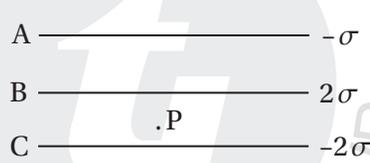
- A. If both Assertion and Reason are true and Reason is the correct explanation of Assertion
 B. If both Assertion and Reason are true and Reason is not the correct explanation of Assertion.
 C. If Assertion is true and Reason is false.
 D. If Assertion is false and reason is true.

14.	Assertion: The electric field inside a conductor is always zero in electrostatic equilibrium. Reason: Excess charges in a conductor redistribute themselves until the internal electric field becomes zero. (A) a (B) b (C) c (D) d	[1]
15.	Assertion: Drift velocity of electrons in a conductor is very small even for large current. Reason: Electrons undergo frequent collisions with lattice ions which limit their acceleration. (A) a (B) b (C) c (D) d	[1]
16.	Assertion: Current will flow between the two points in a circuit only when their is a potential difference act between the points. Reason: Current in a circuit is directly proportional to potential difference between two points. (A) a (B) b (C) c (D) d	[1]

SECTION B**[2 × 5 = 10]****Section B consists of 5 questions of 2 marks each.**

17.	Show that circumference of an electron revolving in hydrogen atom is equal to $n \times \lambda$ (if $n =$ integer and $\lambda =$ de Broglie wavelength).	[2]
18.	What is the de-Broglie wavelength of proton accelerated through 100V potential difference?	[2]
19.	In YDSE light of wavelength 600 nm produce 60 fringes in a region. If the total experiment perform in water ($\mu = \frac{4}{3}$) then find the no. of fringes produce?	[2]
20.	What is the electric flux produce in a sphere if an electron placed at the centre of a sphere?	[2]
21.	Draw a graph of induced current vs. time in the following coil.  the coil move from P to Q.	[2]

SECTION C**[3 × 7 = 21]****Section C consists of 7 questions of 3 marks each**

22.	Name the electromagnetic waves used for the following purpose. (a) Water purification (b) Remote sensing (c) Treatment of cancer	[3]
23.	Calculate the refractive index of the material of an equilateral prism for which the angle of minimum deviation is 60° . OR (a) A beam of white light on passing through a hollow prism gives no dispersion. Explain with ray diagram. (b) Dispersion is caused by refraction not by reflection. Why?	[3] [2] [1]
24.	(a) What happens to the interference pattern if the phase difference between the two sources varies continuously? (b) Why are coherent sources necessary to produce a sustained interference pattern?	[2] [1]
25.	State Gauss's theorem in electrostatics. Is it applicable for magnetic field? OR Find the electric field for the following case due to the three charged plate A, B and C is as follows at point 'P'. 	[3]
26.	Draw the following graph for photoelectric effect— (i) Kinetic energy of emitted electron vs. frequency of incident radiation (ii) Photoelectric current vs. anode voltage	[3]
27.	Find the r.m.s current and average current of the following AC. $I = 3 \sin \omega t + 4 \cos \omega t$	[3]
28.	An electron rotate in a circular path with 120 rpm and radius 2m in anticlockwise direction. Find magnetic field at the centre (magnitude and direction).	[3]

SECTION D**[2 × 4 = 8]****Section D consists of 2 questions of 5 marks each**

29.	Case Based Questions: A student studies a silicon, p - n junction diode connected in forward bias. The diode is connected to a 5V battery and a resistor. The forward voltage drop across the silicon diode is 0.7V when the polarity of the battery is reversed, the diode current becomes negligible. (a) What will be the voltage available across the external resistor in forward bias. (b) Why does a silicon diode start conducting only after 0.7V in forward bias? (c) When the diode is reversed bias, why is the current very small? (d) If circuit resistance is 10Ω find current in the circuit.	[1] [1] [1] [1]
-----	--	--------------------------

30.	Case Based Questions: An electron enters a uniform magnetic field with velocity perpendicular to field direction— (i) What type of path will the electron follow and why. (ii) Draw a graph to show the variation of speed of electron with time in magnetic field. (iii) State the expression for magnetic force on a moving charge. (iv) Mention one application of this principle.	[1] [1] [1] [1]
-----	---	--------------------------

SECTION E

[3 × 5 = 15]

Section E consists of 3 questions of 5 marks each.

31.	Explain the following giving reason: (i) A doped semiconductor is electrically neutral. (ii) In ϕ p-n junction under equilibrium there is no net current. (iii) In a diode, reverse characteristic graph draw in third quadrant. (iv) The semiconductor used for fabrication of LED's must at least a band gap of 1.8eV. (v) Germanium preferred over silicon for making semiconductor devices.	[1] [1] [1] [1] [1]
32.	A convex lens has same radius of curvature of 20 cm for both the surface and refractive index of glass is $\frac{3}{2}$ (i) Find its focal length (ii) If an object is placed 20 cm away from the lens, find magnification (iii) If this lens immersed in a liquid of $\left(\mu = \frac{4}{3}\right)$ find its new focal length. (iv) If one surface is silvered then what will be the new focal length. (v) Find power of the original lens. <p style="text-align: center;">OR</p> (a) State the principle of AC generator. (b) What is the role of slip ring? (c) What is the role of armature? (d) What type of energy conversion happens in a generator? (e) Write one use of an AC generator.	[1] [1] [1] [1] [1] [1] [1] [1] [1]
33.	A capacitor of capacitance $10\mu\text{F}$ is connected to a 200V DC source. If a dielectric of relative permittivity ($K = 4$) inserted between the plates then find the— (i) Ratio of initial charge and final charge store in the capacitor. (ii) Ratio of initial potential energy and final potential energy store in the capacitor. (iii) Ratio of force of attraction between the plate in initial and final. (iv) Ratio of capacitance initial and final. (v) Electric field inside the capacitor initial and final.	[1] [1] [1] [1] [1]