Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that bubble in front of that question number. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank. No credit will be awarded in case BUBBLES are not filled. Do not solve questions on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) The study of electric charges at rest under the action of electric forces is known as:
(A) Electromagnetism (B) Electrostatics (C) Magnetic Induction (D) Electric field

(2) A particle carrying a charge of $2e$ falls through a potential difference of $3V$. The energy acquired by it is:
(A) $9.6 \times 10^{-18} J$ (B) $9.6 \times 10^{-19} J$ (C) $1.6 \times 10^{-19} J$ (D) $9.6 \times 10^{-17} J$

(3) Kirchhoff's 2nd rule is a manifestation of law of conservation of:
(A) Energy (B) Charge (C) Mass (D) Momentum

(4) Formula for magnetic field due to solenoid is given by:
(A) $\mu_o I$ (B) $\mu_o nI$ (C) $\mu_o SI$ (D) $\mu_o n\ell$

(5) The value of permeability of free space 'μ_o' is: (A) $4\pi \times 10^{-7} Wb\, A^{-1} m^{-1}$
(B) $4\pi \times 10^{7} Wb\, A^{-1} m^{-1}$ (C) $4\pi \times 10^{-7} Wb\, Am^{-1}$ (D) $4\pi \times 10^{7} Wb\, Am^{-1}$

(6) The Lenz's Law is also a statement of:
(A) Law of Conservation of Momentum (B) Law of Conservation of Charge
(C) Law of Conservation of Energy (D) Faraday Law of Electromagnetic Induction

(7) Electric current produces magnetic field was discovered by:
(A) Faraday (B) Maxwell (C) Oersted (D) Lenz

(8) The impedance of $R - L$ series circuit is:
(A) $Z = \sqrt{R^2 + X_L^2}$ (B) $Z = \sqrt{R^2 + X_C^2}$ (C) $Z = \sqrt{R + X_L}$ (D) $Z = R$

(9) The capacitance required to construct a resonance circuit of frequency $1000 kHz$ with an inductor of $5mH$ is:
(A) $5.09\, pF$ (B) $5.09\, \mu F$ (C) $5.09\, mF$ (D) $50.9\, pF$

(10) Substances which undergo plastic deformation until they break are called: (A) Brittle Substances
(B) Non-magnetic Substances (C) Magnetic Substances (D) Ductile Substances

(11) The size of base of transistor is of the order of:
(A) $10^{-6} m$ (B) $10^{-5} m$ (C) $10^{-4} m$ (D) $10^{-3} m$

(12) A two inputs NAND gate with inputs A and B has an output 'O' if:
(A) A is O (B) B is O (C) Both A and B are O (D) Both A and B are 1

(13) Compton wavelength is:
(A) $\dfrac{h}{m_o c^2}$ (B) $\dfrac{hc}{m_o}$ (C) $\dfrac{h}{m_o c}$ (D) $\dfrac{hc}{m_o \lambda}$

(14) The energy required for pair production is:
(A) $0.51\, MeV$ (B) $1.02\, MeV$ (C) $2.04\, MeV$ (D) $3.06\, MeV$

(15) The relation for Balmer Series is written as:
(A) $\dfrac{1}{\lambda} = R_H\left(\dfrac{1}{2^2} - \dfrac{1}{n^2}\right)$ (B) $\dfrac{1}{\lambda} = R_H\left(\dfrac{1}{3^2} - \dfrac{1}{n^2}\right)$ (C) $\dfrac{1}{\lambda} = R_H\left(\dfrac{1}{4^2} - \dfrac{1}{n^2}\right)$ (D) $\dfrac{1}{\lambda} = R_H\left(\dfrac{1}{5^2} - \dfrac{1}{n^2}\right)$

(16) 1 rem is equal to:
(A) $0.1 Sv$ (B) $0.01 Sv$ (C) $10 Sv$ (D) $100 Sv$

(17) Subatomic particles are divided into:
(A) Six groups (B) Five groups (C) Four groups (D) Three groups

INTERMEDIATE PART-II (12ᵗʰ CLASS)

PHYSICS PAPER-II (NEW SCHEME)   GROUP-I

TIME ALLOWED: 2.40 Hours   **SUBJECTIVE**   MAXIMUM MARKS: 68

NOTE: - Write same question number and its part number on answer book,
as given in the question paper.

SECTION-I

2.   **Attempt any eight parts.** $8 \times 2 = 16$

(i)   Suppose that you follow an electric field line due to a positive point charge.
Do electric field and the potential increase or decrease?

(ii)   Is it true that Guass's law states that the total number of lines of forces crossing any closed surface
in the outward direction is proportional to the net positive charge enclosed within surface?

(iii)   What are the factors upon which the electric flux depend?

(iv)   Differentiate between electrical potential difference and electric potential at a point.

(v)   How can a current loop be used to determine the presence of a magnetic field in
a given region of space?

(vi)   Why does the picture on a TV screen become distorted when a magnet is brought near the screen?

(vii)   What is galvanometer?   On which principle it works?

(viii)   What is Magnetic Flux Density?   Also write its unit.

(ix)   How would you position a flat loop of wire in a changing magnetic field so that there is
no emf induced in the loop?

(x)   A suspended magnet is Oscillating freely in a horizontal plane.   The Oscillations are strongly
damped when a metal plate is placed under the magnet. Explain why does this occur?

(xi)   What is Transformer?   What is its working principle?

(xii)   What is back emf effect in motors?

3.   **Attempt any eight parts.** $8 \times 2 = 16$

(i)   Why does the resistance of a conductor rise with temperature?

(ii)   Is the filament resistance lower or higher in a 500W, 220V light bulb than in a 100W, 220V bulb?

(iii)   State Kirchhoff's first rule and write its mathematical formula.

(iv)   How many times per second will an incandescent lamp reach maximum brilliance when
connected to a 50 Hz source?

(v)   How does doubling the frequency affect the reactance of   (a) an inductor   (b) a capacitor

(vi)   Define impedance and write the impedance expression for $R - L$ series circuits.

(vii)   Differentiate between Ductile and Brittle substances.

(viii)   How would you obtain n–type and p–type material from pure Silicon?

(ix)   Define Modulus of elasticity.   Show that the units of Modulus elasticity and stress are the same.

(x)   Write two characteristics of Op-amplifier.

(xi)   How does the motion of an electron in a n–type substance differ from the motion of holes
in a p–type substance?

(xii)   What is the effect forward and reverse biasing of a diode on the width of depletion region?

4.   **Attempt any six parts.** $6 \times 2 = 12$

(i)   A particle of mass 5.0 mg moves with speed of $8.0 \, ms^{-1}$. Calculate de Broglie wavelength.

(ii)   Why don't we observe a Compton effect with visible light?

(iii)   Which has the lower energy quanta?   Radiowaves or X-rays.

(iv)   Define Spectroscopy.

(v)   What are the advantages of Laser over ordinary light?