KT-XII-1901
Sig. of Supdt ....
Physics (Part – II)
Fresh/Reappear
Roll No............
Fic. No............

Fic. No............

Time allowed: 3 Hrs   **Physics (Part – II)**   Code - A   **Marks: 85**
Fresh / Reappear

Note: There are three sections of the paper, A, B & C. Attempt Section – A on the same paper and return it to the Superintendent within the given time. Mobile phone etc. are not allowed in the examination hall.

Time: 20 Mins   **Section "A"**   **Marks: 18**

Q.1   Write the correct option i.e. A, B, C or D in the empty box provided opposite to each part.
No marks will be awarded for cutting, erasing or over writing.

i. If two charges are placed at a certain distance apart and a metal sheet is placed between them. What will happen to the force between the charges?   **[A]**
A. Will Decrease   B. Will Increase   C. Will Remain Unchanged   D. Either A or B.

ii. When a proton is accelerated through 1 Volt, then its kinetic energy will be ....   **[C]**
A. 1840 ev   B. 13.6 ev   C. 1 ev   D. 0.54 ev

iii. When a wire is stretched and its radius becomes r/2, then its resistance will be ....   **[A]**
A. 16 R   B. 4 R   C. 2 R   D. R/2

iv. A 100w, 220v bulb is connected across 110v supply. The actual power consumed by bulb will be ....   **[D]**
A. 200W   B. 50W   C. 100W   D. 25W

v. Tesla is the unit of magnetic induction B which is equal to ....   **[A]**
A. 10^4 G   B. 10^{-4} G   C. 10^4 Wb   D. 10^{-4} Wb m^{-2}

vi. Work done by magnetic force on charge particle is   **[C]**
A. Maximum   B. One   C. Zero   D. qvB

vii. Which of the following quantities remain constant in step up transformer?   **[C]**
A. Current   B. Voltage   C. Power   D. Heat

viii. A coil of self inductance 5H, the rate of change of current is 2 amperes per second. The e.m.f induced is ....   **[A]**
A. 10 V   B. 5 V   C. -5 V   D. -10 V

ix. The peak value of a.c voltage on a 220V mains is ....   **[C]**
A. $220/\sqrt{2}$ V   B. $240\sqrt{2}$ V   C. $220\sqrt{2}$ V   D. $440/\sqrt{2}$ V

x. At resonance, in series R-L-C circuit, which relation does not hold good?   **[D]**
A. $\omega = \dfrac{1}{\sqrt{LC}}$ B. $L\omega = \dfrac{1}{C\omega}$ C. $c\omega = \dfrac{1}{L\omega}$ D. $\omega = \dfrac{1}{LC}$

xi. The phenomenon of lagging of flux density (B) behind the magnetizing force (H) in a magnetic material subjected to cycle of magnetization is known as ....   **[D]**
A. Retentivity   B. Reluctance   C. Coercivity   D. Magnetic hysteresis

xii. The ability of materials to resist bending is called ....   **[B]**
A. Elasticity   B. Stiffness   C. Plasticity   D. Ductility

xiii. For a transistor, constant α is 0.95. The value of β will be ....   **[A]**
A. 19   B. 0.19   C. 0.0019   D. 91

xiv. A half wave rectifier is being used to rectify an alternating voltage of frequency 50 Hz. The number of pulses to rectified current obtained in one second is ....   **[A]**
A. 25   B. 100   C. 50   D. 200

xv. The presence of nucleus in pair production is just to ....   **[C]**
A. Split photons   B. Conserve mass   C. Conserve momentum   D. Conserve Charge

xvi. If the Compton shift become equal to Compton wavelength then photon will scattered with an angle of ....   **[A]**
A. 90^0 B. 0^0 C. 180^0 D. 45^0

xvii. The reverse process of x-rays is ....   **[C]**
A. Compton effect   B. Pair production   C. Photo electric effect   D. Pair annihilation

xviii. 1 gram of radioactive element reduces to 1/3 gram in 2 days. The mass of the element remaining at the end of 6 days is ....   **[B]**
A. $\dfrac{1}{6}$ g   B. $\dfrac{1}{9}$ g   C. $\dfrac{1}{12}$ g   D. $\dfrac{1}{27}$ g

Time: 2:40 Hours

KT-XII-1901

Physics (Part – II)

Fresh/Reappear

Section "B"   Marks: 40

Q.2   Attempt any TEN parts. All parts carry equal marks.

I.   What is an equipotential line and equipotential surface?

II.   The drift velocity of free electrons is very small. Why does room light turn on at once as the switch is closed?

iii.   An electron beam passes through a region of crossed electric and magnetic fields of intensity E and B respectively. For what value of the electron speed the beam will remain un-deflected?

iv.   Why does back e.m.f tend to decrease as the rate of doing work increases?

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

vi.   Differentiate between paramagnetic, diamagnetic and ferromagnetic materials with suitable examples?

vii.   Explain why in a transistor (a) the base is thin lightly doped and (b) the collector is large in size?

viii.   An electron is placed in a box about the size of an atom that is about 1×10^{-10} m. What is the velocity of the electron?

ix.   Why must the rest mass of a photon be zero? Explain.

x.   The hydrogen spectrum contains a large number of spectral lines although the hydrogen atom contains only one electron. Explain.

xi.   Why $_2H^4e$ has larger ionization energy than H?

xii.   How do β particles differ from the electrons obtained by thermionic emission and photoelectric emission?

xiii.   What factors make a fusion reaction difficult to achieve?

Section "C"   Marks: 27

Note: Attempt any THREE questions. All questions carry equal marks.

Q.3.a.   Define electric field intensity and it's unit calculate the electric field intensity at a point in the electric field.

b.   Show that electric field intensity due to an finite sheet of charge is $\vec{E} = \dfrac{\sigma}{2\epsilon_0} \hat{\gamma}$

Q.4.a.   Define resonance in R-L-C series A.C Circuits?

b.   The a.c voltage across a 0.5 μF capacitor is 16 Sin $(2 \times 10^3 t)$V. Find (i) capacitive reactance (ii) the peak value of current through the capacitor.

Q.5.a.   What is Compton's effect? Develop a mathematical relation for the Compton's wave shift.

b.   What do you understand by the terms normal state excited state, excitation energy and ionization energy?

Q.6.   Write Note on any two of the following:

I. Interaction of Radiations with Matter

ii. Motional e.m.f.

iii. Effect of temperature on resistance.