Sig. of Supdt..............

KT-XII-18-II
Physics (Part – II)
Fresh/Reappear

Roll No...............

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

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

Time allowed: 3 Hrs Code : II   **Physics (Part – II)**   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. No marks will be awarded for cutting, erasing or over writing. 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 each part.

I.   The S.I unit of the "activity" is ....   **[B]**
       A. Curie   B. Becquerel   C. Henry   D. Tesla

ii.   The ionization energy of hydrogen atom is ....   **[D]**
       A. 13.6 KeV   B. 13.6 MeV   C. 13.6 GeV   D. 13.6 eV

iii.   In Helium – Neon laser discharge tube is filled with ....helium.   **[D]**
       A. 15%   B. 60%   C. 40%   D. 85%

iv.   The dielectric materials are made up of ....types of molecules.   **[A]**
       A. Two   B. Three   C. Four   D. Five

v.   One volt per one ampere is equal to ....   **[B]**
       A. Farad   B. Ohm   C. Ampere   D. Henry

vi.   A moving charge is surrounded by ....fields.   **[A]**
       A. two   B. Three   C. Four   D. Five

vii. $V.s.A^{-1}$ is equal to ....   **[C]**
       A. Tesla   B. Weber   C. Henry   D. Gauss

viii. Bottom quark carries charge ....   **[C]**
       A. $-\frac{2}{3}c$ B. $\frac{1}{3}c$ C. $-\frac{1}{3}c$ D. $\frac{2}{3}c$

ix.   Dipole moment P = ...   **[A]**
       A. qd   B. cv   C. $\frac{\varepsilon.A}{d}$ D. Ad

x.   Radiant converts ....directly into electrical energy.   **[B]**
       A. Heat   B. Sunlight   C. Chemical energy   D. Mechanical energy

xi.   In a pure capacitance, current leads the voltage by ....   **[C]**
       A. 0^0 B. 45^0 C. 90^0 D. 120^0

xii.   The value of permeability of free space is μ_0 = ...   **[A]**
       A. $4\pi \times 10^{-7} WbA^{-1}m^{-1}$ B. $3\pi \times 10^{-7} Wb.A^{-1}m^{-1}$ C. $2\pi \times 10^{-7} WbA^{-1}m^{-1}$ D. $5\pi \times 10^{-7} Wb.A^{-1}.m^{-1}$

xiii. There are ....elastic moduli.   **[A]**
       A. Two   B. Three   C. Four   D. Five

xiv.   Strain energy per unit volume = ...   **[C]**
       A. $\frac{1}{2}$ (stress x strain)   B. $\frac{1}{2}\left(\frac{Fxe}{Al}\right)$ C. $\frac{1}{2}$ (Fxe)   D. A & B both

xv.   The ratio of collector current I_e and base current I_B is called as ....factor.   **[B]**
       A. Alpha   B. Beta   C. Gamma   D. Q-factor

xvi.   A solar cell is also a ....junction.   **[B]**
       A. NP   B. NPN   C. PN   D. PNP

xvii. The plank's constant is given by h = ...   **[A]**
       A. 6.626×10^{-34} js   B. 6.626×10^{34} js   C. 6.626×10^{-34} j   D. 6.626×10^{-34} Nm

xviii. Pair production occurs only when energy of photon is at least equal to ....   **[D]**
       A. 1.02eV   B. 1.02GeV   C. 1.02KeV   D. 1.02 MeV

Section "B"
Marks: 40

Q.2 Attempt any TEN parts. Each part carries equal marks.

I. What are the magnetic properties of a material?

II. What is the relation between alpha and beta factors?

III. An electron and proton are accelerated from rest through the same potential difference. Which particles has the longer wave length? Explain.

IV. What are the basic postulates of Bohr model of hydrogen atom?

V. What is the difference between Gamma emission and Alpha emission?

VI. The electric potential is constant through a given region of space. Is the electric field zero or non-zero in this region? Explain.

VII. Under what circumstances can terminal P.D of a battery exceed its em.f?

VIII. What is the cyclotron frequency of a charged particle of mass 'm' charge 'q' moving in the magnetic field 'B'?

IX. Show that the relationship $\varepsilon = -\frac{\Delta\phi}{\Delta t}$ is dimensionally correct.

X. What is the difference between ultraviolet and infrared radiations?

XI. What is solar cell? Explain briefly.

XII. Discuss briefly time dilation and mass dilation.

XIII. Briefly discuss the relation between hydrogen atom and De-Broglie waves.

Section "C"
Marks: 27

Note: Answer any THREE questions. All questions carries equal marks.

Q.3 a. Describe the statement of four Maxwell's equations. Use Maxwell's theory to show that

$$E = \frac{A}{2\pi r} \cdot \frac{\Delta B}{\Delta t}$$

b. Find the mass defect and binding energy for helium nucleus.

Q.4 a. What is capacitor? Explain its construction? Derive an expression for the energy stored in a capacitor.

b. An electron is in the first Bohr orbit of hydrogen. Find the speed of electron in the orbit.

Q.5 a. What is electrical resistance on what factor does it depends and show that $\alpha = \frac{R_T - R_0}{R_0 T}$?

b. A wire carrying current 20mA exprenences force of 5N in a uniform field. What is the force on it when current rises to 35mA?

Q.6 Write note on any two topics.

i. Transformer

ii. Magnetic hysteresis

iii. Electric potential