

Physics

HSSC (12th) 2nd Annual 2022

(To be filled in by the candidate)

Roll No.							
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Time : 2:40 Hours

Paper : II

Subjective

Marks : 68

Note: Section B is compulsory. Attempt any 3 questions from Section C.

SECTION-B

2. Write short answers to any Eight parts.

(8 x 2 = 16)

- Electric lines of force never cross, why?
- Is E necessarily zero inside a charged rubber balloon if balloon is spherical? Assume that charge is distributed uniformly.
- Show that $1 \frac{\text{volt}}{\text{meter}} = 1 \frac{\text{newton}}{\text{coulomb}}$
- Define Electric Polarization and Electric Dipole.
- Why the resistance of an ammeter should be very low?
- How can a current loop be used to determine the presence of a magnetic field in a given region of space?
- Define Lorentz Force. Write its formula.
- Distinguish between magnetic flux and magnetic flux density.
- How can radioactivity help in the treatment of cancer?
- Why are heavy nuclei unstable?
- Write down the names of different quarks.
- What is radioactive decay? Give an example.

3. Write short answers to any Eight parts.

(8 x 2 = 16)

- Define Kirchhoff's First and Second Rules.
- Why potentiometer is accurate measuring meter?
- Is the filament resistance lower or higher in a 500W, 220V light bulb than in a 100W, 220V bulb?
- Write three properties of series resonance circuit.
- What is meant by A.M and F.M? Also give its range.
- Differentiate between peak value and peak to peak value.
- Define Unit Cell and Crystal Lattice.
- Distinguish between valance and conduction band.
- What is meant by strain energy? How can it be determined from the force-extension graph?
- Why ordinary silicon diodes do not emit light?
- What is the net charge on n-type or a p-type substance?
- In a certain circuit the transistor has a collector current of 10mA and a base current of $40\mu\text{A}$. What is the current gain of transistor?

4. Write short answers to any Six parts.

(6 x 2 = 12)

- State Lenz's law.
- Define Self Induction and give its unit.
- Does the induced emf in a circuit depend on the resistance of the circuit? Does the induced current depend on the resistance of the circuit?
- How would you position a flat loop of a wire in a changing the magnetic field so that there is no emf induced in the loop?
- Which has lower energy quanta? Radio waves or X-rays.
- Can pair production take place in vacuum? Explain.
- Which photon red, green or blue carries the most (a) Energy (b) Momentum
- What are the advantages of lasers over ordinary light?
- Find the speed of electron in the first Bohr's orbit.

SECTION-C

(Each question carries Eight (8) Marks)

- (a) State Gauss's Law. Derive an expression of electric intensity near an infinite sheet of charges. 5

(b) A rectangular bar of iron is 2.0 cm by 2.0 cm in cross section and 40 cm long. Calculate its resistance if the resistivity of iron is $11 \times 10^{-8} \Omega\text{m}$ 3
- (a) State Ampere's Law and find the relation for magnetic field due to a current carrying solenoid. 5

(b) A solenoid coil 10 cm long has 40 turns per centimetre. When the switch is closed, the current rises from zero to its maximum value of 5.0 A in 0.01 sec. Find the energy stored in the magnetic field if the area of cross-section of the solenoid is 28 cm^2 . 3
- (a) Explain the use of a transistor as a common emitter amplifier. Also calculate its voltage gain. 5

(b) Find the capacitance required to construct a resonance circuit of frequency 1000 KHz with an inductor of 5 mH. 3
- (a) Explain the phenomenon of Compton Effect. 5

(b) A wire 2.5 m long and cross-section area 10^{-5} m^2 is stretched 1.5 mm by a force of 100 N in elastic region. Calculate the strain, Young's Modulus and the energy stored in the wire. 3
- (a) Derive an expression for the quantized radii of the orbits of Hydrogen atom. 5

(b) Find the mass defect and binding energy of the deuteron nucleus. The experimental mass of deuteron is $3.3435 \times 10^{-27} \text{ kg}$. 3

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CANCELLED