PHYSICS HSSC–II

Time allowed: 2:35 Hours **Total Marks Sections B and C: 68**

SECTION – B (Marks 42)

Q. 2 Answer the following questions briefly. **(14x3=42)**

(i)	What is meant by 'Magnetic Flux' and 'Magnetic Flux density'? Also give their units.	**03**	**OR**	Why energy dissipated per cycle (magnetization and demagnetization). For steel is more as compared to iron? Explain briefly.	**03**
(ii)	What is Wein's displacement law? Explain briefly.	**1+2**	**OR**	Prove that $E = -\frac{\Delta V}{\Delta r}$	**03**
(iii)	Differentiate between controlled and uncontrolled nuclear chain reactions. How is the chain reaction controlled?	**03**	**OR**	Why in a transistor the base region is made thin and lightly doped?	**03**
(iv)	Distinguish between N-type semiconductor and P-type semiconductor.	**03**	**OR**	Calculate the longest wave length of radiation for the Lyman series of hydrogen spectra.	**03**
(v)	Differentiate "Curie temperature" and "Critical temperature".	**03**	**OR**	How capacitor discharge ignition system works? Enlist some of its uses.	**2+1**
(vi)	Briefly explain resistivity. How it depends on temperature?	**1+2**	**OR**	How can a galvanometer be converted into voltmeter? Draw circuit diagram as well.	**2+1**
(vii)	How are eddy currents produced? Identify their heating effects.	**03**	**OR**	How Geiger-Muller counter detects and counts radiation?	**03**
(viii)	In transformer, why laminated iron core is used instead of solid one?	**03**	**OR**	A coil having a resistance of 10 Ohm and an inductance of 32mH is connected to 220V, 50Hz AC supply. Calculate current passing through the coil.	**03**
(ix)	What is meant by peak value and effective value of sinusoidal current? Give relation between them.	**03**	**OR**	Differentiate Paramagnetic and Diamagnetic materials with one example each.	**03**
(x)	Briefly explain working of transistor as a switch.	**03**	**OR**	What is meant by Meta-stable state and population inversion for LASER action?	**03**
(xi)	Calculate De-Broglie wave length of an electron having KE=1200 kev.	**03**	**OR**	Discuss the difference between Hadrons and Leptons.	**03**
(xii)	How much energy is released when 0.5kg of U-235 undergoes fission reaction? (If the disintegration energy per event is Q=208Mev.)	**03**	**OR**	What is meant by Alpha factor and Beta factor for common emitter configuration of transistor? Derive relation between them.	**03**
(xiii)	Briefly explain the principle of metal detector with circuit diagram.	**2+1**	**OR**	What is electron volt(ev)? Derive its relation with SI unit of energy.	**1+2**
(xiv)	Under what condition a source (Battery or cell) gives maximum power output? Discuss briefly.	**03**	**OR**	State Lenz's law. Prove that it is according to law of conservation of energy.	**1+2**

SECTION – C (Marks 26)

Note: Attempt the following questions.

Q.3	State postulates of Bohr's atomic model. Show that energy of the electron in H-atom is quantized.	**3+4**	**OR**	Derive an expression for charge to mass ratio for an electron and then calculate its value.	**5+2**
Q.4	What is photoelectric effect? Why classical physics fails to explain photoelectric effect? Derive Einstein photoelectric equation.	**1+2+4**	**OR**	What is potentiometer? Explain its principle, construction and working. Also give some uses.	**1+5+1**
Q.5	State and explain Gauss's law. Find electric field intensity between two oppositely charged parallel plates.	**3+3**	**OR**	Explain the phenomenon of self-inductance of a coil. What is its unit? On what factors self-induction depends?	**3+1+2**
Q.6	What is RLC series resonance circuit? Draw its impedance diagram. Also give its properties.	**2+1+3**	**OR**	What is meant by 'half-life' of a radio-active element? Show that $T_{\frac{1}{2}} = 0.693/\lambda$	**2+4**

$\frac{1}{\lambda} = R_H\left(\frac{1}{p^2} - \frac{1}{n^2}\right)$ $X_L = 2\pi fL$ $\lambda = \frac{h}{mv}$ $KE = \frac{1}{2}mv^2$ $R_H = 1.0974 \times 10^7 m^{-1}$ $Z = \sqrt{R_2 + X_L^2}$ $N = \frac{N_A \times m}{A}$

$h = 6.626 \times 10^{-34} Js$ $I = \frac{V}{Z}$ $N_A = 6.023 \times 10^{23}$ $E = PQ$ $m_e = 9.1 \times 10^{-31} kg$ $A = Z + N$ $E = N \times Q$