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(To be filled in by the candidate)

Physics

H.S.S.C (12th) 1st-A-2025

Time: 20 Minutes

Paper: II Group: I

Objective - (i)

Marks: 17

Paper Code

8	4	7	1
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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 circle in front of that question number in you answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

(SECTION - A)

Q.1	Questions	A	B	C	D
1.	The force between two point charges in the presence of air is 80N, when a dielectric 'Germanium' of dielectric constant 16 is placed between them, the force reduces to:	2N	5N	10N	32N
2.	The unit of electric field intensity is $\frac{\text{newton}}{\text{coulomb}}$, which is equal to	$\frac{\text{joule}}{\text{coulomb}}$	$\frac{\text{volt}}{\text{meter}}$	$\frac{\text{coulomb}}{\text{volt}}$	$\frac{\text{newton}}{\text{meter}}$
3.	If the resistance of 500 Ω have fourth band or silver, then its upper maximum resistance will be:	450 Ω	500 Ω	550 Ω	600 Ω
4.	Torque on a current carrying coil placed in a uniform magnetic field is maximum when angle between plane of coil and magnetic field is:	0°	30°	45°	90°
5.	Cathode ray oscilloscope works by deflecting a beam of:	Protons	Neutrons	Alpha particles	Electrons
6.	At what frequency will an inductor of 1.0H have a reactance of 100 Ω ?	10Hz	16Hz	80Hz	100Hz
7.	The component in an A.C circuit which opposes the flow of alternating current but allows direct current is:	Resistor	Capacitor	Inductor	Transistor
8.	"The direction of induced current is always so as to oppose the change which causes are current" is the statement of:	Ampere's law	Gauss's law	Faraday's law	Lenz's law
9.	Mutual induction is the working principle of:	Galvanometer	Generator	Transformer	CRO
10.	Which of the given material is brittle?	Glass	Lead	Copper	Iron
11.	Automatic functioning of street light can be done by the use of:	Comparator	Rectifier	Filter	Choke
12.	The conversion of alternating current into direct current is called:	Oscillation	Amplification	Polarization	Rectification
13.	In photocell a cathode made of cesium coated oxidized silver emits electron for:	Visible light	Infrared	Ultraviolet	Microwaves
14.	Electron microscope make practical use of wave nature of:	Electrons	Protons	Neutrons	Alpha particles
15.	The residing time of an atom in a metastable state is:	10 ⁻³ s	10 ⁻⁴ s	10 ⁻⁵ s	10 ⁻⁸ s
16.	If $^{233}_{99}\text{U}$ decays twice by α - emission, then the resulting isotope has charge number:	86	88	90	92
17.	In nuclear reactor, the number of neutrons are controlled by using the rods made of:	Cadmium	Lead	Mercury	Copper

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

SECTION - B

Q2. Write short answers to any EIGHT parts.

(8×2=16)

- (i) Electric lines of force never cross. Why?
- (ii) The potential is constant throughout a given region of space. Is the electric field zero or non zero in the region?
- (iii) The potential due to equal and opposite charges at mid-way between them is zero. Why?
- (iv) Prove that $E = -\frac{\Delta V}{\Delta r}$
- (v) A plane conducting loop is located in a uniform magnetic field that is directed along the x-axis. For what orientation of the loop is the flux a maximum? For what orientation is the flux a minimum?
- (vi) Why the voltmeter should have a very high resistance?
- (vii) A torque may act on a current carrying coil placed in a magnetic field is $\tau = IAB \cos \alpha$. Under what conditions that torque will be zero?
- (viii) Why digital AVO meter is preferred over coil AVO meter?
- (ix) How can radioactivity help in the treatment of cancer?
- (x) What are isotopes? What do they have in common and what are their differences?
- (xi) What will be the on three up quarks hadron?
- (xii) If mass defect of helium is 0.03034u, then what will be the binding energy in (MeV)?

Q3. Write short answers to any EIGHT parts.

(8×2=16)

- (i) Differentiate between electromotive force and terminal potential difference.
- (ii) State Kirchhoff's rules.
- (iii) Explain why the terminal potential difference of a battery decreases when the current drawn from it is increased?
- (iv) Differentiate between phase lag and phase lead of an alternating quantities.
- (v) Define reactance of an inductor and write its formula.
- (vi) How does doubling the frequency affect the reactance of (a) an inductor (b) a capacitor
- (vii) Distinguish between polymeric solids and crystal lattice.
- (viii) Define elasticity and plasticity.
- (ix) Describe the formation of energy bands in solids.
- (x) Draw circuit diagram of half-wave and full-wave rectification.
- (xi) What is the effect of forward and reverse biasing of a diode on the width of depletion region?
- (xii) Why is the base current in a transistor very small?

Q4. Write short answers to any SIX parts.

(6×2=12)

- (i) Does the induced emf in a circuit depend upon the resistance of the circuit? Explain.
- (ii) How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?
- (iii) What are eddy currents? How can we stop the flow of eddy currents?
- (iv) What do we mean when we say that atom is excited?
- (v) Describe the biological effects of X-rays.
- (vi) As a solid is heated and begins to glow, why does it first appear red?
- (vii) What are the measurements on which two observers in relative motion will always agree upon?
- (viii) Find the mass m of a moving object with speed 0.8c.
- (ix) What do you mean by annihilation of matter? Discuss.

SECTION - C

Note: Attempt any THREE questions. Each question carries Eight (8) Marks.

- Q5. (a) Write a detailed note on working of a rheostat as potential divider and variable potential difference at its output. 5
- (b) Find the electric field strength required to hold a suspended particle of mass $1.0 \times 10^{-6} \text{ kg}$ and charge $1.0 \mu\text{C}$ between two plates 10.0 cm apart. 3
- Q6. (a) State and explain Ampere's Law. Calculate the magnetic field due to current flowing through solenoid. 5
- (b) A solenoid has 250 turns and its self inductance is 2.4mH. What is the flux through each turn when the current is 2A? What is the induced emf when the current changes at 20 A s^{-1} ? 3
- Q7. (a) What is transistor? Write down a detailed note on its construction and working. 5
- (b) Find the capacitance required to construct a resonance circuit of frequency 1000 khz with an inductor of 5mH. 3
- Q8. (a) Define stress, strain and elastic constant with units and types. 5
- (b) What is the energy of a photon in a beam of infrared radiation of wavelength 1240nm? 3
- Q9. (a) Explain Bohr's Model of hydrogen atom and derive the relation of quantized energy of electron in hydrogen atom. 5
- (b) How much energy is absorbed by a man of mass 80kg who receives a lethal whole body equivalent dose of 400 rem in the form of low energy neutrons for which RBE factor is 10? 3