Paper Code	2024 (1st-A)		Roll No: _____
Number: 4477	INTERMEDIATE PART-II (12th Class)		

PHYSICS PAPER-II GROUP-I   MTN-1-24

TIME ALLOWED: 20 Minutes	OBJECTIVE	MAXIMUM MARKS: 17

Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that bubble in front of that question number, on bubble sheet. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles will result in zero mark in that question.

S.#	QUESTIONS	A	B	C	D
1	Two opposite point charges, separated by a distance 2d, the electric potential at mid-way between them is:	1 volt	2 volts	3 volts	Zero volt
2	A current carrying conductor experience maximum force in a uniform magnetic field, when it is placed:	Perpendicular to field	Parallel to field	At an angle $\theta = 60^\circ$ to field	At an angle of 180° to field
3	Which substance of the given has greatest resistivity?	Silver	Germanium	Carbon	Gold
4	When the coil at rest is placed in a uniform magnetic field, then induced current would be:	Maximum	Minimum	Some time maximum some time minimum	Zero
5	In D.C motor the split rings act as:	Commutator	Capacitor	Resistor	Inductor
6	In three phase A.C generator, when the voltage across the first pair of slip rings is zero, then it has the phase of:	0°	90°	120°	180°
7	The amplitude modulation transmission frequencies range is:	88 MHz to 108 MHz	540 kHz to 1600 kHz	540 MHz to 1600 MHz	88 kHz to 108 MHz
8	A temperature above 77k, any super conductor referred as:	High temperature super conductor	Low temperature super conductor	Low temperature semi conductor	High temperature conductor
9	The symbol of NOT gate is:	Rectangle	Bubble only	Triangle and Bubble	Square
10	SI unit of voltage gain of NPN transistor is:	Volt	Coulomb	Farad	No unit
11	The materialization of energy take place in the process of:	Photo electric effect	Compton effect	Pair production	Annihilation of matter
12	Which one of the physical quantity is independent of relativistic speed?	Mass	Length	Time	Charge
13	Which one of the radiations has the most energetic photon?	T.V waves	γ – rays	X – rays	Microwaves
14	Electromagnetic radiation having wavelength longer than the red light is known as:	Infrared radiation	Ultraviolet radiation	Microwaves	Gamma rays
15	The half life of radioactive element depends upon the:	Temperature	Atmospheric pressure	Number of nucleons	Number of electrons
16	The unit of radiation one Becquerel is equal to:	One disintegration per second	3.7×10^{10} disintegration per second	Two disintegration per second	3.7 disintegration per minute
17	Due to polarization of dielectric, the electrical energy stored between the plates of capacitor when battery is connected:	Increases	Decreases	Remains same	May increase or decreases

PHYSICS   PAPER-II   GROUP-I

| TIME ALLOWED: 2.40 Hours | SUBJECTIVE | MAXIMUM MARKS: 68 |

NOTE: Write same question number and its parts number on answer book, as given in the question paper.

SECTION-I

2. Attempt any eight parts. $8 \times 2 = 16$

(i)	What is a Test Charge? Write its any two characteristics.
(ii)	Show that an ohm times farad is equivalent to second.
(iii)	Is E necessarily zero inside a charged rubber balloon if balloon is spherical? Assume that charge is distributed uniformly over the surface.
(iv)	Is it true that Gauss's law states that the total number of lines of forces crossing any closed surface in the outward direction is proportional to the net positive charge enclosed within surface?
(v)	Find the radius of an orbit of an electron moving at a rate of $2.0 \times 10^7 \, ms^{-1}$ in a uniform magnetic field of $1.20 \times 10^{-3} T$.
(vi)	Differentiate between Ammeter and Ohmmeter.
(vii)	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?
(viii)	Is it possible to orient a current loop in a uniform magnetic field such that the loop will not tend to rotate? Explain.
(ix)	Define Mass Defect and write its formula.
(x)	Write down disadvantages of α and β-particles.
(xi)	If someone accidentally swallows an $\alpha-$source and a $\beta-$source, which would be the more dangerous to him? Explain why?
(xii)	Discuss the advantages and disadvantages of nuclear power compared to the use of fossil fuel generated power.

3. Attempt any eight parts. $8 \times 2 = 16$

(i)	Describe a circuit which will give a continuously varying potential.
(ii)	Why does the resistance of a conductor rise with temperature?
(iii)	Derive the mathematical expression for the maximum power output.
(iv)	How does doubling the frequency affect the reactance of a capacitor?
(v)	At what frequency will an inductor of 1.0H have a reactance of 500Ω?
(vi)	Briefly explain the Phase Lag and Phase Lead with wave diagram.
(vii)	Draw a stress-strain curve for a ductile material, and then define the terms: Elastic limit and Yield point.
(viii)	Mention four applications of superconductors.
(ix)	Differentiate between Bulk Modulus and Shear Modulus.
(x)	What is the net charge on a n-type or a p-type substance?
(xi)	The inputs of a gate are 1 and 0. Identify the gate if its output is (a) 0, (b) 1
(xii)	How can we use OP-AMP as a comparator?

4. Attempt any six parts. $6 \times 2 = 12$

(i)	Show that ε and $\dfrac{\Delta\phi}{\Delta t}$ have the same units.
(ii)	Does an induced emf always act to decrease the magnetic flux through a circuit?
(iii)	How can we minimize the energy losses in a practical transformer?
(iv)	What are the measurements on which two observers in relative motion will always agree upon?
(v)	We do not notice the de-Broglie wavelength for a pitched cricket ball. Explain why?
(vi)	What is reason for fundamental uncertainty associated with sub-atomic measurements?
(vii)	How did Bohr stated his complementarity principle for complete description of matter and radiation?
(viii)	Is energy conserved when an atom emits a photon of light?
(ix)	How do we differentiate orbital and free electrons on the basis of their energy?

SECTION-II

NOTE: Attempt any three questions. $3 \times 8 = 24$

5.(a)	Derive a relation for electric potential at a point due to point charge.	05
(b)	The potential difference between the terminals of a battery in open circuit is 2.2 V. When it is connected across a resistance of 5.0Ω, the potential falls to $1.8V$. Calculate current and internal resistance of the battery.	03
6.(a)	What is Galvanometer? Describe the conversion of Galvanometer into ammeter.	05
(b)	An emf of $0.45V$ is induced across the ends of a metal bar due to its motion in a magnetic field of $0.22T$. How much field is required to produce $1.5V$ emf?	03
7.(a)	Describe the effect of inductance in an A.C Circuit.	05
(b)	The current flowing into the base of a transistor is $100\mu A$. Find its collector current I_C, its emitter current I_E, and the ratio I_C/I_E, if the value of current gain β is 100.	03
8.(a)	What is meant by strain energy? Derive the relation for strain energy from force-extension graph.	05
(b)	Yellow light of 577 nm wavelength is incident on a cesium surface. The stopping voltage is found to be 0.25V. Find (a) the maximum K.E of photoelectrons (b) the work function of cesium	03
9.(a)	What is Nuclear Reactor? Explain different parts of a power reactor.	05
(b)	Calculate the longest wavelength of radiation for the Paschen series.	03