

Paper Code Number: <b>4478</b>		2023 (1 <sup>st</sup> -A) INTERMEDIATE PART-II (12 <sup>th</sup> Class)		Roll No: _____	
<b>PHYSICS</b>		<b>PAPER-II</b>		<b>GROUP-II</b>	
				<b>M/TN-12-233</b>	
<b>TIME ALLOWED: 20 Minutes</b>		<b>OBJECTIVE</b>		<b>MAXIMUM MARKS: 17</b>	
<b>Q.No.1</b>	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.				
<b>S.#</b>	<b>QUESTIONS</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
1	To display the given voltage along Y – axis on C.R.O, connected to it:	X – plates of C.R.O.	Y – plates of C.R.O.	Cathode of C.R.O.	Anodes of C.R.O.
2	If we want to increase the measuring range of voltmeter, the series high resistance value should be:	Increased	Decreased	Kept constant	Zero
3	The direction of induced current in a circuit is determined by:	Ohm's law	Faraday's law	Gauss's law	Lenz's law
4	For alternating current in a circuit, the inductor behaves like:	Thermistor	Resistor	Capacitor	Rectifier
5	Metal detectors consist of:	R – C circuit	R – L circuit	RLC series circuit	L – C circuit
6	At high frequency, RLC series circuit shows the behaviour as:	R – L circuit	Pure inductive circuit	R – C circuit	Pure capacitive circuit
7	High temperature super conductors have a critical temperature greater than:	52K	77K	125K	163K
8	In, Op-amp as a comparator, when $V_- > V_+$ then at the output we get:	$V_o = +V_{CC}$	$V_o = 0$	$V_o = -V_{CC}$	$V_o = \infty$
9	The SI unit of current gain are:	Ampere	Ohm	Gray	No unit
10	Which photon of light has least energy?	Red	Yellow	Blue	Green
11	The rest mass of photon is:	$9.1 \times 10^{-31} \text{ kg}$	$1.67 \times 10^{-27} \text{ kg}$	Zero	Infinity
12	X – rays are:	High energy electrons	High energy neutrons	High energy protons	High energy photons
13	Heat produced due to fission reaction taking place in the core of Nuclear reactor is about:	$500^\circ \text{C}$	$900^\circ \text{C}$	$1100^\circ \text{C}$	$1300^\circ \text{C}$
14	Subatomic particles are divided into:	Six groups	Five groups	Four groups	Three groups
15	If a positive charged particle of mass "m" is projected parallel to uniform electric field $\vec{E}$ , The acceleration of the particle is:	Zero	$\frac{q\vec{E}}{m}$	$qm\vec{E}$	$\frac{\vec{E}}{qm}$
16	A $3\text{K}\Omega$ resistor is connected in series with a capacitor of capacitance $2\text{mF}$ . The time constant for capacitor is:	1 sec	5 sec	6 sec	1.33 sec
17	If no fourth band is present on a carbon resistor then its tolerance will taken:	$\pm 20\%$	$\pm 10\%$	$\pm 5\%$	0%



(12)

INTERMEDIATE PART-II (12 <sup>th</sup> Class)	2023 (1 <sup>st</sup> -A)	Roll No: _____
PHYSICS PAPER-II GROUP-II		
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 *M7N-12-2-23*

1. Attempt any eight parts.	8 × 2 = 16
(i) Suppose that you follow an electric field line due to a positive point charge. Do electric field increase or decrease?	
(ii) If a point charge $q$ of mass $m$ is released in a non-uniform field with field lines pointing in the same direction, will it make a rectilinear motion?	
(iii) Show that ohms times farad is equivalent to second.	
(iv) What is a test charge? Write its any two characteristics.	
(v) How can you use a magnetic field to separate isotopes of chemical element?	
(vi) Why the resistance of an ammeter should be very low?	
(vii) Define Lorentz force. Write role of each component of this force.	
(viii) A proton enters this page from left to right while magnetic field is out of the page. Prove that it will be deflected towards bottom of page.	
(ix) What factors make fusion reaction difficult to achieve?	
(x) What is a radioactive tracer? Describe one application in medicine.	
(xi) What are leptons? Name at least two leptons.	(xii) Define nuclear activity. Write its SI unit.
3. Attempt any eight parts.	8 × 2 = 16
(i) Is the filament resistance lower or higher in a 500W, 220V light bulb than in a 100W, 220V bulb?	
(ii) How the bridge circuit is used to determine an unknown resistance?	
(iii) Why heat is produced in a conductor due to flow of electric current?	
(iv) Describe amplitude modulation with diagram.	
(v) Describe the condition which will make the reactance of capacitor small.	
(vi) Describe two advantages of a 3phase A.C. supply.	
(vii) Differentiate between crystalline and amorphous solids.	
(viii) Draw stress-strain curves for ductile and brittle materials.	
(ix) How can the conductivity of a semi-conductor be raised?	
(x) The anode of a diode is 0.2 volts positive with respect to its cathode. Is it forward biased?	
(xi) What is the biasing requirement of the junctions of a transistor for its normal operations?	
(xii) What is importance of use of a semi-conductor in electronic circuits? Explain.	
4. Attempt any six parts.	6 × 2 = 12
(i) How can the spectrum of hydrogen contain so many lines, when hydrogen contain one electron?	
(ii) Will bright light eject more electrons from a metal surface than dimmer light of same colour?	
(iii) Why don't we observe Compton effect with visible light?	
(iv) Can an electric motor be used to drive an electric generator with the output from generator being used to operate the motor?	
(v) In a certain region the earth's magnetic field point vertically downward. When a plane flies due north, which wingtip is positively charged?	
(vi) What is the importance of minus sign in the expression? $\epsilon = -\frac{N\Delta\phi}{\Delta t}$	
(vii) What is threshold frequency in photoelectric effect?	
(viii) What do you mean by annihilation of matter?	(ix) Write down two postulates of Bohr's theory.

## SECTION-II

NOTE: Attempt any three questions.	3 × 8 = 24
5. (a) What is Wheatstone bridge? Explain and prove the principle of Wheatstone bridge.	5
(b) Determine the electric field at the position $\vec{r} = (4i + 3j)m$ caused by a point charge $q = 5.0 \times 10^{-6}C$ placed at origin.	3
6. (a) What is transformer? Derive its equation and discuss power losses in the transformer.	5
(b) The resistance of a galvanometer is 50 ohm and reads full scale deflection with a current of 2.0 mA. Show by a diagram how to convert this galvanometer into voltmeter reading 200V full scale.	3
7. (a) What is an operational amplifier? Describe the use of operational amplifier as non-inverting O.P. amplifier and find its gain.	5
(b) A $10mH$ , $20\Omega$ coil is connected across 240V and $180/\pi$ Hz source. How much power does it dissipate?	3
8. (a) Derive an expression for strain energy in deformed material.	5
(b) What is the de Broglie wavelength of an electron whose kinetic energy is 120 eV.	3
9. (a) Write postulates of Bohr's Model. Prove that radii and energy of electron is quantized in hydrogen atom.	5
(b) Find the mass defect and binding energy for tritium. If the atomic mass of tritium is 3.016049 U, Mass of neutron = 1.008665U, Mass of proton = 1.007276 U, Mass of electron = 0.00055 U	3