

Paper Code		2024 (1 st -A)			Roll No: _____	
Number: 4477		INTERMEDIATE PART-II (12 th Class)				
PHYSICS PAPER-II GROUP-I <i>MTN-1-24</i>						
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	

INTERMEDIATE PART-II (12 th Class)	2024 (1 st -A)	Roll No: <u>MTN-1-24</u>
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 × 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 $2.0 \times 10^7 \text{ ms}^{-1}$ in a uniform magnetic field of $1.20 \times 10^{-3} \text{ T}$.
- (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 α - source and a β - 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 × 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 × 2 = 12

- (i) Show that ϵ and $\frac{\Delta\phi}{\Delta t}$ 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 × 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 $\frac{I_C}{I_E}$, 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

Paper Code Number: 4478		2024 (1 st -A) INTERMEDIATE PART-II (12 th Class)		Roll No: <u>MTN-2-24</u>	
PHYSICS PAPER-II		GROUP-II			
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	Half life of uranium-239 is:	24.5 min	25.5 min	23.5 min	26.5 min
2	The building blocks of protons and neutrons are called:	Positron	Quarks	Electron	Neutron
3	If the medium between the charges is not free space, then electrostatic force will:	Increase	Decrease	Remains constant	Infinite
4	Negative sign in equation $E = -\frac{\Delta V}{\Delta r}$ shows:	Decreasing potential	Increasing potential	Increasing strength	Magnitude
5	Reciprocal of resistivity is called:	Inductance	Conductance	Conductivity	Resistance
6	A charged particle enters in a strong magnetic field its K.E:	Increases	Infinite	Decreases	Remains same
7	When a charged particle is projected perpendicular to a uniform magnetic field, its path is:	Helix	Circular	Spiral	Ellipse
8	If the angular frequency of A.C generator is doubled, the time period will be:	Doubled	Four times	Half	One fourth
9	Split ring are used in:	D.C motor	Transformer	A.C generator	A.C motor
10	Root mean square value of voltage is:	$\sqrt{2}V_0$	$\frac{V_0}{2}$	$\frac{V_0}{\sqrt{2}}$	$2V_0$
11	The phase of A.C at positive peak from origin is:	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{2}$	π
12	Which is pentavalent impurity?	Gallium	Boron	Indium	Antimony
13	Which component of the transistor has lowest concentration of impurity?	Base	Emitter	Collector	Resistor
14	Bolean expression for AND gate is:	$X = A + B$	$X = \overline{A \cdot B}$	$X = A \cdot B$	$X = \overline{A + B}$
15	Compton shift for wavelength is minimum for scattering angle $\theta =$	90°	0°	45°	270°
16	At higher energies more then 1.02 MeV the dominant process is:	Compton effect	Photoelectric effect	Fission process	Pair production
17	Electron normally can reside in excited state for about:	$10^{-8} s$	$10^{-3} s$	$10^{-6} s$	$10^8 s$

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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			
2. Attempt any eight parts.		<i>MTN-2-24</i>	8 × 2 = 16
(i)	Describe the force or forces on a positive point charge when placed between parallel plates. (a) with similar and equal charges (b) with opposite and equal charges		
(ii)	Do electrons tend to go to region of high potential or of low potential?		
(iii)	Two opposite point charges, each of magnitude q are separated by a distance $2d$. What is the electric potential at a point P mid way between them?		
(iv)	Sketch the graphs for charging and discharging of a capacitor.		
(v)	How can a current loop be used to determine the presence of a magnetic field in a given region of space?		
(vi)	How can you use a magnetic field to separate isotopes of chemical element?		
(vii)	How can a galvanometer be converted into an ammeter? Also write down the formula to adjust the shunt resistance.		
(viii)	Define CRO and write down its principle.		
(ix)	If a nucleus has half-life of 1 year, does this mean that it will be completely decayed after 2 years? Explain.		
(x)	What do you understand by "background radiation"? State two sources of this radiation.		
(xi)	Explain the effects of low level radiation and high level radiation.		
(xii)	Explain the p-p reaction in the sun with the help of equations.		
3. Attempt any eight parts.			8 × 2 = 16
(i)	Give two differences between Electromotive force and Potential difference.		
(ii)	What is Open circuit and Closed circuit?		
(iii)	Calculate the terminal potential difference across an external resistance when a current 0.5A flowing in a circuit. The emf is 2V and source of emf has internal resistance 1Ω .		
(iv)	Name the device that will (a) permit flow of direct current but oppose the flow of alternating current (b) permit flow of alternating current but not the direct current		
(v)	How the reception of a particular radio station is selected on your radio set?		
(vi)	Find the capacitance required to construct a resonance circuit of frequency 1000kHz with an inductor of 5mH.		
(vii)	Define Proportional limit and Ultimate tensile strength.		
(viii)	How n-type semi conductor is formed by the process of doping?		
(ix)	What is the difference between Ferromagnetic and Paramagnetic substances?		
(x)	What is Electronics? Write down only names of electronic devices (at least two).		
(xi)	Why +ve terminal of a battery is connected with p-type and -ve terminal with n-type region.		
(xii)	Explain briefly Light emitting diode.		
4. Attempt any six parts.			6 × 2 = 12
(i)	What is to be done in order to enhance the magnetic flux in transformer?		
(ii)	In a certain region, the earth's magnetic field points vertically down. When a plane flies due north, which wingtip is positively charged?		
(iii)	Four unmarked wires emerge from a transformer. What steps would you take to determine the turns ratio?		
(iv)	State Stefan-Boltzmann law and write its mathematical relation.		
(v)	The classical theory cannot explain the threshold frequency of light. Why? Explain.		
(vi)	If an electron and a proton have the same de Broglie wavelength, which particle has greater speed?		
(vii)	What advantages an electron microscope has over an optical microscope?		
(viii)	How line spectra can be used for the identification of elements? Explain.		
(ix)	Explain why laser action cannot occur without population inversion between atomic levels?		
SECTION-II			
NOTE: Attempt any three questions.			3 × 8 = 24
5.(a)	Define Xerography. Draw the schematic diagram of a photocopier and explain its working.		05
(b)	How many electrons pass through an electric bulb in one minute if the 300 mA current is passing through it?		03
6.(a)	State Ampere's law. Apply it to find magnetic field inside the solenoid.		05
(b)	A D.C motor operates at 240V and has a resistance of 0.5Ω . When the motor is running at normal speed, the armature current is 15A. Find the back emf in the armature.		03
7.(a)	Describe the A.C through R.C series circuit.		05
(b)	Calculate the gain of non-inverting amplifier as shown in given figure:		03
8.(a)	What is Compton effect? Derive relation for Compton shift? Also discuss it for $\theta=0^\circ$ and $\theta=90^\circ$		05
(b)	The length of a steel wire is 1.0 m and its cross-sectional area is $0.03 \times 10^{-4} m^2$. Find the work done in stretching the wire when a force of 100N is applied on it. Where $Y = 3.0 \times 10^{11} Nm^{-2}$.		03
9.(a)	What is Nuclear Reactor? Describe function of its main parts.		05
(b)	The wavelength of $K X$ - ray from copper is $1.377 \times 10^{-10} m$. What is the energy difference between the two levels from which this transition results?		03