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 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. No credit will be awarded in case BUBBLES are not filled. Do not solve question on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) $\dfrac{sec}{ohm}$ is equal to:

(A) Coulomb (B) Farad (C) Joule (D) Ampere

(2) S.I unit of electric flux is:

(A) NC^{-1} (B) Nm^2C^{-1} (C) NmC^{-1} (D) NmC^2

(3) A thermistor is a heat sensitive:

(A) Resistor (B) Capacitor (C) Inductor (D) Diode

(4) S.I unit of magnetic flux density is:

(A) $Wb\,m$ (B) $Wb\,m^{-1}$ (C) $Wb\,m^{-2}$ (D) $Wb\,m^{-3}$

(5) If 300 turns of wire are wound on $30cm$ length, then number of turns per unit length is:

(A) 10 (B) 20 (C) 100 (D) 1000

(6) The principle of A.C generator is:

(A) Mutual induction (B) Self induction (C) Electromagnetic induction (D) All of these

(7) Energy density in inductor is given by:

(A) $\dfrac{1}{2}\dfrac{B}{\mu_0}$ (B) $\dfrac{1}{2}\dfrac{B}{\mu_0^2}$ (C) $\dfrac{1}{2}\dfrac{B^2}{\mu_0^2}$ (D) $\dfrac{1}{2}\dfrac{B^2}{\mu_0}$

(8) The device which allows only the flow of D.C is:

(A) Capacitor (B) Resistor (C) Inductor (D) Generator

(9) In R.L.C series circuit resonance occurs when:

(A) $X_C > X_L$ (B) $X_L > X_C$ (C) $X_L >> X_C$ (D) $X_L = X_C$

(10) The Curie temperature for iron is:

(A) 923 K (B) 1023 K (C) 823 K (D) 723 K

(11) For non-inverting amplifier, if $R_1 = \infty\,ohm$, $R_2 = 0\,ohm$ then gain of amplifier is:

(A) 2 (B) 0 (C) 1 (D) Infinite

(12) The current gain $"\beta"$ of a transistor is given by:

(A) $\dfrac{I_C}{I_B}$ (B) $\dfrac{I_E}{I_C}$ (C) $\dfrac{I_B}{I_C}$ (D) $\dfrac{I_E}{I_B}$

(13) The rest mass of $X-$ray photon is:

(A) $1.6 \times 10^{-19}\,kg$ (B) $9.1 \times 10^{-31}\,kg$ (C) $1.67 \times 10^{-27}\,kg$ (D) Zero

(14) When platinum wire is heated, it becomes white at temperature:

(A) $900^{o}C$ (B) $1100^{o}C$ (C) $1300^{o}C$ (D) $1600^{o}C$

(15) The value of Rydberg constant is:

(A) $1.0974 \times 10^{7}\,m^{-1}$ (B) $1.0974 \times 10^{-7}\,m^{-1}$ (C) $1.0974 \times 10^{11}\,m^{-1}$ (D) $1.0974 \times 10^{-11}\,m^{-1}$

(16) When $\gamma-$rays are emitted, the nuclear mass of an element:

(A) Increases by 2 units (B) Increases by 1 unit (C) Decreases by 4 units (D) Does not change

(17) The particles equal in mass or greater than proton are:

(A) Baryons (B) Hadrons (C) Fermions (D) Mesons

PHYSICS PAPER-II GROUP-I   MTN-91-21   TIME ALLOWED: 2.40 Hours
SUBJECTIVE   MAXIMUM MARKS: 68

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

SECTION-I

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

(i) Electric lines of force never cross. Explain why?

(ii) If a point charge $'q'$ of mass m is released in a non-uniform electric field with field lines pointing in the same direction, will it make a rectilinear motion?

(iii) Prove that $1\dfrac{volt}{meter} = 1\dfrac{Newton}{Coulomb}$

(iv) A particle carrying a charge of $2e$ falls through a potential difference of $3.0V$. Find energy acquired by it.

(v) How can you use a magnetic field to separate isotopes of chemical element?

(vi) If a charged particle moves in a straight line through some region of space, can you say that magnetic field in the region is zero?

(vii) Draw Saw tooth voltage waveform and explain it.

(viii) Define magnetic flux and one Tesla.

(ix) Does the induced *emf* in a circuit depend on the resistance of the circuit?

(x) How would you position a flat loop of wire in a changing magnetic field, so that there is no *emf* induced in the loop?

(xi) A metal rod of length $25cm$ is moving at speed of $0.5m/s$ in a direction perpendicular to a $0.25T$ magnetic field. Find the *emf* produced in the rod.

(xii) Define motional *emf* and write its mathematical expression.

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

(i) Do bends in a wire affect its electrical resistance? Explain.

(ii) Why does the resistance of a conductor rise with temperature?

(iii) State Kirchhoff's Second Rule and write its equation.

(iv) In a R−L circuit will the current lag or lead the voltage? Illustrate your answer by a vector diagram.

(v) How does doubling the frequency affect the reactance of (a) an inductor   (b) a capacitor

(vi) Write four properties of parallel resonance circuit.

(vii) Distinguish between ductile and brittle substances.

(viii) Define modulus of elasticity. Show that the units of modulus of elasticity and stress are the same.

(ix) Write a brief note on superconductor.

(x) What is rectification, write its two types.

(xi) Why is the base current in a transistor very small?

(xii) Why ordinary silicon diodes do not emit light?

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

(i) Discuss the variation of photoelectric current with the intensity of light falling on plate of photocell.

(ii) Which photon, red, green or blue carries the most (a) energy and (b) momentum.

(iii) What advantages an electron microscope has over an optical microscope?

P.T.O

(iv)   What are characteristic X – rays? How are they originated from the atoms?

(v)   Can the electron in the ground state of hydrogen absorb a photon of energy $13.6\,eV$ and greater than $13.6\,eV$?

(vi)   Why is the mass of a nucleus less than the total mass of constituent particles? Where is this mass lost?

(vii)   What is the difference between hadrons and leptons?

(viii)   A particle which is more ionizing is less penetrating. Why?

(ix)   What do you understand by "back ground radiation"? State two sources of this radiation.

SECTION-II

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

5.(a)   Derive an expression for the energy stored in the capacitor.   5

  (b)   The potential difference between the terminals of a battery in open circuit is $2.2V$. When it is connected across a resistance of $5.0\,\Omega$. The potential falls to $1.8V$. Calculate the current and the internal resistance of the battery.   3

6.(a)   Define self induction. Prove that in case of inductor, the energy density is directly proportional to the square of magnetic field.   5

  (b)   A power line $10m$ high carries a current $200A$. Find the magnetic field of the wire at the ground.   3

7.(a)   Describe A.C through R–C series circuit.   5

  (b)   In a circuit, the transistor has a current $10\,mA$ at collector and base current $40\,\mu A$. What is the current gain of the transistor?   3

8.(a)   What are intrinsic and extrinsic semiconductors? How the P – type and N – type materials are formed?   5

  (b)   Calculate the energy (in MeV) released in the following fusion reaction: 3
$$^2_1H + {}^3_1H \longrightarrow {}^4_2He + {}^1_0n$$

9.(a)   What is photoelectric effect? Write two results of this effect which cannot be explained by classical electromagnetic theory. Explain them on the basis of quantum theory.   5

  (b)   A tungsten target is struck by electron that have been accelerated from rest through $40\,kV$ potential difference. Find the shortest wavelength of the bremsstrahlung radiation emitted.   3

19-2021(A)-25000 **(MULTAN)**

PHYSICS   PAPER-II   GROUP-II   MTN-6II-21   TIME ALLOWED: 20 Minutes

OBJECTIVE   MAXIMUM MARKS: 17

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 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. No credit will be awarded in case BUBBLES are not filled. Do not solve question on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) The SI unit of Impedance is:

(A) Henry   (B) Hertz   (C) Ohm   (D) Volt

(2) Which one of the following is the example of crystalline solid?

(A) Plastic   (B) Glass   (C) Rubber   (D) Zirconia

(3) Which component of the transistor has greater concentration of impurity?

(A) Base   (B) Emitter   (C) Collector   (D) Resistor

(4) In full wave rectification, the numbers of diodes required is:

(A) 4   (B) 3   (C) 1   (D) 5

(5) Plank's constant 'h' has the same unit as that of:

(A) Angular momentum   (B) Linear velocity   (C) Torque   (D) Power

(6) The factor $\dfrac{h}{m_0 c}$ has the dimension of:

(A) Mass   (B) Time   (C) Length   (D) Power

(7) The radius of 10th orbit of hydrogen atom in nm is:

(A) 0.53   (B) 51.3   (C) 5.3   (D) 53

(8) The binding energy per nucleon is maximum for:

(A) Iron   (B) Helium   (C) Radium   (D) Copper

(9) Which of the following is highly penetrating?

(A) α – particles   (B) γ – rays   (C) X – rays   (D) β – particles

(10) The force on electron in an electric field of magnitude $10^4 NC^{-1}$ is:

(A) $1.9 \times 10^{-15} N$ (B) $1.6 \times 10^{-15} N$ (C) $1.6 \times 10^{-8} N$ (D) $1.8 \times 10^{-15} N$

(11) The total electric flux through any closed surface depends upon:

(A) Charge   (B) Medium   (C) Geometry of closed surface   (D) Both A and B

(12) Heat generated by a 50 watt bulb in one hour is:

(A) $36000 J$ (B) $48000 J$ (C) $1800 J$ (D) $180000 J$

(13) One Tesla(T) is equal to:

(A) $1 NA^{-1}$ (B) $1 Nm^{-1}$ (C) $1 NA^{-1}m$ (D) $1 NA^{-1}m^{-1}$

(14) A 5 meter wire carrying a current of $2A$ is at right angle to uniform magnetic field of 0.5 Tesla. The force on the wire is:

(A) $5N$ (B) $4N$ (C) $2N$ (D) $1.5N$

(15) Lenz's law is in accordance with the law of conservation of:

(A) Mass   (B) Momentum   (C) Energy   (D) Charge

(16) The emf induced in $1 mH$ inductor in which current changes from $5A$ to $3A$ in $1ms$ is:

(A) $2 \times 10^{-6} V$ (B) $2V$ (C) $6 \times 10^{-6} V$ (D) $8V$

(17) Current leads the applied voltage in pure _____ circuit.

(A) Resistive   (B) Capacitive   (C) Inductive   (D) Reactive

2021 (A)   Roll No: _____

INTERMEDIATE PART-II (12th CLASS)
PHYSICS PAPER-II   GROUP-II   M TN-6I-21   TIME ALLOWED: 2.40 Hours
                              SUBJECTIVE   MAXIMUM MARKS: 68

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

SECTION-I

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

(i)   How can you identify that which plate of capacitor is positively charged?

(ii)   Is $\vec{E}$ necessarily zero inside a charged rubber balloon if balloon is spherical? Assume that charge is distributed uniformly over the surface.

(iii)   Define surface charge density. Also give its S.I unit.

(iv)   Describe the change in the magnetic field inside a solenoid carrying a steady current I, if (a) length of solenoid is doubled but number of turns remains same and
        (b) the number of turns is doubled but length remains the same.

(v)   What are dissimilarities between electric and gravitational forces?

(vi)   Two charged particles are projected into a region where there is a magnetic field perpendicular to their velocities. If the charges are deflected in opposite directions, what can you say about them?

(vii)   Write down the main parts of C.R.O.

(viii) Define magnetic induction, also define its unit.

(ix)   How would you position a flat loop of wire in a changing magnetic field so that there is no *emf* induced in the loop?

(x)   Is it possible to change both the area of the loop and the magnetic field passing through the loop and still not have an induced *emf* in the loop?

(xi)   Name the factors upon which self inductance depends?

(xii)   Write down two methods for producing the induced *emf* in a loop.

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

(i)   Do bends in a wire affect its electrical resistance? Explain.

(ii)   Why does the resistance of a conductor rise with increase of temperature?

(iii)   Write two uses of potentiometer.

(iv)   A sinusoidal current has *rms* value of $10\ A$. What is maximum or peak value?

(v)   In a R–L circuit, will the current lag or lead the voltage? Illustrate your answer by a vector diagram.

(vi)   What is the advantage of three phase A.C supply over single phase A.C?

(vii)   Distinguish between crystalline, amorphous and polymeric solids.

(viii) What are superconductors? Write its two applications.

(ix)   Why does doping not change the basic structure of the solid? Explain.

(x)   Why does light emitting diodes emit visible light?

(xi)   What is the net charge on a n – type or a p – type substance?

(xii)   Why ordinary silicon diodes do not emit light?

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

(i)   Will bright light eject more electrons from a metal surface than dimmer light of the same colour?

(ii)   Will higher frequency light eject greater number of electrons than low frequency light?

(iii)   Write the name of any four applications of photocell.

(iv)   Write any two uses of Laser in medicine and industry.

(v)   What do we mean when we say that the atom is excited?

(vi)   What is fission chain reaction?

(vii)   For what purpose, bromine is mixed with principal gas in Geiger tube?

(viii)   What information is revealed by the length and shape of the tracks of an incident particle in Wilson cloud chamber?

(ix)   What factors make a fusion reaction difficult to achieve?

SECTION-II

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

5.(a)   Compare the properties of electric and gravitational force.   5

(b)   A platinum wire has resistance of $10\,\Omega$ at $0^o C$ and $20\,\Omega$ at $273^o C$. Find the value of temperature co-efficient of resistance of platinum.   3

6.(a)   Define mutual induction. Also derive an expression for induced *emf* in the secondary coil.   5

(b)   A coil of $0.1\,m \times 0.1\,m$ and of 200 turns carrying a current of $1.0\,mA$ is placed in a uniform magnetic field of $0.1\,T$. Calculate the maximum torque that acts on the coil.   3

7.(a)   What is operational amplifier. Derive the relation for the gain of non-inverting amplifier.   5

(b)   Find the value of current flowing through a capacitance $0.5\,\mu F$. When connected to a source of $150\,V$ at $50\,Hz$ 3

8.(a)   What is fusion reaction? Discuss in detail. What is the major source of heat and light in the Sun?   5

(b)   What stress would cause a wire to increase in length by 0.01% if the Young's modulus of the wire is $12 \times 10^{10}\,Pa$? What force would produce this stress if the diameter of the wire is $0.56\,mm$?   3

9.(a)   What is photoelectric effect? Explain it on the basis of quantum theory.   5

(b)   Find the speed of the electron in the first Bohr's orbit.   3