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. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank. No credit will be awarded i case BUBBLES are not filled. Do not solve questions on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) The phase at the positive peak is:-

(A) Zero (B) π (C) 2π (D) $\frac{\pi}{2}$

(2) In three phase A.C. supply, if first coil has phase $0°$, then the other two coils will have phases:-

(A) $0°$ and $120°$ (B) $120°$ and $240°$ (C) $240°$ and $360°$ (D) $0°$ and $360°$

(3) In ferromagnetic substances, domain contains atoms nearly equal to:-

(A) 10^8 to 10^{12} (B) 10^{10} to 10^{14} (C) 10^{12} to 10^{16} (D) 10^{14} to 10^{18}

(4) _____ is the building block of every complex electronic circuit.

(A) Semiconductor diode (B) Resistor (C) Capacitor (D) Amplifier

(5) Photodiode is used for the detection of:-

(A) Light (B) Thermal radiation (C) Radio waves (D) Sound waves

(6) The rest mass of Photon is:-

(A) Infinite (B) Small (C) Zero (D) $1.67 \times 10^{-27} kg$

(7) Application of wave nature of particle is:-

(A) Photodiode (B) Simple microscope
(C) Compound microscope (D) Electron microscope

(8) X – rays are similar in nature to:-

(A) γ – rays (B) β – rays (C) α – rays (D) Cathode rays

(9) Hydrogen bomb is an example of:-

(A) Nuclear fission (B) Nuclear fusion (C) Chain reaction (D) Chemical reaction

(10) Various types of cancer are treated by:-

(A) Carbon – 14 (B) Nickel – 63 (C) Cobalt – 60 (D) Strontium – 90

(11) In photocopier, the drum is coated with a layer of:-

(A) Copper (B) Silver (C) Selenium (D) Gold

(12) If time constant in RC series circuit is small, then capacitor is charged:-

(A) Slowly (B) Rapidly (C) At constant rate (D) Intermittently

(13) The current flowing through each resistor of equal resistance in parallel combination is:-

(A) Same (B) Different (C) Zero (D) Infinite

(14) Two parallel wires carrying currents in the same direction:-

(A) Have no effect (B) Repel each other (C) Have no field around them (D) Attract each other

(15) Cathode ray oscilloscope works by deflecting beam of _____ .

(A) Protons (B) Electrons (C) Neutrons (D) Positrons

(16) The mutual inductance of the coils depends upon:-

(A) Density of coil (B) Material of coil (C) Geometry of coil (D) Stiffness of coil

(17) A 50 mH coil carries a current of 2.0 A. Then energy stored in its magnetic field is:-

(A) 0.1 J (B) 10 J (C) 100 J (D) 1000 J

MTN-GI-12-18   **INTERMEDIATE PART-II (12th CLASS)**
PHYSICS PAPER-II (NEW SCHEME)   **GROUP-I**
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)   Do electrons tend to go to region of high potential or of low potential? Explain.

   (ii)   The potential is constant throughout a given region of space. Is the electrical field zero or non-zero in this region? Explain.

   (iii)   Define charging and discharging of a capacitor.

   (iv)   How sharks locate their prey? Explain briefly.

   (v)   Can a charged particle move through a magnetic field without experiencing any magnetic force? If so then how?

   (vi)   Why the resistance of an ammeter should be very low?

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

   (viii)   How might a loop of wire carrying a current be used as a compass? How could such a compass distinguish between north and south pole?

   (ix)   Does the induced emf always act to decrease the magnetic flux through a circuit? Explain.

   (x)   Can a transformer be used with D.C? Explain.

   (xi)   Show that ε and $\frac{\Delta\phi}{\Delta t}$ have the same units.

   (xii)   Can an emf be produced in a D.C. motor? Would it be possible to use motor as a generator or source? Explain.

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

   (i)   What is the resistance of a Carbon resistor if its first band is red, second band is green, third band is orange and fourth band is gold?

   (ii)   Write name of any two effects of current.

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

   (iv)   What is Impedance? Write its SI unit.

   (v)   At what frequency, will an inductor of inductance 1.0 H have a reactance of $500\,\Omega$?

   (vi)   How many times per second, will an incandescent lamp reach maximum brilliance when connected to a $50\,Hz$ source?

   (vii)   Define Elasticity and Plasticity.

   (viii)   Distinguish between Crystalline and Amorphous solids and give an example for each.

   (ix)   What is meant by Diamagnetic Substances? Give and example.

   (x)   Write the truth table of NAND gate.

   (xi)   Define open loop gain of an operational amplifier.

   (xii)   Why ordinary Silicon diodes do not emit light? Explain.

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

   (i)   Define work function and threshold frequency.

   (ii)   Why don't we observe a Compton effect with visible light?

   (iii)   When does light behave as a wave? When does it behave as a particle?

   (iv)   Write down two properties and two uses of x – rays.

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

(vi)   Differentiate between mass-defect and binding energy.

(vii)   Show that $1\,a.m.u = 931\,MeV$

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

(ix)   How can radio activity help in the treatment of cancer?

SECTION-II

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

5.(a)   What is Rheostat? How can it be used as a variable resistor as well as potential divider? $1 + 4$

(b)   Find the electric field strength required to hold suspended a particle of mass $1.0 \times 10^{-6}\,kg$ and charge $1.0\,\mu C$ between two plates 10.0 cm apart.   3

6.(a)   Define Electromagnetic Induction. Derive the expression for motional e.m.f. $1 + 4$

(b)   What shunt resistance must be connected across a galvanometer of $50.0\,\Omega$ resistance which gives full scale deflection with $2.0\,mA$ current, so as to convert it into an ammeter of range $10.0\,A$?   3

7.(a)   Describe an $R - L - C$ series circuit. Draw its impedance diagram and derive expression for its resonance frequency. Also write down its two properties. $1 + 1 + 2 + 1$

(b)   Calculate the gain of non-inverting amplifier shown in figure.   3
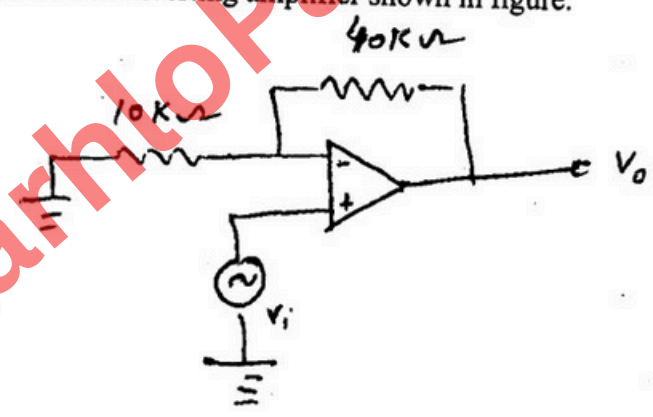
8.(a)   What is assumption of de-Broglie wavelength? How is it verified experimentally by Davisson and Germer experiment? $2 + 3$

(b)   A 1.25 cm diameter cylinder is subjected to a load of 2500 kg. Calculate the stress on the bar in mega pascals.   3

9.(a)   What are isotopes and how isotopes are separated by mass spectrograph? Explain. $1 + 4$

(b)   Calculate the longest wavelength of radiation for the Paschen series.   3