

1224 Warning:- Please write your Roll No. in the space provided and sign. Roll No. _____
(Inter Part - II) (Session 2020-22 to 2022-24) Sig. of Student _____

Physics (Objective) *SLID-2-24* (Group II)

Paper (II)

Time Allowed:- 20 minutes

PAPER CODE 4472

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 circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Write PAPER CODE, which is printed on this question paper, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1

- 1) If the distance between two point charge is halved, the electric intensity becomes
(A) Half (B) $\frac{1}{4}$ times (C) Double (D) 4 times
- 2) Current which flows from high potential to low potential is
(A) Electric current (B) Conventional current (C) Eddy current (D) Remain constant
- 3) The value of permeability of free space is
(A) $4\pi \times 10^{-9} \text{ WbA}^{-1}\text{m}^{-1}$ (B) $4\pi \times 10^{-7} \text{ WbA}^{-1}\text{m}^{-1}$ (C) $4\pi \times 10^{-10} \text{ WbA}^{-1}\text{m}^{-1}$ (D) $4\pi \times 10^7 \text{ WbA}^{-1}\text{m}^{-1}$
- 4) Lenz's law applies on
(A) Magnitude of emf (B) Direction of emf (C) Direction of induced current (D) Resistance
- 5) The mean value of A.C in a cycle is
(A) 1 (B) 0 (C) I_0 (D) $\frac{I_0}{\sqrt{2}}$
- 6) Which one is a ductile substance.
(A) Glass (B) Wood (C) Lead (D) Oxygen
- 7) Reverse current flows due to
(A) Majority charge carrier (B) Minority charge carrier (C) Electrons (D) Holes
- 8) Earth orbital speed is
(A) 10 km/s (B) 20 km/s (C) 30 km/s (D) 40 km/s
- 9) Which of the series of hydrogen atom lies in ultraviolet region
(A) Lyman series (B) Balmer series (C) Paschen series (D) Bracket series
- 10) The binding energy per nucleon is maximum for
(A) Helium (B) Iron (C) Polonium (D) Radium
- 11) Which one is photo conductor
(A) Copper (B) Selenium (C) Mercury (D) Aluminium
- 12) If the length and turns of a solenoid is doubled, strength of magnetic field will be
(A) Doubled (B) Half (C) Constant (D) Four times
- 13) Energy stored in inductor is
(A) $\frac{1}{2} LI^2$ (B) $\frac{1}{2} LI$ (C) $\frac{1}{2} L^2 I$ (D) $\frac{1}{2} L^2 I^2$
- 14) In case of A.C through resistor, voltage and current are
(A) 0° (B) 90° (C) 180° (D) 270°
- 15) A diode characteristic curve is plotted between
(A) Current and Resistance (B) Voltage and Time (C) Voltage and current (D) Current and Time
- 16) At low temperature, Body emits radiation of
(A) Short wavelength (B) Long wavelength (C) High frequency (D) Both (A) and (C)
- 17) Which one is not affected by Electric and magnetic field.
(A) β - rays (B) γ - rays (C) α - rays (D) Electrons

1229- 1224 -- 12000 (1)

2. Answer briefly any Eight parts from the followings:- *SGD-2-248* $\times 2 = 16$

- (i) How can you identify that which plate of a capacitor is positively charged?
- (ii) Electric lines of force never cross. Why? (iii) State Coulomb's law. Also write its mathematical form.
- (iv) Write down at least two properties of electric field lines.
- (v) Suppose that a charge 'q' is moving in a uniform magnetic field with a velocity v. Why is there no work done by the magnetic force that acts on the charge q?
- (vi) Why does the picture on a T.V screen become distorted when a magnet is brought near the screen?
- (vii) Define right hand rule for determining the direction of magnetic field in a current carrying conductor.
- (viii) Find the value of the magnetic field that will cause a maximum force of 2.0×10^{-3} N on a 10 cm straight wire carrying a current of 5A.

(ix) Why are heavy nuclei unstable? (x) What factor make a fusion reaction difficult to achieve.

(xi) Define mass defect and binding energy. Also write their mathematical expressions.

(xii) Show that $1u = 931 \text{ MeV}$ by using the relation $E = mc^2$.

3. Answer briefly any Eight parts from the followings:-

 $8 \times 2 = 16$

- (i) Do bends in a wire effect its electrical resistance? Explain.
- (ii) Why heat is produced in a conductor due to flow of current.
- (iii) What are the difficulties in testing whether the filament of a lighted bulb obeys ohm's Law?
- (iv) A sinusoidal current has rms value of 20 A. What is the maximum or peak value?
- (v) How many times per minutes will be an incandescent Lamp reach maximum brilliance when connected to 50 Hz Source.
- (vi) What is power factor in an A.C circuit? Explain. (vii) Define stress and strain. What are their SI units?
- (viii) Define modulus of elasticity. Show that the units of modulus of elasticity and stress are the same.
- (ix) What is squids and where it is used? (x) Define the current gain of a Transistor. Give Mathematical expression.
- (xi) Why a photo diode is operated in reverse biased state?
- (xii) How does the motion of an electron in a n-type substance differ from the motion of holes in p-type substance?

4. Answer briefly any Six parts from the followings:-

 $6 \times 2 = 12$

- (i) In transformer, output power is less than input power. Why? Explain.
- (ii) Can an electric motor be used to drive an electric generator with the output from the generator being used to operate the motor?
- (iii) Does the induced emf always act to decrease the magnetic flux through a circuit?
- (iv) What is frame of reference? Also differentiate between inertial and non-inertial frames of reference.
- (v) Write the postulates upon which special theory of relativity is based.
- (vi) Will higher frequency light eject greater number of electrons than low frequency light?
- (vii) Is it possible to create a single electron from energy? Explain.
- (viii) State two postulates of Bohr's model of the Hydrogen atom.
- (ix) What are the advantages of lasers over ordinary light?

Note: Attempt any three questions.

Section ----- II

 $(8 \times 3 = 24)$

- 5. (a) Derive the expressions for electrical power and power dissipated in resistors.
- (b) Two point charges, $q_1 = -1.0 \times 10^{-6} \text{ C}$ and $q_2 = +4.0 \times 10^{-6} \text{ C}$, are separated by a distance of 3.0 m. Find and justify the zero - field location.
- 6. (a) Derive an expression of force acting on a moving charge in a magnetic field.
- (b) An ideal step down transformer is connected to main supply of 240 V. It is desired to operate a 12 V, 30 W lamp. Find the current in the primary and the transformation ratio.
- 7. (a) What is transistor? How can we use it as an amplifier. Find an expression for gain of an amplifier.
- (b) A circuit has an inductance of $\frac{1}{\pi} \text{ H}$ and resistance of 2000Ω . A 50 Hz A.C is supplied to it. Calculate the reactance and impedance offered by the circuit.
- 8. (a) Define photoelectric effect? Discuss it when the intensity of incident light remain constant.
- (b) A 1.5 cm diameter cylinder is subjected to a load of 2500 kg. Calculate the stress on the bar in mega pascals.
- (a) Explain the term mass defect and binding energy with an example.
- (b) Compute the shortest wavelength radiation in the Balmer series? What value of n must be used?