Roll No. _____ (To be filled in by the candidate)

(Academic Sessions 2017 – 2019 to 2019 – 2021)

PHYSICS 221-(INTER PART – II) Time Allowed : 20 Minutes

Q.PAPER – II (Objective Type) GROUP – I Maximum Marks : 17

PAPER CODE = 8471

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	The quantity $-\frac{\Delta V}{\Delta r}$ is called : (A) Electric potential (B) Electric energy (C) Potential energy (D) Potential gradient
2	If the potential difference across two plates of capacitor is doubled, the energy in it will be : (A) Two times (B) Eight times (C) Four times (D) Remains same
3	Kirchhoff's second rule is a way of stating conservation of : (A) Mass (B) Charge (C) Energy (D) Momentum
4	The brightness of spot on CRO screen is controlled by : (A) Plates (B) Cathode (C) Anode (D) Grid
5	The e/m of neutron is : (A) Less than electron (B) Zero (C) Greater than electron (D) The same as electron
6	The energy stored in inductor is : (A) $\frac{1}{2}LI^2$ (B) $\frac{1}{2}LI$ (C) $\frac{1}{2}L^2I$ (D) $\frac{1}{2}L^2I^2$
7	The unit of self inductance is : (A) Weber (B) Tesla (C) Henry (D) Farad
8	At high frequency the value of reactance of capacitor will be : (A) Small (B) Zero (C) Large (D) Infinite
9	When 10 V are applied to an A.C. circuit, the current flowing in it 100 mA, its impedance is : (A) 10 Ohm (B) 100 Ohm (C) 1000 Ohm (D) 1 Ohm
10	The critical temperature of mercury is : (A) 1.18 K (B) 4.2 K (C) 3.72 K (D) 7.2 K
11	The current gain β of the transistor is given by : (A) $\beta = \frac{I_B}{I_C}$ (B) $\beta = I_B + I_C$ (C) $\beta = I_B - I_C$ (D) $\beta = \frac{I_C}{I_B}$
12	The input resistance of an operational amplifier is : (A) Zero (B) Low (C) High (D) Equal to output resistance
13	The value of Plank's constant h is : (A) $6.63\times10^{-34} Js$ (B) $6.63\times10^{-34} J/s$ (C) $6.63\times10^{-34} Js^2$ (D) $6.63\times10^{-34} J/s^2$
14	Albert Einstein was awarded Noble Prize in Physics in : (A) 1905 (B) 1911 (C) 1918 (D) 1921
15	Radius of first Bohr orbit of hydrogen atom is : (A) 0.053 nm (B) 0.053 mm (C) 0.053 μm (D) 0.053 m
16	Gamma rays emitted from radioactive element have speed : (A) $1\times10^{7} ms^{-1}$ (B) $1\times10^{8} ms^{-1}$ (C) $3\times10^{8} ms^{-1}$ (D) $4\times10^{19} ms^{-1}$
17	The dead time of G.M. counter is : (A) $10^{-3} s$ (B) $10^{-4} s$ (C) $10^{-6} s$ (D) $10^{-8} s$

LHR-I-21

Roll No. _____ (To be filled in by the candidate)

(Academic Sessions 2017 – 2019 to 2019 – 2021)

PHYSICS 221-(INTER PART – II) Time Allowed : 2.40 hours

PAPER – II (Essay Type) GROUP – I Maximum Marks : 68

SECTION – I

2. Write short answers to any EIGHT (8) questions : **16**

(i) If 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?

(ii) Do electrons tend to go to region of high potential or of low potential?

(iii) Electric field lines provide information about the strength of the electric field. Describe electric field intensity in terms of field lines.

(iv) Define and write relation for dielectric constant in terms of capacitances of a capacitor.

(v) Explain the principle of extension of right hand rule.

(vi) How does the graph pattern appear stationary on the screen of CRO? Explain the condition.

(vii) 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?

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

(ix) What is the importance of minus sign in the expression $\left(\varepsilon = -N\frac{\Delta\phi}{\Delta t}\right)$ for Faraday's law of electromagnetic induction?

(x) Why self induced emf is also called as back emf ?

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

(xii) 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?

3. Write short answers to any EIGHT (8) questions : **16**

(i) What is Wheatstone bridge? How can it be used to determine an unknown resistance?

(ii) Differentiate between resistance and resistivity.

(iii) Explain why the terminal potential difference of a battery decreases when the current drawn from it is increased?

(iv) How does doubling the frequency affect the reactance of : (a) An inductor (b) A capacitor

(v) A sinusoidal current has rms value of 10A. What is the maximum or peak value?

(vi) Explain the power dissipation in an inductor.

(vii) What is meant by para, dia and ferromagnetic substances? Give examples of each.

(viii) What is meant by hysteresis loss? How is it used in the construction of a transformer?

(ix) Differentiate between young modulus Y and bulk modulus K.

(x) Why charge carriers are not present in the depletion region?

(xi) What is the principle of virtual ground? Apply it to find the gain of an inverting amplifier.

(xii) What is the potential barrier of silicon and germanium?

4. Write short answers to any SIX (6) questions : **12**

(i) As a solid is heated and begins to glow, why does it first appear red?

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

(Turn Over)

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

(iv) What are the advantages of laser over ordinary light?

(v) What is Helium-Neon Laser?

(vi) Why are heavy nuclei unstable?

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

(viii) Define mass defect and binding energy.

(ix) What are hadrons? Give examples.

SECTION – II

Note : Attempt any THREE questions.

5. (a) State Gauss's law. Find out the electric intensity due to an infinite sheet of charge. 5

(b) 0.75 A current flows through an iron wire when a battery of 1.5 V is connected across its ends. The length of the wire is 5 m and its cross-sectional area is $2.5\times10^{-7} m^2$. Compute the resistivity of iron. 3

6. (a) Derive the expression for force on moving charge in a uniform magnetic field. 5

(b) An alternating current generator operating at 50 Hz has a coil of 200 turns. The coil has an area of 120 cm^2. What should be the magnetic field in which the coil rotates in order to produce an emf of maximum value of 240 volts? 3

7. (a) How OP amplifier can be made as inverting amplifier? Explain your answer by circuit diagram. 5

(b) Find the value of the current and inductive reactance when A.C. voltage of 220 V at 50 Hz is passed through an inductor of 10 H. 3

8. (a) Explain the principle, construction and working of Geiger Mullar Counter. 5

(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) State postulates of Bohr's model of the hydrogen atom and then show that hydrogen atom have quantized radii? 5

(b) An electron is accelerated through a potential difference of 50 V. Calculate its de Broglie wavelength. 3