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

(Academic Sessions 2019 – 2021 to 2021 – 2023)

PHYSICS 223-1st Annual-(INTER PART – II) Time Allowed : 2,40 hours

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

SECTION – I

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

(i) Describe the force or forces on a positive charge when placed between parallel plates with opposite and equal charges.

(ii) If the distance between two point charges is halved, what will happen to the force between them?

(iii) What are the factors upon which the electric flux depend?

(iv) Why does capacitance of a parallel plate capacitor increase in the presence of a dielectric?

(v) At a given instant, a proton moves in the positive x-direction in a region where there is a magnetic field in the negative z-direction. What is the direction of the magnetic force and direction of motion of proton?

(vi) How can a current loop be used to determine the presence of a magnetic field in a given region of space?

(vii) What is the importance of hair spring used in a Weston galvanometer? Explain.

(viii) Describe the working of an electron gun in CRO.

(ix) What is radiation tracer? Explain.

(x) Which radiation dose would deposit more energy to your body? (a) 10 mGy to your hand or (b) 1 mGy dose to your entire body?

(xi) How quenching is done in GM-tube?

(xii) How the scientists dispose off the radioactive waste safely?

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

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

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

(iii) What is meant by strain energy?

(iv) What is principle of virtual ground?

(v) Do bends in a wire affects its electrical resistance? Explain.

(vi) What is meant by A.M. and F.M.?

(vii) Define superconductor. Give example.

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

(ix) How rheo-state is used as potential divider?

(x) What is impedance? Give unit.

(xi) What is elastic limit of material in stress strain curve?

(xii) Give the application of gates in control system.

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

(i) Can a D.C motor be turned into DC generator? What changes are required be done?

(ii) In a transformer, there is no transfer of charge from the primary to the secondary. How is then the power transferred?

(iii) What is meant by armature?

4. (iv) Can pair production take place in vacuum? Explain.

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

(vi) Is it possible to create a single electron from energy? Explain.

(vii) What are black body radiations? How can you get a black body?

(viii) How can the spectrum of hydrogen contain so many lines when hydrogen contains one electron?

(ix) Is energy conserved when an atom emits photon of light?

SECTION – II

Note : Attempt any THREE questions.

5. (a) Describe Millikan's oil drop experiment to determine charge on electron. 5

(b) A rectangular bar of iron is 2.0 cm by 2.0 cm in cross-section and 40 cm long. Calculate its resistance if the resistivity of iron is $11\times10^{-8}\Omega m$. 3

6. (a) Derive the relation of e/m of an electron. 5

(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. 3

7. (a) What is RLC series circuit? Find out an expression for resonance frequency. Also write down its properties. 5

(b) The current flowing into the base of a transistor is 100μA. Find its collector current and ratio I_C/I_E, if the value of current gain β is 100. 3

8. (a) What is hysteresis loop? Explain different terms, saturation, remanence and coercivity. 5

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

9. (a) What is nuclear fission? Describe uncontrolled and controlled chain reaction. 5

(b) Compute the shortest wavelength radiation in the Balmer Series. What value of n must be used? 3