

**Physics (Subjective)****SECTION-I***RWP-1-24*

2. Write short answers of any eight parts from the following: (8x2=16)
- Define electric polarization and electric dipole.
  - Sketch the graphs for charging and discharging of a capacitor.
  - The potential is constant throughout a given region of space. Is the electric field zero or non-zero in this region? Explain
  - How can you identify that which plate of a capacitor is positively charged?
  - Can an electron at rest be set in motion with a magnet? Explain.
  - How does the graph pattern appear stationary on the screen of CRO? Explain the condition.
  - What should be the orientation of a current carrying coil in a magnetic field so that torque acting upon the coil is (a) maximum (b) minimum?
  - Why the voltmeter should have a very high resistance?
  - What factors make a fusion reaction difficult to achieve?
  - What information is revealed by the length and shape of the tracks of an incident particle in Wilson cloud chamber?
  - What is meant by dose of radiation? What is its S.I. unit?
  - Why Geiger counter is not suitable for fast counting?
3. Write short answers of any eight parts from the following: (8x2=16)
- Why does the resistance of a conductor rise with temperature?
  - What is meant by A.M. and F.M.?
  - Describe a circuit which will give a continuously varying potential.
  - Why potentiometer is a better instrument than a voltmeter to measure potential difference? Explain briefly.
  - In an R.L circuit, will the current lag or lead the voltage? Illustrate your answer by a vector diagram.
  - When a 100v are applied to an A.C. circuit, the current flowing in it is 100mA. Find its impedance.
  - What is meant by para, dia and ferromagnetic substance? Give examples for each.
  - Define curie temperature. Also write the value of curie temperature for iron.
  - Differentiate between elasticity and plasticity of a material.
  - Why ordinary silicon diodes do not emit light?
  - Evaluate the gain of a non-inverting amplifier for external resistances  $R_1 = 5K\Omega$  and  $R_2 = 20K\Omega$ .
  - Draw characteristic curves for the forward biased and reverse biased  $p-n$  junction diode.
4. Write short answers of any six parts from the following: (6x2=12)
- Show that  $\epsilon$  and  $\frac{\Delta\phi}{\Delta t}$  have the same units.
  - Write any four applications of photocell.
  - Can a D.C. motor be turned into a D.C. generator? What changes are required to be done?
  - What is the main difference between A.C. generator and D.C. generator in its construction?
  - What are the measurements on which two observers in relative motion will always agree upon?
  - Will bright light eject more electrons from a metal surface than dimmer light of the same colour?
  - Is it possible to create a single photon in annihilation of matter? Explain briefly.
  - Can the electron in the ground state of hydrogen absorb a photon of energy 13.6 eV and greater than 13.6 eV
  - Differentiate between excited state and metastable state. Also write the residing times for each state.

**SECTION-II****Note Attempt any three questions. Each question carries equal marks:**

(8x3=24)

- Derive the relation for energy stored in a capacitor. Calculate the energy density. (5)
  - A platinum wire has a resistance of 10 $\Omega$  at 0°C and 20 $\Omega$  at 273°C. Find the value of temperature coefficient of resistance of platinum. (3)
- What is alternating current generator? Find the value of instantaneous induced current by it. (5)
  - A power line 10 m high carries a current 200A. Find the magnetic field of the wire at the ground? (3)
- Derive an expression for resonance frequency in R-L-C series circuit. Also write down the properties of the series resonance. (5)
  - The current flowing into the base of a transistor is 100 $\mu$ A. find its collector current  $I_C$ , its emitter current  $I_E$  and the ratio  $I_C/I_E$ , if the value of current gain  $\beta$  is 100. (3)
- Explain "Energy Band Theory" of solids. How does it help to distinguish between conductors, insulators & semi conductors? (5)
  - What is the maximum wavelength of two photons produced when a positron annihilates an electron? The rest mass energy of each is 0.51 MeV. (3)
- What are inner shell transition? Also discuss the production of x-rays. (5)
  - If  $^{233}_{92}\text{U}$  decays twice by  $\alpha$ -emission, what is the resulting isotopes? (3)