Time allowed: 2:35 Hours **Total Marks Sections B and C: 68**

NOTE:- **Answer any fourteen parts from Section 'B' and any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet–B if required. Write your answers neatly and legibly.**

SECTION – B (Marks 42)

Q 2 Attempt any FOURTEEN parts. The answer to each part should not exceed 3 to 4 lines. (14 x 3 = 42)

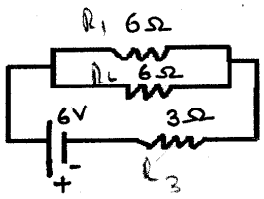
(i) Compare Electric and Gravitational forces.
(ii) Prove that the electric intensity at any point inside a hollow charged sphere is zero.
(iii) What are the difficulties in testing whether the filament of a lighted bulb obeys ohm's law?
(iv) Describe briefly, how Potentiometer is used to compare the e.m.fs of two cells.
(v) Give three uses of Cathode Ray Oscilloscope(CRO).
(vi) By using formula, describe the change in the magnetic field inside a solenoid carrying a steady current "I" if (a) the length of the solenoid is doubled but the number of turns remains the same and (b) the number of turns is doubled but the length remains the same.
(vii) Does the induced e.m.f in a circuit depend on the resistance of the circuit? Does the induced current depend on the resistance of the circuit?
(viii) When the primary of a transformer is connected to A.C mains the current in it (a) is very small if the secondary circuit is open but (b) increases when the secondary circuit is closed. Explain these facts.
(ix) What are Electrical oscillators? How do they play their part in metal detectors?
(x) Compare F.M and A.M radio waves.
(xi) What are Superconductors? Why are they preferred? Give names of the two devices where super–conductors are applied.
(xii) What is meant by Hysteresis loss? How is it used in construction of a transformer?
(xiii) What is Photodiode? Why is it operated in reverse biased state?
(xiv) We often see that during day time when it is cloudy, street lights turn ON, automatically. Why does it so happen?
(xv) How have the results of special theory of relativity been applied to NAVSTAR navigation system?
(xvi) Photon A has twice the energy of photon B. What is the ratio of the momentum of A to that of B?
(xvii) How can the spectrum of hydrogen contain so many lines when hydrogen contains one electron?
(xviii) What factors make a fusion reaction difficult to achieve?
(xix) What do you understand by "background radiation"? State two sources of this radiation.

SECTION – C (Marks 26)

Note:- Attempt any TWO questions. (2 x 13 = 26)

Q. 3 **a.** What is Capacitor and its Capacitance? Discuss the factors upon which capacitance of a capacitor depends. Obtain the expression for dielectric constant. 1+1+6

b. Find equivalent resistance of the circuit, total current drawn from the source and the current through each resistor . 05



Q. 4 **a.** What is Current generator? Give the principle and construction of an A.C generator. Derive formula to calculate the e.m.f induced in the loop. 08

b. A circuit consists of a capacitor of $2\mu F$ and a resistance of 1000Ω connected in series. An alternating voltage of 12volts and frequency $50Hz$ is applied. Find 04
(i) The current in the circuit
(ii) The average power supplied

c. How many times per second will an incandescent lamp reach maximum brilliance when connected to a $50Hz$ source? 01

Q. 5 **a.** How are the X-rays produced? Explain the production of: 08
(i) Characteristic X-ray
(ii) Continuous X-ray

b. What is the de-Broglie wavelength of an electron whose kinetic energy is120 eV? 04

c. What does LASER stand for? 01