SECTION-I

Rwp-12-2-23

2. Write short answers of any eight parts from the following: (8x2=16)

i. What are the photo conductors?
ii. Show that v/m = N/C.
iii. Do electrons tend to go region of high potential or of low potential?
iv. Electric lines of force never cross why?
v. Describe the change in magnetic field inside a solenoid carrying a steady current 'I'. If the number of turns is double, but length remains same?
vi. Why does the picture on a TV screen becomes distorted when a magnet is brought near screen?
vii. Why the resistance of an ammeter should be very low?
viii. What is Lorentz force? Give the role of electric and magnetic force in this regard.
ix. How can radioactivity help in the treatment of cancer?
x. What do we mean by the term critical mass?
xi. What do you understand by "background radiation"? State two sources of radiation.
xii. What is the self-quencing in Geiger Muller Counter?

3. Write short answers of any eight parts from the following: (8x2=16)

i. What are the difficulties in testing whether the filament of a lighted bulb obeys Ohm's Law?
ii. Write down the statement of Kirchoff's current rule and Kirdoff's voltage rule.
iii. What is meant by temperature coefficient of resistance? Give its S-I unit.
iv. Draw diagram and wave shape of three phase A.C generator.
v. How does doubling of frequency affect the reactance of: (a): An inductor (b): A capacitor
vi. In a R-L circuit, will the current log or lead the voltage? Illustrate your answer by a vector diagram.
vii. Discuss the mechanism of electrical conduction by holes and electrons in a pure semi-conductor element.
viii. What are high temperature super conductors? Give some examples.
ix. Define hysteresis and draw hysteresis curve.
x. Why ordinary silicon diode do not emit light?
xi. Draw diagram and explain working of transistor as a switch in its 'ON' state.
xii. Write down two characteristics of an operational amplifier.

4. Write short answers of any six parts from the following: (6x2=12)

i. What is electromagnetic induction?
ii. Does the induced emf always act to decrease the magnetic flux through a circuit?
iii. How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?
iv. The period of a pendulum is measured to be 3.0 s in the inertial reference frame of the pendulum. What is its period measured by an observer moving at a speed of 0.95 c with respect to the pendulum?
v. Define Compton effect and write relation for its wavelength.
vi. Which has the lower energy Quanta? Radio waves or X-rays.
vii. Can pair production take place in vacuum? Explain.
viii. State postulates of Bohr's model of hydrogen atom.
ix. What are the advantages of lasers over ordinary light?

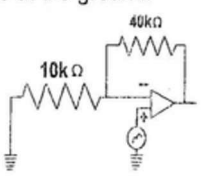
SECTION-II

Note Attempt any three questions. Each question carries equal marks: (8x3=24)

5. (a) Derive en expression for the energy stored in the electric field of a capacitor. 5
(b) A platinum wire has a resistance of 10Ω at 0°C and 20Ω at 273°C. Find the volume of temperature co-efficient of resistance of this wire. 3

6. (a) Derive an expression for self induce emf i.e. $\varepsilon = vBL \sin\theta$. Define unit of self induction. 5
(b) A power line 10.0 m high carries a current 200 A . Find the magnetic field of wire at the ground. 3

7. (a) Find out expression of resonance frequency for the case of series resonance circuit. Also describe its properties? (1+4)
(b) Calculate the gain of non-inverting amplifier shown in figure. 3



8. (a) What is wave nature of particle? How this ideas was confirmed by Davison and Germer? 1+4
(b) A wire 2.5 m long and coress section area $10^{-5}m^2$ is stretched 1.5mm by a force of 100N in the elastic region calculate (i) Strain (ii) Young's modules. 3

9. (a) *Write a note on construction and working of Wilson Cloud Chamber to detect unknown radiations.* 5
(b) Calculate the longest wavelength of radiations for the Paschen Series. 3