

PHYSICS (Subjective) GROUP - II

Time: 02:40 Hours Marks: 68

SECTION - I

2. Write short answers to any EIGHT parts.

(i) Define dielectric coefficient of capacitance.
 (ii) Show that $\text{Ohm} \times \text{Farad} = \text{Second}$.
 (iii) Electric lines of force never cross. Why?
 (iv) In the presence of dielectric why potential difference decreases?
 (v) Why does the picture on a T.V screen becomes distorted when a magnet is brought near the screen?
 (vi) What is Lorentz force? Give the role of electric and magnetic force in this regard.
 (vii) Do two long and parallel current carrying wires attract each other? Explain.
 (viii) A power line 20m high carries a current 200 A. Find the magnetic field of the wire at the ground.
 (ix) If decay constant of a radioactive isotope is 0.3465 hr^{-1} . What will be its half-life?
 (x) What is nuclear transmutation? Give one example.
 (xi) What is radiography? Write its one use.
 (xii) Discuss the advantages and disadvantages of nuclear power compared to the use of fossil fuel generated power.

3. Write short answers to any EIGHT parts.

(i) Write names of two devices in which resistance decreases due to increase in temperature.
 (ii) Do bends in a wire affect its electrical resistance? Explain.
 (iii) What are the difficulties in testing whether the filament of a lighted bulb obeys Ohm's law?
 (iv) In RLC series circuit, the impedance of the circuit at resonance is resistive. Why?
 (v) A sinusoidal current has rms value of 10A. What is the maximum or peak value?
 (vi) Name the device that will (a) permit flow of direct current but oppose the flow of alternating current (b) permit flow of alternating current but not the direct current.
 (vii) Differentiate between glossy solids and polymeric solids.
 (viii) Define modulus of elasticity. Show that the units of modulus of elasticity and stress are the same.
 (ix) What is meant by strain energy?
 (x) Summarize the advantages of photo diode.
 (xi) What is net charge on a n-type or a p-type substance?
 (xii) Why charge carriers are not present in the depletion region?

4. Write short answers to any SIX parts.

(i) Four unmarked wires emerge from a transformer. What steps would you take to determine the turns ratio?
 (ii) How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?
 (iii) Define motional emf. Write its expression.
 (iv) What happens to total radiation from a black body if its absolute temperature is doubled?
 (v) Is it possible to create a single electron from energy? Explain.
 (vi) State the two postulates of special theory of relativity.
 (vii) What is work function? Write its mathematical relation with threshold frequency.
 (viii) Mention any four applications of LASER.
 (ix) Can X-rays be reflected, refracted, diffracted and polarized just like any other waves? Explain.

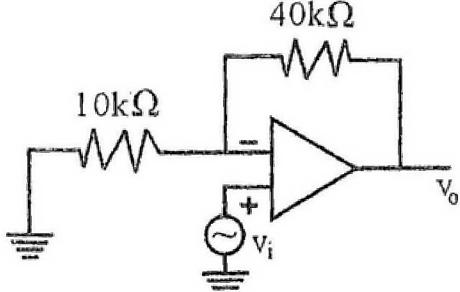
SECTION - II Attempt any THREE questions. Each question carries 08 marks.

5. (a) Define absolute potential. Derive its relation due to a point charge at a distance r from it. 05
 (b) A charge of 90C passes through a wire in 1 hour and 15 minutes. What is the current in the wire? 03

(Continued P/2)

6. (a) Discuss the principle, construction and working of an alternating current generator. Also find expression for induced emf and induced current. 05
(b) What current should pass through a solenoid that is 0.5m long with 10000 turns of copper wire, so that it will have a magnetic field of 0.4T? 03

7. (a) Describe the flow of A.C. through resistor and through capacitor. 05
(b) Calculate the gain of non-inverting amplifier as shown in figure given below: 03



8. (a) What is photoelectric effect? Explain it on the basis of quantum theory. 05
(b) A 1.25cm diameter cylinder is subjected to a load of 2500kg. Calculate the stress on the bar in mega pascals. 03

9. (a) What is meant by half-life of a radioactive element? How it can be determined by the decay of radioactive element? 05
(b) Compute the shortest wavelength radiation in the Balmer series. What value of n must be used? 03

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