

PHYSICS (Subjective) GROUP - II

Time: 02:40 Hours

Marks: 68

SECTION – I**2. Write short answers to any EIGHT parts.**

16

- (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.

16

- (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.

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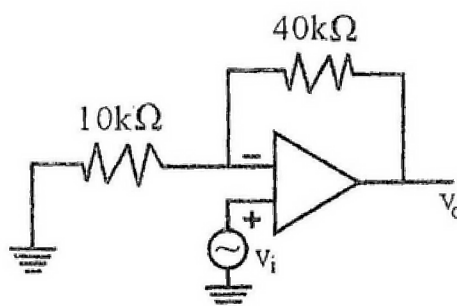
- (i) Four unmarked wires emerge from a transformer. What steps would you take to determine the turns ratio?
- (ii) How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?
- (iii) Define motional emf. Write its expression.
- (iv) What happens 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 $A \cdot C$ 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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