

OBJECTIVE

Time: 20 Minutes

Marks: 17

Q.No.1. Note: Write answers to the questions on the objective answers sheet provided. You have four choices for each objective type question as A, B, C, and D. The choice which you think is correct; fill the circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling to or more circles will result in zero mark in that question. Attempt as many questions as given in objective-type question paper and leave others blank.

- (i) The S.I. unit of charge is
 (a) ampere (b) volt (c) coulomb (d) newton
- (ii) The reciprocal of the resistivity of a material is called
 (a) permittivity (b) permeability (c) susceptibility (d) conductivity
- (iii) A carbon resistance is $26\text{ k}\Omega \pm 10\%$. What band colours represent this resistance?
 (a) Red, Yellow, Green, silver (b) Red, green, yellow, silver
 (c) red, blue, orange, silver (d) red, green, red, silver
- (iv) A 5 m wire carrying a current of 2 A is at right angles to the uniform magnetic field of 0.5 weber /m². The force on the wire is
 (a) 1.5 N (b) 2 N (c) 4 N (d) 5 N
- (v) Two parallel wires carrying currents in the opposite directions
 (a) repel each other (b) attract each other (c) no effect (d) they cancel each other magnetic field
- (vi) Lenz's law is in accordance with the law of conservation of
 (a) momentum (b) energy (c) charge (d) mass
- (vii) The energy stored in an inductor is given by
 (a) $L I^2$ (b) $L^2 I / 2$ (c) $L I^2 / 2$ (d) $L I^2$
- (viii) The device which allows only the continuous flow of an A.C. through a circuit is
 (a) Capacitor (b) inductor (c) D.C. generator (d) battery
- (ix) The S.I. unit of shear strain is
 (a) N/m (b) ohm (c) N/m² (d) no unit
- (x) Which one of the following substance cannot be used to form a p-type substance?
 (a) indium (b) boron (c) gallium (d) antimony
- (xi) At 0 K, a pure semiconductor behave like a
 (a) good conductor (b) conductor (c) semiconductor (d) insulator
- (xii) Light can detected by the use of
 (a) LED (b) photodiode (c) silicon diode (d) germanium diode
- (xiii) The basic region of the diode is
 (a) Base (b) emitter (c) collector (d) all of these
- (xiv) The mass m of a moving object with speed 0.8 c is
 (a) $1.67 m_0$ (b) $1.76 m_0$ (c) $1.87 m_0$ (d) $1.97 m_0$
- (xv) Pair production take place only when gamma ray photon has minimum energy equal to
 (a) 0.51 MeV (b) 0.81 MeV (c) 1.0 MeV (d) 1.02 MeV
- (xvi) The energy required to remove the electron from the atom is called
 (a) Excitation energy (b) ionization energy (c) excitation potential (d) ionization potential
- (xvii) During fission process, large amount of .
 (a) Heat energy is released (b) chemical energy is released
 (c) electrical energy is released (d) nuclear energy is released

INTER PART – II (Full Book)

Paper –II (Essay Type)
SUBJECT: Physics

Maximum Marks: 68
Time Allowed: 2.40 hours

SECTION-I

Q.No. 2. Write short answers to any EIGHT (8) questions. (16)

- i. If a point charge q of mass m is released in a non uniform electric field with field lines pointing in the same direction, will it make a rectilinear motion?
- ii. Describe a force or forces on a positive point charge placed between parallel plates with similar and equal charges and with opposite and equal charges.
- iii. How can you identify that which plate of a capacitor is positively charged?
- iv. Describe a circuit which will give a continuously varying potential.
- v. Why does the resistance of a conductor rise with temperature?
- vi. Is the filament resistance lower or higher in a 500 W, 220 V light bulb than in a 100 W, 220 V bulb?
- vii. Why an ammeter should have very low resistance?
- viii. Why does the picture on a TV screen distorted when a magnet is brought near the screen?
- ix. Is a charged particle moves in a straight line in a certain region of space, can you say that the magnetic field in the region is zero?
- x. Differentiate between a step up and a step down transformer.
- xi. Can an electric motor be used to drive an electric generator with the out put from the generator being used to operate the motor?
- xii. A suspended magnet is oscillating freely in a horizontal plane. The oscillations are strongly damped when a metal plate is placed under the magnet. Explain why this occurs.

Q.No. 3. Write short answers to any EIGHT (8) questions. (16)

- i. Name the device that will (a). permit the flow of alternating current but not the direct current (b). permit flow of direct current but not alternating current.
- ii. A sinusoidal current has rms value of 10 A. what is the maximum or peak value?
- iii. How many times per second will an incandescent lamp reach maximum brilliance when connected to a 50 hertz source?
- iv. What is the difference between ductile and brittle substances?
- v. Distinguish between extrinsic and intrinsic substance?
- vi. Define stress and strain. What are their SI units?
- vii. Why photodiode is operated in reverse biased state?
- viii. Why the charge carrier is not present in depletion region?
- ix. The anode of a diode is 0.2 V positive with respect to its cathode. Is it forward biased?
- x. How does the motion of an electron in a n-type substance differ from the motion of holes in a p-type substance?
- xi. When does light behave as a wave? When does it behave as a particle?
- xii. A beam of red light and a beam of blue light have exactly the same energy. Which beam contains the greater number of photons?

Q.No. 4. Write short answers to any EIGHT (6) questions. (12)

- i. What happens to the total radiations of a body if its absolute temperature is doubled?
- ii. A solid is heated it begins to glow, why does it appear red first?
- iii. Which assumptions of Bohr's theory of hydrogen atom contradicts the classical physics?
- iv. Can the electron in the ground state of hydrogen absorb a photon of energy 13.6 eV and greater than 13.6 eV?
- v. Is energy conserved when an atom emits a photon of light?
- vi. Can X-rays be reflected, refracted, diffracted and polarized just like any other waves? Explain.
- vii. What are isotopes? What do they have in common and what are their differences?
- viii. If you swallow an alpha and a beta source which could be more dangerous to you? Explain why?
- ix. If a nucleus has a half life of 1 year, does this mean that it will be completely decayed after 2 years? Explain.

SECTION-II

Note: Attempt any THREE questions.

3x8=24

- Q.5. (a)** State Gauss' law. Calculate electric intensity due to an infinite sheet of charge by applying Gauss's law. (5)
(b) The resistance of an iron wire at 0 °C is $1 \times 10^{-4} \Omega$. What is the resistance at 500 °C if the temperature coefficient of resistance of iron is $5.2 \times 10^{-3} \text{ K}^{-1}$. (3)
- Q.6. (a)** State and prove Faraday's law of electromagnetic induction. (5)
(b) A power line 10.0 m high carries a current 200 A. Find the magnetic field of the wire at the ground. (3)
- Q.7. (a)** Explain RC series circuit with help of diagram. Also calculate expression for impedance and draw its vector diagram. (5)
(b) What is the resonant frequency of a circuit which includes a coil of inductance 2.5 H and a capacitance 40 micro farad? (3)
- Q.8. (a)** Explain pair production and pair annihilation in detail. (3+2)
(b) In a non-inverting amplifier the resistance R_1 is 10 k Ω and R_2 is 40 k Ω . Calculate its gain. (3)
- Q.9.(a)** Explain Davison and Germer experiment in detail with the help of diagram. How this experiment confirmed the wave nature of particles?. (5)
(b) The half life of an element is 9.70 hours. Find its decay constant? (3)

SECTION - III (PRACTICAL)

Q. No. 10(a) Attempt any four parts.

(4x2 = 8)

- 1) A 100cm long wire of area of cross-section 0.002m^2 having resistance 6Ω . Find its resistivity.
- 2) Sketch the table to find the resistance of galvanometer by half deflection method.
- 3) What is potentiometer? Give its one use.
- 4) What is voltmeter?
- 5) Why the resistance of filament of a lamp varies with the rise of current?
- 6) Define the term capacitance and its unit.
- 7) What is the intensity of light?
- 8) What is meant by the internal resistance?

Q. No. 10(b)

Write down the procedure to find the resistance of galvanometer by half deflection method?

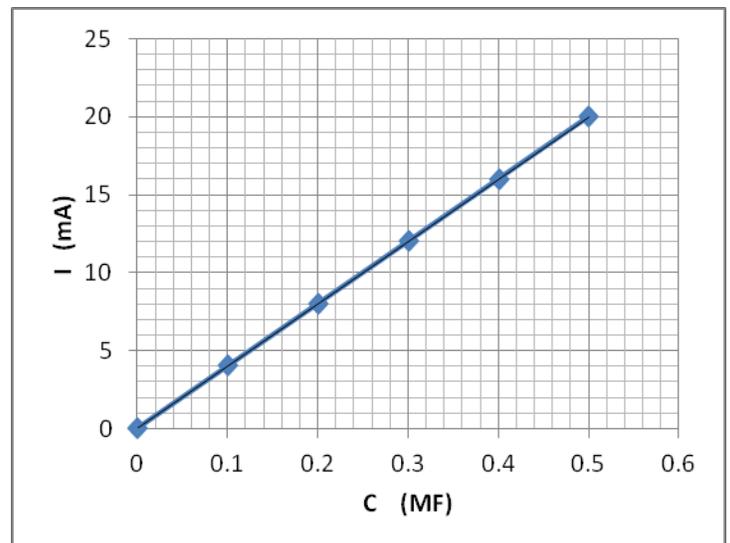
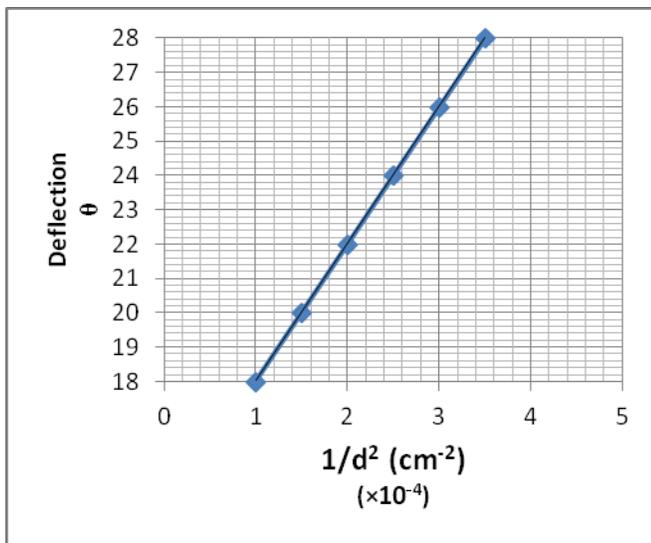
(3)

OR

Write down the procedure to find the resistance of a voltmeter by drawing a graph between R and $1/V$ **(3)**

Q. No. 10(c) Answer the following questions on the basis of graph drawn below:

(4)



- (A)** (i) What do you conclude from the graph? **OR** **(B)** (i) What does the graph show?
(ii) Find the slope of the graph. (ii) Find the slope of the graph