

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two 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.

1. When some dielectric is inserted between the plates of a capacitor, then capacitance.
 - (A) decreases
 - (B) increases
 - (C) becomes zero
 - (D) becomes infinity
2. Intensity of field inside a hollow charged sphere will be
 - (A) negative
 - (B) unaffected
 - (C) zero
 - (D) maximum
3. 5A of current flows through a conductor in 2 minutes, charge in the wire is
 - (A) 500 C
 - (B) 600 C
 - (C) 400 C
 - (D) 10 C
4. The resistance of a conductor of length L, cross-sectional area 'A' and resistivity ' ρ ' is given by
 - (A) $R = \frac{\rho}{AL}$
 - (B) $R = \rho AL$
 - (C) $R = \rho \frac{L}{A}$
 - (D) $R = \rho \frac{A}{L}$
5. Two parallel wires carrying current in the opposite directions
 - (A) may repel or attract each other
 - (B) attract each other
 - (C) have no effect on each other
 - (D) repel each other
6. The SI unit of flux density is
 - (A) $Nm^{-1}A^{-2}$
 - (B) $NA^{-1}m^{-1}$
 - (C) NAm^{-1}
 - (D) $NA^{-1}m$
7. Energy stored per unit volume is called
 - (A) surface charge density
 - (B) power density
 - (C) energy density
 - (D) induction
8. If V_0 is the peak value of A.C. voltage, its rms value is
 - (A) $V_{rms} = \sqrt{2} V_0$
 - (B) $V_{rms} = \frac{V_0}{2}$
 - (C) $V_{rms} = \frac{\sqrt{2}}{V_0}$
 - (D) $V_{rms} = \frac{V_0}{\sqrt{2}}$
9. The inductive reactance X_L of coil of inductance 'L' across an A.C. source is given by
 - (A) $X_L = \frac{1}{2\pi f L}$
 - (B) $X_L = \frac{2\pi f}{L}$
 - (C) $X_L = \frac{1}{\pi f L}$
 - (D) $X_L = 2\pi f L$
10. Conductors have conductivities of the order of
 - (A) $10^{-6}(\Omega m)^{-1}$
 - (B) $10^7(\Omega m)^{-1}$
 - (C) $10^9(\Omega m)^{-1}$
 - (D) $10^3(\Omega m)^{-1}$
11. Curie temperature for iron is
 - (A) $780^\circ C$
 - (B) $750^\circ C$
 - (C) $730^\circ C$
 - (D) $710^\circ C$
12. In n-type substance, minority charge carries are
 - (A) electrons
 - (B) holes
 - (C) protons
 - (D) neutrons
13. Conversion of only one half of A.C. into D.C. is called
 - (A) half wave amplification
 - (B) wave amplification
 - (C) half wave electrification
 - (D) half wave rectification
14. By modern system of NAVSTAR, the speed anywhere on the earth can be determined to accuracy about
 - (A) $20 ms^{-1}$
 - (B) $10 ms^{-1}$
 - (C) $2 Cms^{-1}$
 - (D) $2 ms^{-1}$
15. The value of plank's constant is
 - (A) $8.85 \times 10^{-34} JS$
 - (B) $1.6 \times 10^{-19} JS$
 - (C) $6.63 \times 10^{-34} JS$
 - (D) $6.62 \times 10^{-34} JS$
16. Paschen series lie in the
 - (A) far-ultraviolet region
 - (B) visible region
 - (C) infrared region
 - (D) ultraviolet region
17. The charge number of ${}_{56}^{141}Ba$ is
 - (A) 197
 - (B) 141
 - (C) 85
 - (D) 56

Cy-12-18

Physics (New Scheme)

Time: 2:40 Hours

Note: Section I is compulsory. Attempt any three (3) questions from Section II.

(INTER PART-II) 418
SUBJECTIVE

(SECTION - I)

Paper II
Marks: 68

(2 x 8 = 16)

2. Write short answers to any EIGHT questions.

- i. How can you identify that which plate of capacitor is positively charged?
- ii. Derive relation for potential gradient.
- iii. Write down any two properties of electric field lines.
- iv. Do electrons tend to go to region of high potential or of low potential? Give its reason.
- v. What is the difference between magnetic flux and magnetic flux density? Give the units of both quantities.
- vi. How the beam of electron is focused on the screen of CRO? Show it with diagram.
- vii. If a charged particle moves in a straight line through some region of space, can you say that the magnetic field in the region is zero or non-zero.
- viii. Why the resistance of an ammeter should be very low?
- ix. What is meant by mutual inductance? Give its units.
- x. Draw and label the diagram of a D.C motor.
- xi. Can an electric motor be used to drive an electric generator with the output from the generator being used to operate the motor.
- xii. How would you position a flat loop of wire in a changing magnetic field, so that there is no emf induced in the loop?

(2 x 8 = 16)

3. Write short answers to any EIGHT questions.

- i. Do bends in a wire affect its electrical resistance? Explain.
- ii. Describe a circuit which will give a continuously varying potential.
- iii. Briefly describe the current through a metallic conductor and drift velocity.
- iv. An A.C. voltmeter reads 250 V. What is its peak value?
- v. A 100 μF capacitor is connected to an alternating voltage of 24 V and frequency 50 Hz. Calculate the current in the circuit.
- vi. How does doubling the frequency affect the reactance of?
a) an inductor b) a capacitor
- vii. Write a note on super conductors.
- viii. What is meant by ferromagnetic substances?
- ix. What is meant by strain energy?
- x. What is meant by forward biasing and reverse biasing of P-n junction?
- xi. Write a note on LED.
- xii. Write down the applications of photo-diode.

(2 x 6 = 12)

4. Write short answers to any SIX questions.

- i. Define Compton effect and pair production.
- ii. What advantages an electron microscope has over an optical microscope?
- iii. Which has the lower energy quanta? Radio waves or x-rays.
- iv. Define spectroscopy, holography.
- v. What are the advantages of laser over an ordinary light?
- vi. Why are heavy nuclei unstable?
- vii. A particle which produces more ionization is less penetrating. Why?
- viii. How can radioactivity help in the treatment of cancer?
- ix. Define Hadrons and Leptons.

(Turn Over)

(SECTION - II)

5. (a) What is potentiometer? How can it be used as
i) Potential divider
ii) Measuring of emf of a cell.
- (b) Two point charges $q_1 = -1.0 \times 10^{-6}$ C and $q_2 = 4.0 \times 10^{-6}$ C are separated by a distance of 3.0 m. Find and justify the zero-field location.
6. (a) What is A.C. generator? Give its principle, construction and working of A.C. generator.
(b) A power line 10 m high carries a current of 200 A. Find the magnetic field of wire at the ground.
7. (a) Explain the RLC series resonance circuit. Determine the value of resonant frequency and write down its properties.
(b) The current flowing into the base of transistor is $100 \mu\text{A}$. Find its collector current I_c . Its emitter current I_e and the ratio $\frac{I_C}{I_E}$, if the value of current gain β is 100.
8. (a) What is meant by strain energy? Draw force extension graph for a vertically suspended wire stretched by a variable weight at the other end and by its graph derive a relation to calculate its value.
(b) An electron accelerated through a potential difference of 50 V. Calculate its de Broglie wavelength.
9. (a) What is nuclear reactor? Describe its principle, construction and working.
(b) Compute the shortest wavelength of radiation in the Balmer series.
What value of 'n' must be used?