

Physics (Objective Type)

RWP-12-19

Time: 20 Minutes

Marks: 17

NOTE: Write answers to the questions on objective answer sheet provided. Four possible answers A, B, C & D to each question are given. Which answer you consider correct, fill the corresponding circle A, B, C or D given in front of each question with Marker or pen ink on the answer sheet provided.

1.1. In RLC series circuit, at higher frequencies.

- (A) $X_L = X_C$ (B) $X_L > X_C$ (C) $X_L < X_C$ (D) $X_L = 0$

2. Which one belongs to trivalent group?

- (A) Aluminium (B) Antimony (C) Phosphorous (D) Arsenic

3. Colour of light emitted by LED depends upon

- (A) its forward biasing (B) its reverse biasing (C) type of material (D) forward current

4. At low temperature, a body emits radiations of.

- (A) shorter wavelength (B) longer wavelength (C) high frequency (D) high frequency & shorter wavelength

5. The shortest wavelength in Lyman series is equal to:

- (A) R_H (B) $\frac{R_H}{2}$ (C) $\frac{1}{R_H}$ (D) $\frac{1}{3} R_H$

6. In the reaction, $X + {}^1_8O \rightarrow {}^{14}_7N + {}^4_2He$, X is:

- (A) 1_1H (B) 2_1H (C) ${}^0_{-1}e$ (D) ${}^0_{+1}e$

7. If the charges are doubled and the distance between them is also doubled, then Coulomb's force will be:

- (A) double (B) halved (C) remains same (D) four times

8. A rubber ball of radius 2cm has a charge of $5\mu C$ on its surface, which is uniformly distributed, the value of E at its centre is.

- (A) $10NC^{-1}$ (B) Zero (C) $2.5NC^{-1}$ (D) $5 \times 10^{-6}NC^{-1}$

9. Which one of the following relation is correct?

- (A) joule=volt x ampere (B) joule=coulomb / volt (C) joule=volt / ampere (D) joule=coulomb x volt

10. In carbon resistors, which colour band indicates the tolerance of $\pm 10\%$?

- (A) White (B) Silver (C) Gold (D) Violet

11. For an open circuit, terminal potential difference V_t is

- (A) $V_t = 2emf$ (B) $V_t = emf$ (C) $V_t > emf$ (D) $V_t < emf$

12. An electron travelling at $10^6 m/s$ enters parallel in a magnetic field of 1 tesla, the magnetic force acting on it is.

- (A) Zero (B) $10^{-12}N$ (C) $10^{-3}N$ (D) $1.6 \times 10^{-13}N$

13. When a charged particle is projected opposite to the direction of magnetic field, it experiences a force equal to.

- (A) $qub \cos \theta$ (B) $qub \sin \theta$ (C) qub (D) zero

14. In order to increase the range of voltmeter R_H is

- (A) increased (B) decreased (C) unchanged (D) increased by 4 times

15. Which device permits the flow of D.C?

- (A) Capacitor (B) Photocell (C) Inductor (D) transformer

16. For an ideal step up transformer.

- (A) $N_p > N_s$ (B) $V_s I_s > V_p I_p$ (C) $V_s < V_p$ (D) $I_s < I_p$

17. When a metal detector comes close to a metal then its frequency

- (A) becomes double (B) remains same (C) becomes half (D) increases

Roll No. (To be filled in by the candidate)

(For all sessions)

RWP-12-19

Physics (Essay Type)

Time: 2:40 Hours

Section - I

Marks: 68

2- Write short answers of any eight parts from the following.**2 x 8 =16**

- i. Show that Σ and $\frac{\Delta\phi}{\Delta t}$ have the same units.
- ii. What is the effect of current passing through a long straight wire?
- iii. Electric lines of force never cross. Why?
- iv. What is motional emf? State the factors it depends upon.
- v. What is the back emf effect in motors?
- vi. Why the resistance of ammeter should be very low?
- vii. Why does the picture on T.V screen become distorted when a magnet is brought near the screen?
- viii. Write down the factors upon which the force on current carrying conductor placed in uniform magnetic field depends.
- ix. What is Coulomb's law and effect of dielectric on Coulomb's force?
- x. State Gauss's law and its mathematical expression.
- xi. Is \vec{E} necessarily zero inside a charged rubber balloon if balloon is spherical? Assume that charge is distributed uniformly over the surface.
- xii. Does the induced emf in a circuit depend on the resistance of the circuit? Does induced current depend on the resistance of the circuit?

3- Write short answers of any eight parts from the following.**2 x 8 =16**

- i. What are difficulties in testing whether the filament of a lighted bulb obeys ohm's law?
- ii. How heating effect produced when current flow through the conductor?
- iii. What is Thermister? Give its two applications.
- iv. What is Choke? Why is it used in A.C circuit?
- v. At what frequency will an inductor of 1.0H have a reactance of 500 Ω ?
- vi. How many times per second will an incandescent lamp reach maximum brilliances when connected to a 50Hz source?
- vii. What are ductile and brittle substances? Give an example of each.
- ix. What is meant by hysteresis loss? How is it used in the construction of a transformer?
- viii. What is meant by Dia and Ferromagnetic substances? Give an example for each.
- xi. Write four applications of photo diode.
- xii. Draw the symbol and truth table of NOR gate.
- x. Why a photo diode is operated in reverse biased state?

4- Write short answers of any six parts from the following.**2 x 6 =12**

- i. What advantages an electron microscope has over an optical microscope?
- ii. Why do we not observe compton effect with visible light?
- iii. Define positron and Heisenberg uncertainty principle.
- iv. What do we mean when we say that atom is excited?
- v. What are the advantages of laser over ordinary light?
- vi. How can radioactivity help in the treatment of cancer?
- vii. What factors make a fusion reaction difficult to achieve?
- viii. What do you mean by the terms critical mass?
- ix. Define Hadrons and Leptons.

Section - II**NOTE: Answer any three questions from the following.****8x3=24**

5. (a) Define a capacitor and capacitance. Derive an expression for capacitance of a parallel plate capacitor when a dielectric material is inserted between the plates. **05**
- (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 co-efficient of resistance of iron is $5.2 \times 10^{-3} \text{K}^{-1}$? **03**
6. (a) What do you mean by the galvanometer? Write down the principle, construction and working of galvanometer. **05**
- (b) A square coil of side 16cm has 200 turns and rotates in a uniform magnetic field of magnitude 0.05T. If the peak emf is 12V. What is angular velocity of the coil? **03**
7. (a) What is RC series circuit? Calculate the impedance and phase angle for RC series circuit. **05**
- (b) The current flowing into the base of transistor is $100 \mu\text{A}$. Find its collector current I_c and emitter current I_e if the value of current gain β is 100. **03**
8. (a) What is meant by photo electric effect? Explain it with reference to (i) Intensity of light (ii) Frequency of light. Also write and discuss its Important results. **05**
- (b) What stress would cause a wire into increase in length of 0.01%. If Young's modulus of the wire is $12 \times 10^{10} \text{Pa}$? What force would produce this stress if the diameter of the wire is 0.56mm? **05**
9. (a) Describe the principle, construction and working of Wilson's cloud chamber. How it provide information about charged particle? **05**
- (b) Calculate the longest wavelength of radiation for the Paschen Series **03**