

**RWP**

Inter. (Part-II)-A- 2019

Roll No. \_\_\_\_\_ to be filled in by the candidate.

(For all sessions)

Paper Code

8

4

7

1

**Physics** (Objective Type)

Marks: 17

Time: 20 Minutes

**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. 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
2. A rubber ball of radius 2cm has a charge of  $5\mu\text{C}$  on its surface, which is uniformly distributed, the value of  $\vec{E}$  at its centre is:
  - (A)  $10\text{NC}^{-1}$
  - (B) Zero
  - (C)  $2.5\text{NC}^{-1}$
  - (D)  $5 \times 10^{-6}\text{NC}^{-1}$
3. 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
4. In carbon resistors, which colour band indicates the tolerance of  $\pm 10\%$ ?
  - (A) White
  - (B) Silver
  - (C) Gold
  - (D) Violet
5. For an open circuit, terminal potential difference 'Vt' is:
  - (A)  $V_t = 2\text{emf}$
  - (B)  $V_t = \text{emf}$
  - (C)  $V_t > \text{emf}$
  - (D)  $V_t < \text{emf}$
6. An electron travelling at  $10^6\text{m/s}$  enters parallel in a magnetic field of 1 tesla, the magnetic force acting on it is:
  - (A) Zero
  - (B)  $10^{-12}\text{N}$
  - (C)  $10^3\text{N}$
  - (D)  $1.6 \times 10^{-13}\text{N}$
7. When a charged particle is projected opposite to the direction of magnetic field, it experiences a force equal to:
  - (A)  $q\vec{v} \times \vec{B} \cos \theta$
  - (B)  $q\vec{v} \times \vec{B} \sin \theta$
  - (C)  $q\vec{v} \times \vec{B}$
  - (D) zero
8. In order to increase the range of voltmeter  $R_H$  is:
  - (A) increased
  - (B) decreased
  - (C) unchanged
  - (D) increased by 4 times
9. Which device permits the flow of D.C?
  - (A) Capacitor
  - (B) Photocell
  - (C) Inductor
  - (D) transformer
10. 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)  $I_s < I_p$
11. When a metal detector comes close to a metal then its frequency:
  - (A) becomes double
  - (B) remains same
  - (C) becomes half
  - (D) increases
12. In RLC series circuit, at higher frequencies:
  - (A)  $X_L = X_C$
  - (B)  $X_L > X_C$
  - (C)  $X_L < X_C$
  - (D)  $X_L = 0$
13. Which one belongs to trivalent group?
  - (A) Aluminium
  - (B) Antimony
  - (C) Phosphorous
  - (D) Arsenic
14. Colour of light emitted by LED depends upon:
  - (A) its forward biasing
  - (B) its reverse biasing
  - (C) type of material
  - (D) forward current
15. At low temperature, a body emits radiations of:
  - (A) shorter wavelength
  - (B) longer wavelength
  - (C) high frequency
  - (D) high frequency & shorter wavelength
16. The shortest wavelength in Lyman series is equal to:
  - (A)  $R_H$
  - (B)  $\frac{R_H}{2}$
  - (C)  $\frac{1}{R_H}$
  - (D)  $\frac{2}{3} R_H$
17. In the reaction,  $X + {}^{17}_8\text{O} \rightarrow {}^{14}_7\text{N} + {}^4_2\text{He}$ , X is:
  - (A)  ${}^1_1\text{H}$
  - (B)  ${}^2_1\text{H}$
  - (C)  ${}^0_{-1}\text{e}$
  - (D)  ${}^0_0\text{e}$

629-012-A-☆

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

(For all sessions)

**Physics** (Essay Type)

Time: 2:40 Hours

**Section - I**

Marks: 68

2 x 8 = 16

**2- Write short answers of any eight parts from the following.**

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

2 x 8 = 16

**3- Write short answers of any eight parts from the following.**

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

2 x 6 = 12

**4- Write short answers of any six parts from the following.**

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

**Section - II**

8x3=24

**NOTE: Answer any three questions from the following.**

- (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  $0^\circ\text{C}$  is  $1 \times 10^4 \Omega$ . What is the resistance at  $500^\circ\text{C}$ . If the temperature co-efficient of resistance of iron is  $5.2 \times 10^{-3} \text{K}^{-1}$ ? 03
- (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
- (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  $\beta$  is 100. 03
- (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  $12 \times 10^{10} \text{Pa}$ ? 05  
What force would produce this stress If the diameter of the wire is 0.56mm?
- (a) Describe the principle, construction and working of Wilson's cloud chamber. How it provide information about charged particle? 03  
(b) Calculate the longest wavelength of radiation for the Paschen Series.



سید

Roll No. 2220 to be filled in by the candidate.

(For all sessions)

Paper Code

8

4

7

1

# Physics (Objective Type)

193303

Marks: 17

Time: 20 Minutes

**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. The photo copying process is called:
  - (A) Photo graphy
  - (B) Scanning
  - (C) Xerography
  - (D) Holography
2. The absolute electric potential at a point distance 20 cm from a charge of  $2 \mu\text{C}$  is:
  - (A)  $9 \times 10^2 \text{ V}$
  - (B)  $9 \times 10^3 \text{ V}$
  - (C)  $9 \times 10^4 \text{ V}$
  - (D)  $9 \times 10^5 \text{ V}$
3. The S.I unit of resistivity is:
  - (A)  $\Omega \cdot \text{m}^2$
  - (B)  $\Omega \cdot \text{m}^{-1}$
  - (C)  $\Omega$
  - (D)  $\Omega \cdot \text{m}$
4. The S.I unit of magnetic permeability is:
  - (A)  $\text{Wb A}^{-1} \text{m}^{-1}$
  - (B)  $\text{Wb m}^{-2}$
  - (C)  $\text{Wb mA}^{-1}$
  - (D)  $\text{Wb Am}^{-1}$
5. The magnetic force on an electron travelling with velocity  $108 \text{mS}^{-1}$  perpendicular to magnetic field of strength  $1 \text{Wb m}^{-2}$  is:
  - (A)  $2 \times 10^{-11} \text{ N}$
  - (B)  $1.6 \times 10^{-11} \text{ N}$
  - (C)  $5 \times 10^{-11} \text{ N}$
  - (D) zero
6. Energy density in an inductor is given by:
  - (A)  $\frac{B}{2\mu_0}$
  - (B)  $\frac{B}{2\mu_0^2}$
  - (C)  $\frac{B^2}{2\mu_0}$
  - (D)  $\frac{B^2}{2\mu_0^2}$
7. The motional emf depends upon the:
  - (A) length of conductor
  - (B) speed of conductor
  - (C) strength of magnet
  - (D) all of these
8. The relation for resonance frequency of RLC series circuit is:
  - (A)  $\frac{1}{\sqrt{2\pi LC}}$
  - (B)  $\frac{2\pi}{\sqrt{LC}}$
  - (C)  $\frac{1}{2\pi\sqrt{L}}$
  - (D)  $\frac{1}{2\pi\sqrt{LC}}$
9. If the frequency of A.C supplied is doubled then the capacitive reactance becomes:
  - (A) half
  - (B) two times
  - (C) four times
  - (D) one fourth
10. The substance in which atom co-operate with each other in such a way so as to exhibit a strong magnetic field is called:
  - (A) Ferromagnetic
  - (B) Paramagnetic
  - (C) Diamagnetic
  - (D) Non-magnetic
11. The device which converts low voltage or current to high voltage or current is called:
  - (A) Transformer
  - (B) A.C generator
  - (C) Rectifier
  - (D) Amplifier
12. The relation for gain of inverting amplifier is:
  - (A)  $1 + \frac{R_2}{R_1}$
  - (B)  $1 + \frac{R_1}{R_2}$
  - (C)  $-\frac{R_2}{R_1}$
  - (D)  $-\frac{R_1}{R_2}$
13. The value of Stefan's Constant ' $\sigma$ ' is:
  - (A)  $6.67 \times 10^{-8} \text{ Wm}^2 \text{K}^{-4}$
  - (B)  $6.67 \times 10^8 \text{ Wm}^2 \text{K}^{-4}$
  - (C)  $6.67 \times 10^{-18} \text{ Wm}^2 \text{K}^{-4}$
  - (D)  $5.67 \times 10^{-8} \text{ Wm}^2 \text{K}^{-4}$
14. For which metal, the photo electrons are emitted by using visible light:
  - (A) Sodium
  - (B) Copper
  - (C) Nickel
  - (D) Cobalt
15. The production of X-rays is the reverse process of:
  - (A) photo-electric effect
  - (B) compton effect
  - (C) Annihilation
  - (D) Pair production
16. When Nitrogen is bombarded by Alpha particles, then Nitrogen nuclei change into \_\_\_\_\_ nuclei:
  - (A) Oxygen
  - (B) Carbon
  - (C) Helium
  - (D) Beryllium
17. The number of proton in an Uranium atom is:
  - (A) 92
  - (B) 235
  - (C) 143
  - (D) 238

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

(For all sessions)

**Physics** (Essay Type)

Time: 2:40 Hours

**Section - I**

Marks: 68

2 x 8 = 16

2- Write short answers of any eight parts from the following.

- Prove that  $t = RC$
- Define Potential Gradient.
- What is function of grid in CRO?
- Why the voltmeter should have a very high resistance?
- What is meant by Eddy current?
- State the Lenz's law and define Henry.
- Show that  $\mathcal{E}$  and  $\frac{\Delta\Phi}{\Delta t}$  have same units.
- Can a step up transformer increase the power level? Explain.
- Do electrons tend to go to region of high potential or of low potential?
- The potential is constant throughout a given region of space. Is the electrical field zero or non-zero in this region? Explain.
- What is digital multimeter? Give its two advantages over AVO meter.
- How can you use a magnetic field to separate isotopes of chemical element?

2 x 8 = 16

3- Write short answers of any eight parts from the following.

- What are the difficulties in testing, whether the filament of a lighted bulb obeys ohm's law?
- What is wheatstone bridge? Draw its circuit diagram.
- Define temperature co-efficient of resistance and write its formula?
- What is an electrical oscillator? Give its two applications.
- How does doubling the frequency affect the reactance of (a) an inductor (b) a capacitor.
- When 10V are applied to an A.C circuit the current flowing in it is 100mA. Find its impedance.
- Differentiate between the soft and hard magnetic materials. Also give one example of each.
- Explain the polymerization process. Also give an example of polymer solid?
- What do you know about bulk modulus? Give its formula with unit.
- How does the motion of an electron in a n-type substance differ from the motion of holes in a p-type substance?
- Why the photodiode is operated in reverse biased state?
- Write Boolean expression for the exclusive-NOR gate (XNOR). Also draw its symbol.

2 x 6 = 12

4- Write short answers of any six parts from the following.

- What are Leptons? Write its examples.
- Write the name of basic forces.
- Why are heavy nuclei unstable?
- Why don't we observe a Compton effect with visible light?
- We do not notice the de Broglie wavelength for a pitched cricket ball. Explain why?
- State uncertainty principle. Give its two mathematical forms.
- Is energy conserved when an atom emits a photon of light?
- Distinguish between spontaneous and stimulated emission.
- What fraction of a radioactive sample decays after two half-lives have elapsed?

8x3=24

**Section - II**

NOTE: Answer any three questions from the following.

- State and explain Kirchhoff's rules. 05
  - Determine the electric field at the position  $\vec{r} = (4\hat{i} + 3\hat{j})$  m caused by point charge  $q = 5 \times 10^{-6} \text{C}$  placed at origin. 03
- Write down the principle, construction and working of a galvanometer. 05
  - A square coil of side 16cm has 200 turns and rotate in a uniform magnetic field of magnitude 0.05T. If the peak emf is 12V, what is angular velocity of the coil? 03
- Describe the behaviour of A.C through R-L series circuit. Derive expressions for impedance and phase angle in R-L series circuit. 05
  - 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  $\beta$  is 100. 03
- Discuss nuclear fission reaction in detail. 05
  - A 1.25 cm diameter cylinder is subjected to a load of 2500 Kg. Calculate the stress on the bar in mega pascals. 03
- What did de Broglie propose about wave nature of particles? Also describe the Davison and Germer experiment that confirmed the wave nature of particles. 05
  - Calculate the longest wavelength of radiation for the Paschen series. 03