

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

(Academic Sessions 2019 – 2021 to 2021 – 2023)

PHYSICS

223-1st Annual-(INTER PART – II)

Time Allowed : 20 Minute.

Q.PAPER – II (Objective Type)

GROUP – II

Maximum Marks : 17

PAPER CODE = 8478 *CHD-12-2-23*

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	Wave behaviour of matter is prominent at --- level : (A) Macroscopic (B) Mega structure (C) Microscopic (D) Any object size
2	The points where AC crosses the time axis corresponds to phase : (A) $\frac{\pi}{2}$ or $3\frac{\pi}{2}$ (B) 0 or π (C) $\frac{\pi}{4}$ or $3\frac{\pi}{4}$ (D) 0 or $\frac{\pi}{2}$
3	A galvanometer coil of resistance R_g gives full scale deflection with current I_g . What is required shunt resistance R_s . = ---- if range of ammeter is $I = 2I_g$: (A) R_g (B) $2 R_g$ (C) $R_g / 2$ (D) $4 R_g$
4	A combination of two back to back PN junctions is --- : (A) Operational amplifier (B) Digital gate (C) Transistor (D) Photo diode
5	The --- work on the principle of beats : (A) DC motors (B) Metal detectors (C) Choke coils (D) AC generators
6	$1 \text{ J} = \text{--- eV}$: (A) 1.6×10^{-19} (B) 6.25×10^{18} (C) 9.6×10^{-18} (D) 9×10^9
7	Faraday and Maxwell unified electric and --- force : (A) Weak nuclear (B) Strong nuclear (C) Gravitational (D) Magnetic
8	Which is not true for ideal step up transformer : (A) $I_s < I_p$ (B) $P_{out} = P_{in}$ (C) $I_s > V_p$ (D) $N_s = N_p$
9	A rod of length ℓ_o in a stationary frame is accelerated at speed of light. Its length measured perpendicular to its direction of motion is : (A) $\frac{\ell_o}{2}$ (B) Zero (C) ℓ_o (D) $2\ell_o$
10	The slope of graph between charge and time for capacitor charging is large initially when the product RC is : (A) Small (B) Large (C) Intermediate (D) Infinite
11	A ductile wire is stretched to double of its original length, %age elongation is --- : (A) 200% (B) 50% (C) 100% (D) 400%
12	The fractional change in resistance is minimum for --- if temperature change is same for all : (A) Platinum (B) Nichrome (C) Copper (D) Constantan
13	If ionization energy of hydrogen atom is E_o , the energy required to remove electron from hydrogen in state $n = 4$ is : (A) $\frac{E_o}{4}$ (B) $4E_o$ (C) $\frac{E_o}{16}$ (D) Zero
14	The value of voltage gain of a transistor amplifier (common emitter) is of the order of : (A) Thousands (B) Millions (C) Fraction (D) Hundreds
15	Energy required to remove all nucleons from nuclide of --- is maximum : (A) Fe^{58} (B) U^{235} (C) Ba^{141} (D) H^2
16	In alternating current, --- behave like resistors : (A) Inductors (B) Capacitors (C) Transformers (D) Generators
17	The potential of --- is least in CRO : (A) Anode (B) Screen (C) Cathode (D) Grid

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

(Academic Sessions 2019 – 2021 to 2021 – 2023)

PHYSICS

223-1st Annual-(INTER PART – II)

Time Allowed : 2,40 hours

PAPER – II (Essay Type)

GROUP – II

Maximum Marks : 68

SECTION – I

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2. Write short answers to any EIGHT (8) questions :

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- (i) Describe the force or forces on a positive charge when placed between parallel plates with opposite and equal charges.
- (ii) If the distance between two point charges is halved, what will happen to the force between them?
- (iii) What are the factors upon which the electric flux depend?
- (iv) Why does capacitance of a parallel plate capacitor increase in the presence of a dielectric?
- (v) At a given instant, a proton moves in the positive x-direction in a region where there is a magnetic field in the negative z-direction. What is the direction of the magnetic force and direction of motion of proton?
- (vi) How can a current loop be used to determine the presence of a magnetic field in a given region of space?
- (vii) What is the importance of hair spring used in a Weston galvanometer? Explain.
- (viii) Describe the working of an electron gun in CRO.
- (ix) What is radiation tracer? Explain.
- (x) Which radiation dose would deposit more energy to your body? (a) 10 mGy to your hand or (b) 1 mGy dose to your entire body?
- (xi) How quenching is done in GM-tube?
- (xii) How the scientists dispose off the radioactive waste safely?

3. Write short answers to any EIGHT (8) questions :

16

- (i) Why does the resistance of conductor rise with temperature?
- (ii) A sinusoidal current has rms value of 10A. What is maximum or peak value?
- (iii) What is meant by strain energy?
- (iv) What is principle of virtual ground?
- (v) Do bends in a wire affects its electrical resistance? Explain.
- (vi) What is meant by A.M. and F.M.?
- (vii) Define superconductor. Give example.
- (viii) Why is the base current in a transistor is very small?
- (ix) How rheo-state is used as potential divider?
- (x) What is impedance? Give unit.
- (xi) What is elastic limit of material in stress strain curve?
- (xii) Give the application of gates in control system.

4. Write short answers to any SIX (6) questions :

12

- (i) Can a D.C motor be turned into DC generator? What changes are required be done?
- (ii) In a transformer, there is no transfer of charge from the primary to the secondary. How is then the power transferred?
- (iii) What is meant by armature?

(Turn Over)

(2)

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4. (iv) Can pair production take place in vacuum? Explain.
(v) Will bright light eject more electrons from a metal surface dimmer light of same colour?
(vi) Is it possible to create a single electron from energy? Explain.
(vii) What are black body radiations? How can you get a black body?
(viii) How can the spectrum of hydrogen contain so many lines when hydrogen contains one electron?
(ix) Is energy conserved when an atom emits photon of light?

SECTION – II

Note : Attempt any **THREE** questions.

5. (a) Describe Millikan's oil drop experiment to determine charge on electron. 5
(b) A rectangular bar of iron is 2.0 cm by 2.0 cm in cross-section and 40 cm long. Calculate its resistance if the resistivity of iron is $11 \times 10^{-8} \Omega m$. 3
6. (a) Derive the relation of e/m of an electron. 5
(b) An ideal step down transformer is connected to main supply of 240 V. It is desired to operate a 12 V, 30 W lamp. Find the current in the primary and the transformation ratio. 3
7. (a) What is RLC series circuit? Find out an expression for resonance frequency. Also write down its properties. 5
(b) The current flowing into the base of a transistor is $100 \mu A$. Find its collector current and ratio I_C/I_E , if the value of current gain β is 100. 3
8. (a) What is hysteresis loop? Explain different terms, saturation, remanence and coercivity. 5
(b) An electron is accelerated through a potential difference of 50 V. Calculate its de-Broglie wavelength. 3
9. (a) What is nuclear fission? Describe uncontrolled and controlled chain reaction. 5
(b) Compute the shortest wavelength radiation in the Balmer Series. What value of n must be used? 3