

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	The crystalline structure of NaCl is :	(A) Trigonal	(B) Cubical	(C) Tetragonal	(D) Hexagonal
2	If we make magnetic field stronger the value of induced current is :	(A) Decreased	(B) Increased	(C) Vanishes	(D) Constant
3	Unit of Plank's constant is same as that of :	(A) Entropy	(B) Angular momentum	(C) Acceleration	(D) Force
4	The force between two similar unit charges separated one meter apart in air is :	(A) Zero	(B) One Newton	(C) $9 \times 10^9 N$	(D) $9 \times 10^{-9} N$
5	A proton consists of quark which are :	(A) All up	(B) One up, two down	(C) Two up, one down	(D) All down
6	At high frequency the current through a capacitor of A.C. circuit will be :	(A) Small	(B) Infinite	(C) Zero	(D) Large
7	Which one has least resistance :	(A) Galvanometer	(B) Ammeter	(C) Voltmeter	(D) Ohm-meter
8	For which material medium, force between two charged particles is maximum :	(A) Ammonia	(B) Germanium	(C) Mica	(D) Teflon
9	Minimum diode required for full wave rectifier are :	(A) 1	(B) 3	(C) 2	(D) 4
10	Radiation produced from TV picture tube is :	(A) Gamma rays	(B) X-rays	(C) Infrared light	(D) β -rays
11	A.C. through inductor, the applied voltage :	(A) Leads the current $\frac{\pi}{2}$	(B) Lags the current $\frac{\pi}{2}$	(C) In phase	(D) Out of phase 180°
12	A voltmeter is always connected in :	(A) Parallel	(B) Series	(C) Perpendicular	(D) Oblique
13	What is difference in isotopes :	(A) Number of electron	(B) Number of proton	(C) Charge number	(D) Number of neutron
14	The device which consume electrical energy is called :	(A) Generator	(B) Motor	(C) Load	(D) Dissipaters
15	Kirehhoff's 2 nd rule is based on :	(A) Energy conservation	(B) Mass conservation	(C) Charge conservation	(D) Momentum conservation
16	Photovoltaic cell formed from :	(A) Arsenic	(B) Carbon	(C) Germanium	(D) Silicon
17	Stefen Boltzmann Law is given by :	(A) $E = hf$	(B) $E = mc^2$	(C) $E = \sigma T^4$	(D) $\lambda \times T = \text{constant}$

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 – I

Maximum Marks : 68

SECTION – I

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

- (i) Give similarity and difference between Coulomb and Gravitational forces.
- (ii) Summarize the properties of electric field lines.
- (iii) Do electrons tend to go to region of high potential or of low potential?
- (iv) Electric lines of force never cross. Why?
- (v) What is the function of grid in cathode ray oscilloscope?
- (vi) What should be the orientation of current carrying coil in a magnetic field so when the torque maximum acting upon the coil?
- (vii) How can you use a magnetic field to separate isotopes of chemical element?
- (viii) Why the resistance of an ammeter should be very low?
- (ix) Why are heavy nuclei unstable?
- (x) What is the radioactive tracer? Describe one application each in medicine.
- (xi) How can radioactivity help in treatment of cancer?
- (xii) What is meant by absorber dose, also write down the unit of absorber dose?

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

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- (i) Explain why the terminal potential difference of a battery decreases when current drawn from it is increased?
- (ii) What is wheatstone bridge? How can it be used to determine an unknown resistance?
- (iii) What is a potentiometer, how can it be used to measure the emf of a battery?
- (iv) How the reception of a particular radio station is selected on your radio set?
- (v) What is meant by A.M. and F.M.?
- (vi) Write down the properties of parallel resonance circuit.
- (vii) Distinguish between intrinsic and extrinsic semiconductors.
- (viii) What information is obtained from the area of hysteresis loop?
- (ix) Explain energy band theory.
- (x) Draw diagram, write equation and give truth table of exclusive OR-gate.
- (xi) What is meant by op. amp. as a comparator?
- (xii) What is principle of virtual ground? Apply it to find the gain of an inverting amplifier.

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

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- (i) Differentiate between mutual induction and mutual inductance.
- (ii) When an electric motor, such as an electric drill, is being used, does it also act as a generator? If so what is the consequence of this?
- (iii) Can an electric motor be used to drive an electric generator with the output from the generator being used to operate the motor?
- (iv) Describe briefly black body radiations.
- (v) Find the mass of a moving object with speed $0.8c$.

(Turn Over)

(2)

4. (vi) Does the dilation means that time really passes more slowly in moving system or that it only seems to pass more slowly?
- (vii) Is it possible to create a single electron from energy? Explain.
- (viii) How hydrogen spectrum is obtained?
- (ix) Can X-rays be reflected, refracted, diffracted and polarized just like any other waves? Explain.

SECTION – II

Note : Attempt any THREE questions.

5. (a) Define electric intensity and electric potential. Derive a relation between them. 5
- (b) A rectangular bar of iron is 2 cm by 2 cm in cross-section and 40 cm long. Calculate its resistance if resistivity is $5.2 \times 10^{-8} \Omega m$. 3
6. (a) Determine the e/m of electron. How the path of electrons is made visible? 5
- (b) A circular coil has 15 turns of radius 2 cm each. The plane of the coil lies at 40° to the uniform magnetic field of 0.2 T. If the field is increased by 0.5 T in 0.2 s, find the magnitude of the induced emf. 3
7. (a) What is meant by rectification? Explain half wave and how full wave rectifiers attain by using bridge rectifier. 5
- (b) A 10 mH, 20Ω coil is connected across 240 V and $180 / \pi$ Hz source. How much power does it dissipate? 3
8. (a) What is hysteresis loop? Describe the different features of hysteresis loop for a ferromagnetic material. 1,4
- (b) An electron is accelerated through a potential difference of 50 V. Calculate its de-Broglie wavelength. 3
9. (a) State three postulates of Bohr's model of the hydrogen atom. And describe mathematically the de-Broglie interpretation of Bohr's orbits. 5
- (b) Find the mass defect for tritium, if the atomic mass of tritium is 3.016049u. 3

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