

Physics

(D)

L.K.No. 1307

Paper Code No. 2177

Note : Four possible choices A, B, C, D to each question are given. Which choice is correct fill that circle in front of that Question No. Use Marker or Pen to fill the circles. Cutting or filling two or more circles will result in Zero Mark in that Question.

Q.No.1	The Gradient of the Scalar Field is always be a :
(1)	(A) Scalar Quantity (B) Vector Quantity (C) Variable Quantity (D) Fixed Quantity
(2)	Work done by Magnetic Force on a charge particle while moving through Magnetic Field is : (A) qvB (B) vB/q (C) $\frac{q}{vB}$ (D) Zero
(3)	Which one of the following is used to determine internal resistance of a cell : (A) Potentiometer (B) Wheat Stone Bridge (C) Ammeter (D) Voltmeter
(4)	On removing the dielectric from a charged capacitor, its energy : (A) Increases (B) Remains Unchanged (C) Decreases (D) None of these
(5)	The Ratio of Magnetic Force (F_m) and Electric Force (F_e) acting on a charge moving undeflected through the field is : (A) E/B (B) B/E (C) 1 (D) $\frac{E}{vB}$
(6)	The emf induced in 1 mH inductance in which current changes from 5A to 3A in 1ms is : (A) 2×10^{-6} V (B) 8×10^{-6} V (C) 2 V (D) 8 V
(7)	The Inductance of Coil is proportional to : (A) Its shape (B) The number of turns (C) The Resistance of Coil (D) The Square of the number of turns
(8)	In an A.C. Circuit, a Resistance R is connected in Series with an inductance L if phase angle between voltage and current be 45° , the value of inductive reactance will be : (A) $2R$ (B) R (C) $\frac{R}{2}$ (D) $\frac{R}{4}$
(9)	An A.C. varies as a function of : (A) Time (B) Current (C) Voltage (D) Displacement
(10)	In Common Emitter Transistor Amplifier the Input Signal and Output Signal are always : (A) Have the same Magnitude (B) Have Same Phase (C) Out of the Phase by 180° (D) Negative
(11)	The value of Input Resistance of OP-Amplifier is of the order of : (A) Few Ohms (B) Milli Ohms (C) Kilo Ohms (D) Mega Ohms
(12)	Very weak magnetic field produced by brain can be detected by : (A) Mkl (B) Metallic Needle (C) Squids (D) Cat Scanner
(13)	Who gave the idea of Matter Waves : (A) de-Broglie (B) Einstein (C) Huygen (D) Max-planck
(14)	Dead Time of G.M. Counter is approximately : (A) 10^{-6} s (B) 10^{-5} s (C) 10^{-4} s (D) 10^{-3} s
(15)	In order to increase the stopping potential of ejected photoelectrons, there should be an increase in : (A) Intensity of Radiation (B) Wavelength of Radiation (C) Frequency of Radiation (D) Both Wavelength of Radiation and Intensity of Radiation
(16)	Leptons are particles do not experience : (A) Strong Nuclear Force (B) Weak Nuclear Force (C) Electric Force (D) Magnetic Force
(17)	Which of the following is the energy required (in eV) for ionizing an excited Hydrogen atom : (A) 13.6 eV (B) 10.2 eV (C) More than 13.6 eV (D) 3.4 eV or less than it

Roll No.	1307 - 22000	Session (2017-19) to (2020-22)	Inter (Part - II)
Physics (Subjective)	Inter - A - 2021	Time 2 : 40 Hours Marks : 68	Group - 1

- Q.No.2
- If a point charge q of mass m is released in a non-uniform electric field with field lines pointing in the same direction, will it make a rectilinear motion?
 - Do Electrons tend to go to region of High Potential or of Low Potential?
 - Show that $\frac{V}{m}$ is equal to $\frac{N}{C}$
 - A particle carrying a charge of $5e$ falls through a potential difference of $2V$. Calculate the energy acquired by it.
 - How can you use a magnetic field to separate isotopes of chemical element?
 - Is it possible to orient a current loop in a uniform magnetic field such that the loop will not tend to rotate? Explain.
 - Define Magnetic Flux Density and write its unit.
 - What is CRO? Write two uses of CRO.
 - How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?
 - Is it possible to change both the area of the loop and the magnetic field passing through the loop and still not have an induced emf in the loop?
 - State Faraday's Law of Electromagnetic induction and write its mathematical expression.
 - Define Self Inductance and also define its unit.

- Q.No.3
- What are Non-Ohmic Substance? Give two examples.
 - A Voltmeter cannot read the exact emf of the cell, Why?
 - Why does the resistance of a conductor rise with temperature?
 - What is Impedance?
 - A Sinusoidal has rms value of $10A$. What is the maximum value?
 - How does doubling the frequency affect the reactance of : (a) An Inductor (b) A Capacitor
 - Distinguish between Ductile and Brittle Substances.
 - Energy Dissipated per cycle is more for steel as compared to iron, why?
 - What are Super Conductors?
 - Give four applications of a photodiode.
 - Define Open Loop gain of Operational Amplifier.
 - Why Ordinary Silicon Diode does not emit light?

- Q.No.4
- A Beam of Red Light and a Beam of Blue Light have exactly the same energy. Which Beam contains the greater number of photons?
 - Why don't we observe a Compton Effect with Visible Light?
 - What are Black Body Radiations and how can you get a Black Body?
 - Bohr's Theory of Hydrogen atom is based upon several assumptions. Do any of these assumptions contradict classical physics?
 - What are the advantages of Laser Over Ordinary Light?
 - Describe the principle of Operation of a Solid State Detector of ionizing radiation in terms of generation and detection of charge carriers.
 - Discuss the advantages and disadvantages of fission power from the point of safety, pollution and resources.
 - Differentiate between Baryons and Mesons.
 - Define Absorbed Dose D and write down its unit.

Part - II

- Q.No.5
- State Gauss's Law. Using the concept of Gaussian Surface, derive the formula of Electric Intensity due to an infinite sheet of charge. (5)
 - $0.75A$ current flows through an iron wire when a battery of $1.5V$ is connected across its ends. The length of the wire is $5.0m$ and cross sectional area is $2.5 \times 10^{-7} m^2$. Compute Resistivity of Iron. (3)
- Q.No.6
- What is an Alternating Current Generator? Describe its principle, construction and working. Also derive an expression for induced emf and induced current. (5)
 - You are asked to design a Solenoid that will give a magnetic field of $0.10T$, yet the current must not exceed $10.0A$. Find the number of turns per unit length that the Solenoid should have. (3)
- Q.No.7
- What is Rectification? Explain Full Wave Rectification with circuit Diagrams. (5)
 - An Iron core coil of $2.0H$ and 50Ω is placed in series with a resistance of 450Ω . An A.C. supply of $100V$, $50Hz$ is connected across the circuit. Find : (3)
 - The Current Flowing in the Coil
 - Phase angle between the Current and Voltage.
- Q.No.8
- Describe the construction and working of a Solid State Detector. What are its merits over other Detectors? (5)
 - A $1.25cm$ Diameter Cylinder is subjected to a load of $2500Kg$. Calculate the stress on the bar in Mega Pascals. (3)
- Q.No.9
- Derive the relation for the Quantized Radii of Hydrogen Atom on the Basis of Bohr's Model of Hydrogen Atom. (5)
 - An Electron is placed in a box about the size of an atom $1.0 \times 10^{-10}m$. What is the velocity of the Electron? (3)



Physics	(D)	L.K.No. 1308	Paper Code No. 8478
Note : Four possible choices A, B, C, D to each question are given. Which choice is correct fill that circle in front of that Question No. Use Marker or Pen to fill the circles. Cutting or filling two or more circles will result in Zero Mark in that Question.			

Q.No.1	Electric Flux does not depend upon :
(1)	(A) Charge Enclosed (B) Medium (C) Medium and Charge Enclosed (D) Shape of Closed Surface
(2)	One Tesla in terms of other units $i - e \quad IT = ?$: (A) $1 \text{ NA}^{-1} \text{ m}^{-1}$ (B) 1 Nm A^{-1} (C) $1 \text{ NA}^{-1} \text{ m}^{-2}$ (D) $1 \text{ NA}^{-1} \text{ m}^2$
(3)	Kirchhoff's Second Rule is based on the Law of Conservation of : (A) Mass (B) Momentum (C) Energy (D) Charge
(4)	Electric Intensity at a point close to an infinite sheet of charge is given by : (A) $\frac{\sigma}{2\epsilon_0}$ (B) $\frac{2\sigma}{\epsilon_0}$ (C) $\frac{\epsilon_0}{\sigma}$ (D) $\frac{\sigma}{\epsilon_0}$
(5)	An Electric Circuit in CRO that provides voltage to X plates is called : (A) Tweet (B) Sweep (C) Sleep (D) Cheap
(6)	The sum of positive and negative peak values of an A.C. Cycle is called : (A) Instantaneous Value (B) Peak Value (C) P-P Value (D) rms Value
(7)	Assembly of Coil and Cylinder is called : (A) Generator (B) Solenoid (C) Router (D) Armature
(8)	One Henry is equal to : (A) $\text{Vs}^{-1} \text{ A}$ (B) $\text{Vs}^{-1} \text{ A}^{-1}$ (C) Vs A^{-1} (D) VsA
(9)	In Free Space, the speed of Electromagnetic Waves is : (A) 332 ms^{-1} (B) $3 \times 10^8 \text{ ms}^{-1}$ (C) $1.1 \times 10^3 \text{ ms}^{-1}$ (D) $2.6 \times 10^4 \text{ ms}^{-1}$
(10)	Number of Diodes used in Full Wave (bridge) rectifier circuit are : (A) 4 (B) 3 (C) 2 (D) 1
(11)	The value of Potential Barrier for Silicon at room temperature is : (A) 0.3 V (B) 0.5 V (C) 0.7 V (D) 0.9 V
(12)	A Semi Conductor will behave as an insulator at temperature : (A) 0 K (B) 0°C (C) 10 K (D) 10°C
(13)	Momentum of a Photon is given by : (A) $\frac{hf}{\lambda}$ (B) $\frac{h\lambda}{c}$ (C) $\frac{f\lambda}{c}$ (D) $\frac{hf}{c}$
(14)	In a Nuclear Transmutation when Thorium is transformed into Protactinium, the emitted particle is : (A) A Beta Particle (B) A Neutron (C) A Proton (D) An Alpha Particle
(15)	The energy required to completely remove an electron from the first Bohr Orbit is called : (A) Excitation Energy (B) Ionization Energy (C) Potential Energy (D) Kinetic Energy
(16)	A photon of Radio Wave has an energy of the order of : (A) 10^{-16} eV (B) 10^{-10} eV (C) 1 eV (D) 1 KeV
(17)	The temperature of the core of the sun is about : B (A) $5 \text{ M}^\circ \text{C}$ (B) $10 \text{ M}^\circ \text{C}$ (C) $20 \text{ M}^\circ \text{C}$ (D) $40 \text{ M}^\circ \text{C}$

Roll No.	1308 - 21000	Session (2017 -19) to (2020 - 22)	Inter (Part - II)
Physics (Subjective)	Inter - A - 2021	Time 2.00 Hours	22 x 2 = 44
make diagram where necessary.		Part - I	

- Q.No.2
- Differentiate between Volt and Electron Volt.
 - Give two similarities and dissimilarities between Electric and Gravitational Forces.
 - Prove that : $1 \text{ Ohm} \times 1 \text{ Farad} = 1 \text{ Second}$
 - Do Electrons tend to go to region of High Potential or of Low Potential?
 - Why does the Picture on a T.V. Screen become distorted when a magnet is brought near the screen?
 - Describe the change in the Magnetic Field inside a Solenoid carrying a steady current I , if the length of the Solenoid is doubled but the number of turns remains the same.
 - What is the function of Grid in Cathode Ray Oscilloscope?
 - State Ampere's Law and write it in Mathematical Form.
 - A Square Loop of wire is moving through a uniform magnetic field. The normal to the loop is oriented parallel to the magnetic field. Is a emf induced in the loop?
 - Show that \mathcal{E} and $\frac{\Delta\phi}{\Delta t}$ have the same units.
 - Describe working principle and use of A.C. Generator.
 - Define Mutual Inductance and write its SI Unit.

- Q.No.3
- Define Tolerance. Give an example.
 - Describe a circuit which will give a continuously varying potential.
 - Do bends in a wire affect its Electrical Resistance, explain?
 - What is meant by Inductive Reactance and Capacitive Reactance?
 - How does doubling the frequency affect the reactance of : (a) An Inductor (b) A Capacitor
 - In RL Circuit, will the current Lag or Lead the Voltage? Illustrate your answer by a Vector Diagram.
 - Distinguish between Ductile and Brittle Substances.
 - What is meant by Para and Ferromagnetic Substances? Give examples for each.
 - Distinguish between Intrinsic and Extrinsic Semi Conductors.
 - What is Light Emitting Diode?
 - Why is the Base Current in a Transistor very small?
 - Why Charge carriers are not present in the Depletion Region?

- Q.No.4
- The life time of an electron in an excited state is 10^{-8} s. What is its uncertainty in energy during this time?
 - Which Photon red, green or blue carries the most energy and momentum?
 - Which has the Lower Energy Quanta Radiowaves or X-rays?
 - Find the Speed of the Electron in the First Bohr Orbit.
 - What are the advantages of Laser Over Ordinary Light?
 - Define Half Life and write its formula.
 - Write name of basic forces of nature.
 - Why are Heavy Nuclei unstable?
 - A particle which produces more ionization is less penetrating why?

Part - II

- Q.No.5
- Describe the Millikan's method to determine charge on an Electron. (5)
 - 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 coefficient of resistance of iron is $5.2 \times 10^{-3} \text{ K}^{-1}$? (3)
- Q.No.6
- Derive the Expression for Force on moving electric charge in a uniform magnetic field. Also determine its direction. (5)
 - Like any field, the Earth's Magnetic Field stores energy. Find the Magnetic Energy stored in a space, where strength of Earth's field is $7 \times 10^{-5} \text{ T}$, if the space occupies an area of $10 \times 10^8 \text{ m}^2$ and has a height of 750 m? (3)
- Q.No.7
- Discuss the behaviour of an inductor in an A.C. Circuit and write expression for the Inductive Reactance. (5)
 - The Current Flowing into the base of a 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. (3)
- Q.No.8
- Define and explain Nuclear Fission. (5)
 - A 1.25 cm Diameter Cylinder is subjected to a load of 2500 Kg. Calculate the stress on the bar in Mega Pascals. (3)
- Q.No.9
- State and explain Photo Electric Effect. Write down its experimental results. Also explain it on the basis of Quantum Theory. (5)
 - What are the Energies in eV of Quanta of Wave-lengths $\lambda = 400, 500$ and 700 nm ? (3)