| Physics | (D) | Session (2017-19, to (2020-22) | L.K.No. 1307 | Paper Code No. 8477 |

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	
(1)	The Gradient of the Scalar Field is always be a : (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 (Fm) and Electric Force (Fe) 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) 2 R (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) MRI (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

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Q.No.2 (i) 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?

(ii) Do Electrons tend to go to region of High Potential or of Low Potential?

(iii) Show that $\frac{V}{m}$ is equal to $\frac{N}{C}$

(iv) A particle carrying a charge of 5e falls through a potential difference of 2 V. Calculate the energy acquired by it.

(v) How can you use a magnetic field to separate isotopes of chemical element?

(vi) Is it possible to orient a current loop in a uniform magnetic field such that the loop will not tend to rotate? Explain.

(vii) Define Magnetic Flux Density and write its unit.

(viii) What is CRO? Write two uses of CRO.

(ix) How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?

(x) 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?

(xi) State Faraday's Law of Electromagnetic induction and write its mathematical expression.

(xii) Define Self Inductance and also define its unit.

Q.No.3 (i) What are Non-Ohmic Substance? Give two examples.

(ii) A Voltmeter cannot read the exact emf of the cell, Why?

(iii) Why does the resistance of a conductor rise with temperature?

(iv) What is Impedance?

(v) A Sinusoidal has rms value of 10 A. What is the maximum value?

(vi) How does doubling the frequency affect the reactance of: (a) An Inductor (b) A Capacitor

(vii) Distinguish between Ductile and Brittle Substances.

(viii) Energy Dissipated per cycle is more for steel as compared to iron, why?

(ix) What are Super Conductors?

(x) Give four applications of a photodiode.

(xi) Define Open Loop gain of Operational Amplifier.

(xii) Why Ordinary Silicon Diode does not emit light?

Q.No.4 (i) A Beam of Red Light and a Beam of Blue Light have exactly the same energy. Which Beam contains the greater number of photons?

(ii) Why don't we observe a Compton Effect with Visible Light?

(iii) What are Black Body Radiations and how can you get a Black Body?

(iv) Bohr's Theory of Hydrogen atom is based upon several assumptions. Do any of these assumptions contradict classical physics?

(v) What are the advantages of Laser Over Ordinary Light?

(vi) Describe the principle of Operation of a Solid State Detector of ionizing radiation in terms of generation and detection of charge carriers.

(vii) Discuss the advantages and disadvantages of fission power from the point of safety, pollution and resources.

(viii) Differentiate between Baryons and Mesons.

(ix) Define Absorbed Dose D and write down its unit.

Part-II

Q.No.5 (a) State Gauss's Law. Using the concept of Gaussian Surface, derive the formula of Electric Intensity due to an infinite sheet of charge? (5)

(b) 0.75 A current flows through an iron wire when a battery of 1.5 V is connected across its ends. The length of the wire is 5.0 m and cross sectional area is 2.5×10^{-7} m^2. Compute Resistivity of Iron. (3)

Q.No.6 (a) What is an Alternating Current Generator? Describe its principle, construction and working. Also derive an expression for induced emf and induced current. (5)

(b) You are asked to design a Solenoid that will give a magnetic field of 0.10 T, yet the current must not exceed 10.0 A. Find the number of turns per unit length that the Solenoid should have. (3)

Q.No.7 (a) What is Rectification? Explain Full Wave Rectification with circuit Diagrams. (5)

(b) An Iron core coil of 2.0 H and 50 Ω is placed in series with a resistance of 450 Ω. An A.C. supply of 100 V, 50 Hz is connected across the circuit. Find:
(i) The Current Flowing in the Coil (ii) Phase angle between the Current and Voltage. (3)

Q.No.8 (a) Describe the construction and working of a Solid State Detector. What are its merits over other Detectors? (5)

(b) 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 (a) Derive the relation for the Quantized Radii of Hydrogen Atom on the Basis of Bohr's Model of Hydrogen Atom. (5)

(b) An Electron is placed in a box about the size of an atom 1.0×10^{-10} m. What is the velocity of the Electron? (3)