PAPER CODE - 8471

12th CLASS – 12021

PHYSICS
GROUP : FIRST

DGK-I-21

TIME: 20 MINUTES
MARKS: 17

OBJECTIVE

NOTE: You have four choices for each objective type question as A , B , C and D . The choice which you think is correct , fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question

QUESTION NO. 1

1	A particle of charge 2 e falls through potential difference of 3.0 V will have energy (A) 1.5 eV (B) 0.66 eV (C) 6 eV (D) 12 eV
2	The minimum value of charge on free particle is (A) $\frac{2}{3}$ e (B) $\frac{1}{3}$ e (C) $\frac{-2}{3}$ e (D) e
3	The SI unit of conductance is (A) Siemen (B) Ohm (C) Henry (D) Weber
4	In the expression $\frac{e}{m} = \frac{V}{Br}$, the radius is measured by making electronic trajectory (A) Hyperbolic (B) Ellipse (C) Dark (D) Visible
5	Output waveform of built-in voltage of the CRO is (A) Sinusoidal (B) Square (C) Rectangular (D) Saw tooth
6	The Lenz's law is also a statement of law of conservation of (A) Charge (B) Parity (C) Mass (D) Energy
7	The principle of A.C generator is (A) Lenz's law (B) Faraday's law (C) Mutual induction (D) Coulomb's law
8	In A.C through resistance, current and voltage are (A) in phase (B) out of phase (C) current leads (D) 90^o phase difference
9	The unit of $\frac{WL}{R}$ in R – L series circuit is (A) Ohm (B) Volt (C) Henry (D) Unitless
10	The most suitable metal for making permanent magnet is (A) Iron (B) Steel (C) Silver (D) Copper
11	Base of the transistor is very thin of the order of the (A) 10^{-6} m (B) 10^{-2} m (C) 10^{-1} m (D) 10^{-3} m
12	The operational amplifier, when works as inverting amplifier. The phase change between its input and output is (A) 90^o (B) 120^o (C) 150^o (D) 180^o
13	The factor $\frac{h}{m_o c}$ has the unit of (A) Kilogram (B) Second (C) Meter (D) Joule
14	Which properties of radio waves are predominate ? (A) Wave (B) Particle (C) Partial wave (D) Partial particle
15	Finely focused beam of laser has been used to destroy (A) Crystal structure (B) Cancerous cells (C) Weapons (D) Germs
16	Baryon with combination of up , up and up quark has charge (A) 1 e (B) 2 e (C) – 1 e (D) – 2 e
17	$^2_1H + ^2_1H \longrightarrow ^3_1H + X + 4.0$ Mev. The particle X is (A) ^1_0n (B) ^1_1H (C) ^2_1H (D) electron

D

PHYSICS 12th CLASS – 12021 TIME : 2.40 HOURS
GROUP : FIRST (SUBJECTIVE) SECTION-I D4K-I-21 MARKS : 68

QUESTION NO. 2 Write short answers any Eight (8) of the following 16

1	Show that : $1\frac{\text{volt}}{\text{meter}} = 1\frac{\text{newton}}{\text{coulomb}}$
2	Two opposite point charges , each of magnitude q are separated by a distance 2d. What is the electric potential at a point P mid-way between them ?
3	Is E necessarily zero inside a charged rubber balloon if balloon is spherical ? Assume that charge is distributed uniformly over the surface.
4	Is it true that Gauss's law states that the total number of lines of forces crossing any closed surface in the outward direction is proportional to the net positive charge enclosed within surface ?
5	The magnetic field in a certain region is given by $\vec{B} = (40\,\hat{i} - 18\,\hat{k})$ wbm^{-2}. How much flux passes through a 5.0 cm^2 area loop in this region if the loop lies flat in the XY-plane ?
6	Prove that $\vec{F} = q\vec{E} + q(\vec{V} \times \vec{B})$
7	Why does the picture on a TV screen become distorted when a magnet is brought near the screen ?
8	How can a current loop be used to determine the presence of a magnetic field in a given region of space ?
9	How can an induced current be increased ?
10	Define mutual inductance and write its unit
11	Does the induced *emf* in a circuit depend on the resistance of the circuit ? Does the induced current depend on the resistance of the circuit ?
12	In a certain region, the earth's magnetic field point vertically down. When a plane flies due north, which wingtip is positively charged ?

QUESTION NO. 3 Write short answers any Eight (8) of the following 16

1	What are thermistors ? For what they are used for ?
2	Do bends in a wire affect its electrical resistance ? Explain
3	Describe a circuit which will give a continuously varying potential
4	What are the average values of current ' I ' and voltage ' V ' over a cycle of alternating current ? What are the average values of I^2 and V^2 over a cycle ?
5	What is impedance ? Give its unit
6	How does doubling the frequency affect the reactance of (a) an inductor (b) a capacitor ?
7	What is difference between ductile and brittle substances ? Give example of each
8	Define modulus of elasticity. Also discuss its three kinds
9	What is meant by para , dia and ferromagnetic substances ? Give examples for each
10	What is a light emitting diode ? Give its applications
11	Describe the variation of size and the difference in concentration of impurity in different parts of a transistor
12	What is the principle of virtual ground ?

QUESTION NO. 4 Write short answers any Six (6) of the following 12

1	As a solid is heated and begins to glow , why does it first appear red ?
2	Which has the lower energy quanta ? Radio waves or X-rays
3	A particle of mass 5.0 mg moves with speed of 8.0 m/s. Calculate its de-Broglie wavelength
4	Can X-rays be reflected , refracted , diffracted and polarized just like any other waves ? Explain
5	What is difference between spontaneous and stimulated emission ?
6	If a nucleus has a half life of 1 year , does this mean that it will be completely decayed after 2-years. Explain
7	What information is revealed by the length and shape of the tracks of an incident particle in Wilson Cloud Chamber ?
8	Define hadrons. Also differentiate between baryons and mesons
9	Define Half life and write its mathematical formula

SECTION-II

Note: Attempt any Three questions from this section 8 x 3 = 24

Q.5.(A)	By using Millikan oil drop experiment , How can the charge on electron be measured	5
(B)	The resistance of an iron wire at 0 °C is $1.0 \times 10^4\ \Omega$. What is the resistance at 500 °C if the temperature coefficient of resistance of iron is $5.2 \times 10^{-3}\ K^{-1}$?	3
Q.6.(A)	What is cathode Ray Oscilloscope ? Explain the functions of (i) Cathode (ii) Grid (iii) Anodes (iv) Deflecting plates and (v) Sweep generator	5
(B)	A solenoid has 250 turns and its self inductance is 2.4 mH. What is the flux through each turn when the current is 2A ? What is the induced *emf* when the current changes at 20 AS^{-1} ?	3
Q.7.(A)	What is p-n junction ? Describe forward and reverse biased p-n junction. Discuss the characteristics curves in short	5
(B)	Find the value of the current flowing through a capacitance 0.5 μF when connected to a source of 150 V at 50 Hz	3
Q.8.(A)	Write a brief note on nuclear fission	5
(B)	A 1.25 cm diameter is subjected to a load of 2500 kg. Calculate the stress on the bar in mega-Pascals	3
Q.9.(A)	Explain photoelectric effect on the basis of classical and quantum theory	5
(B)	The wave length of K X-ray from copper is 1.377×10^{-10} m. What is the energy difference between two levels from which this transition results ?	3