PAPER CODE – 8476

12th CLASS – 1st Annual 2023

PHYSICS **TIME: 20 MINUTES**

GROUP : SECOND DGK-12-2-23 **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	The slope of q-t graph at any instant of time gives (A) Charge (B) Voltage (C) Current (D) Frequency
2	Which one here is a ductile substance ? (A) Copper (B) Glass (C) Stone (D) Steel
3	In p-type semiconductor, the majority charge carrier are (A) Photons (B) Holes (C) Protons (D) Electrons
4	In reverse biasing a p-n-junction ideal, offers a resistance (A) Zero (B) Higher (C) Infinite (D) Medium
5	All motions are (A) Absolute (B) Uniform (C) Variable (D) Relative
6	In 1905, the theory of relativity was proposed by (A) Maxwell (B) Michelson (C) Einstein (D) de- Broglie
7	The radius of the 1st. Bohr orbit in hydrogen atom is (A) 8.8×10^{-12} cm (B) 0.53×10^{-10} cm (C) 9.1×10^{-31} cm (D) 1.6×10^{-31} cm
8	1 atomic mass unit (amu) is equal to (A) 1.66×10^{-24} kg (B) 1.66×10^{-19} kg (C) 1.66×10^{-34} kg (D) 1.66×10^{-27} kg
9	In nuclear radiations, the tracks of alpha-particles are (A) Thin (B) Continuous (C) Discontinuous (D) Eratic
10	The number of electrons in one coulomb charge is (A) 6.2×10^{18} (B) 1.6×10^{19} (C) 6.2×10^{21} (D) 1.6×10^{31}
11	The SI unit of relative permittivity of free space is (A) N/m (B) No units (C) Nm^2C^{-2} (D) $C^2N^{-1}m^{-2}$
12	The graphical representation of ohm's law is (A) Hyperbola (B) Ellipse (C) Parabola (D) Straight line
13	Energy stored per unit volume inside a solenoid is called as (A) Energy density (B) Electric flux (C) Charge density (D) Current density
14	A charge particle enters in a strong magnetic field, its K.E (A) Remains constant (B) Increases (C) Decreases (D) Increases than decreases
15	If we make magnetic field stronger, the value of induced current is (A) Decreased (B) Constant (C) Vanished (D) Increased
16	An alternating current is converted into direct current by a (A) Rectifier (B) Motor (C) Generator (D) Transformer
17	In A.C waveform , negative peak is obtained at the phase angle of (A) 90° (B) 120° (C) 270° (D) 360°

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D

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PHYSICS **SUBJECTIVE** **TIME: 2 HRS 40 MINUTES**

GROUP: SECOND DGK-12-2-23 **SECTION-I** **MARKS: 68**

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

i	Is it true that Gauss's law states that the total number of field lines crossing a surface in outward direction is proportional to net positive charge enclosed with in surface ?
ii	Describe the net force on a positive point charge when placed between parallel plates with opposite and equal charges.
iii	Define capacitance. On what factors, does it depend for parallel plate capacitor ?
iv	Why electric field lines are called lines of force ? Write any one characteristic of these lines.
v	Describe change in magnetic field inside a solenoid when number of turns are doubled without changing length.
vi	For what orientation of a flat loop in a magnetic field, is the electric flux (a) Maximum (b) Minimum ?
vii	What is concept of synchronization in CRO to measure certain parameters of applied wave - form ?
viii	Why digital multimeter is preferred over an ordinary Avo meter ?
ix	If some accidently swallows an α – source and β – source, which would be more dangerous and why ?
x	What are isotopes ? What do they have in common ?
xi	How many types of radioactive waste are there ? Write each category.
xii	Define fission reaction. State any one nuclear reaction indicating fission of $_{92}U^{235}$

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

i	Do bends in a wire affect electrical resistance ?
ii	What are the difficulties in testing whether the filament of a lighted blub obeys ohm's law ?
iii	Is the principle of energy conservation always applicable to electrical circuits ?
iv	How does doubling the frequency affect the reactance of (a) an inductor (b) a capacitor
v	In a R-L circuit, will the current lag or lead the voltage ? Shows its diagram.
vi	Why does capacitor not conduct D.C current ?
vii	Which materials obey Hook's law and which do not ?
viii	Differentiate between ductile and brittle substances.
ix	Why soft iron is better in the construction of transformer ?
x	What is the net charge on a n-type and p-type substance. Justify your answer with reason.
xi	Why base current in a transistor is very small ?
xii	Why does depletion region in diode increases in case of its reverse biasing ?

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

i	Can a D.C motor be turned into D.C generator ? What changes are required to be done ?
ii	When an electric motor, such as and electric drill is being used. Does it also act as a generator ? If so what is the consequences of this ?
iii	What happens to total radiation from a blackbody if its absolute temperature is doubled ?
iv	Which has lower energy quanta ? Radio-waves or X-rays ?
v	Explain why Laser action could not occur without population inversion between atomic level ?
vi	What do you mean by root mean square value (rms) of current and write formula.
vii	What is Stefan's Boltzmann law ? Give the value of Stefan constant.
viii	Define Compton effect. Express Compton shift for scattering angle θ.
ix	Distinguish between spontaneous and stimulated emission.

SECTION-II

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

Q.5.(A)	What is capacitor ? Derived an expression energy stored in a capacitor and also calculate the energy stored in the electric field ?	5
(B)	A charge of 90 C passes through a wire in 1 hour and 15 minutes what is current in the wire ?	3
Q.6.(A)	What is A.C generator ? Give its construction and describe its working.	5
(B)	A coil of 0.1m x 0.1m and of 200 turns carrying a current of 1.0 mA is placed in uniform magnetic field of 0.1T. Calculate the maximum torque that acts on the coil.	3
Q.7.(A)	Describe series resonant circuit. Find formula for resonance frequency and write its properties.	5
(B)	The current flowing into the base of a transistor is 100 μA. Find its collector current I_C , its emitter current I_E and the ratio I_C / I_E, if the value of current gain β is 100.	3
Q.8.(A)	What is de-Broglie hypothesis ? Give an experiment of its proof.	5
(B)	The length of steel wire is 1.0 m and its cross – sectional area is 0.03×10^{-4} m^2. Calculate the work done in stretching the wire when force of 100N is applied within the elastic region. Young's modulus of steel is 3.0×10^{11} Nm^{-2}	3
Q.9.(A)	How X-rays are produced ? Explain bremsstrahlung. Write two uses of X-rays.	5
(B)	If $^{233}_{92}U$ decays twice by α –emission. What is the resultant isotope ? Explain with nuclear reaction.	3

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