PHYSICS **OBJECTIVE** TIME: 20 MINUTES
GROUP : FIRST MARKS: 17

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 DGK-12-1-23

1	SI units of capacitive reactance are
	(A) Farad (B) Ohm (C) Volt (D) Ampere
2	Which of the following does not undergo plastic deformation ?
	(A) Glass (B) Copper (C) Wrought iron (D) Lead
3	For full–wave rectification , number of diodes used in bridge circuit is
	(A) 3 (B) 2 (C) 4 (D) 1
4	The SI units of current gain are
	(A) Volts (B) Ampere (C) Weber (D) No units
5	The Compton shift $\Delta\lambda$ is equal to Compton wave - length at an angle of
	(A) Zero (B) 90° (C) 45° (D) 120°
6	A single quantum of electromagnetic radiation is called
	(A) Photon (B) Meson (C) Positron (D) Quark
7	The reverse process of photo electric effect is called
	(A) Pair–production (B) Compton effect
	(C) Annihilation of matter (D) X–rays emission
8	Two down and one up quarks make
	(A) Proton (B) Photon (C) Neutron (D) Deutron
9	One Joule of energy absorbed per Kilogram of body is
	(A) Rem (B) Roentgens (C) Grey (D) Becquerel
10	The minimum charge on any object cannot be less than
	(A) 1.8×10^{-19} C (B) 3.2×10^{-19} C (C) 1.6×10^{-19} C (D) 9.1×10^{-19} C
11	An electric field can deflect
	(A) Neutrons (B) x–rays (C) Gama–rays (D) Alpha–rays
12	The SI units of the temperature coefficient of resistivity of a material are
	(A) Ohm–meter (B) Kelvin (C) Per Kelvin (D) Ohm–Kelvin
13	Which has High resistance ?
	(A) Ohm–meter (B) Ammeter (C) Galvanometer (D) Voltmeter
14	In order to increase the range of an ammeter , the shunt resistance is
	(A) Decreased (B) Increased (C) Kept constant (D) Randomly changed
15	The self inductance is given by the relation
	(A) $NL = \emptyset I$ (B) $NI = L\emptyset$ (C) $N = LI\emptyset$ (D) $N\emptyset = LI$
16	If speed of a generator is doubled , the output voltage will be
	(A) Same (B) One half (C) Four times (D) Double
17	The device which allows only the flow of D.C through a circuit is
	(A) Inductor (B) Capacitor (C) Transformer (D) A.C generator

D

PHYSICS

GROUP: FIRST DGK-12-1-23

SUBJECTIVE

SECTION-I

TIME: 2 HRS 40 MINUTES

MARKS: 68

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

i	Suppose that you follow an electric field line due to positive point charge. Do electric field and potential increase or decrease ?
ii	Why the voltmeter should have very high resistance ?
iii	A particle which produce more ionization is less penetrating. Why ?
iv	Differentiate between electric potential and electric potential difference.
v	State amperes law. Give its significance.
vi	Charge particle α , β and γ – radiation produce fluorescence. Define fluorescence .
vii	Do electron tend to go to region of high potential or of law potential ?
viii	Give the working of xero – graphy.
ix	What do we mean that the term critical mass ?
x	How can you use a magnetic field to separate isotopes of chemical elements ?
xi	How can you make electronic trajectory visible , when calculating to charge to mass ratio ?
xii	Give two advantages and disadvantages of nuclear power.

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

i	Explain why the terminal potential difference of battery decrease when current drawn from it is increased ?
ii	Is the filament resistance lower or higher in 500 w , 220 v light bulb than in 100 w , 220 v bulb ?
iii	What are the difficulties in testing whether the filament of a light bulb obeys ohm's law ?
iv	How does doubling the frequency affect the reactance of a capacitor ?
v	In a R-L circuit , will the current lag or lead the voltage ? Explain with vector diagram.
vi	What is resonance condition in R-L-C series circuit ?
vii	Distinguish between intrinsic and extrinsic semiconductors ?
viii	Discuss the mechanism of electric conduction by holes and electrons in semiconductors ?
ix	What are ductile and brittle substances ? Give an example of each.
x	What is the net charge on n-type or p-type substance ?
xi	Why charge carrier are not present in depletion region ?
xii	Define open loop gain of operational amplifier ?

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

I	Show that Lenz's law corresponds to law of conservation of energy.
ii	Show that ε and $\frac{\Delta\phi}{\Delta t}$ have the same units.
iii	Four unmarked wires emerge from a transformer. What steps would you take to determine the turn ratio ?
iv	Why don't we observe a Compton effect with visible light ?
v	Can pair production take place in vacuum ? Explain .
vi	How the results of special theory of relativity are used in NAVSTAR navigation system ?
vii	What is Steffen Boltzmann's law ? Write down the equation of Steffen Boltzmann's law.
viii	Can the electron in the ground state of hydrogen absorb a photon of energy 13.6 eV and greater than 13.6 eV ?
ix	Draw a graph of wavelength verses intensity showing the spectrum of continuous and characteristics x-rays.

SECTION-II

Note: **Attempt any Three questions from this section** $8 \times 3 = 24$

Q.5.(A)	Define electric potential and derive a relation for electric potential at a point due to a point charge.	5
(B)	A rectangular bar of iron is 2.0 cm by 2.0 cm in cross section and 40 cm long. Calculate its resistance if the resistivity of iron is 11×10^{-8} Ωm.	3
Q.6.(A)	Find an expression for a moving charge in the magnetic field.	5
(B)	The back emf in a motor is 120 V when the motor is turning at 1680 rev per minute. What is the back emf when the motor turns 3360 rev per minute ?	3
Q.7.(A)	What is rectification ? Explain full wave rectification. How pulsating output voltage is made smooth ?	5
(B)	A 10 mH, 20Ω coil is concocted across 240 V and $180/\pi$ Hz source. How much power do it dissipate ?	3
Q.8.(A)	Explain de Broglie hypothesis. How Davisson and Germer experimentally verified the de-Broglie hypothesis ?	5
(B)	A 1.0 m long copper wire is subjected to stretching force and its length increase by 20 cm. Calculate the tensile strain and percent elongation which the wire undergoes.	3
Q.9.(A)	Write the postulate of Bohr's atomic model of Hydrogen atom and show that how de-Broglie's hypothesis confirm one of its postulate.	2+3
(B)	A 75 kg person receives a whole body radiation dose of 24 m-rad, delivered by α-particles for which RBE factor is 12. Calculate (i) Absorbed energy in joules (ii) Equivalent dose in rem.	3

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) 90^0 (B) 120^0 (C) 270^0 (D) 360^0

D

12th CLASS – 1st Annual 2023

PHYSICS
GROUP: SECOND DGK-12-2-23

SUBJECTIVE
SECTION-I

TIME: 2 HRS 40 MINUTES
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 $8 \times 3 = 24$

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 x 10^{-4} m². 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 x 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