

PAPER CODE – 8472

12th CLASS – 2nd Annual 2025

PHYSICS		TIME : 20 MINUTES
GROUP : SECOND		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 marks in that question.

QUESTION NO. 1

- Two equal and opposite charges separated by a small distance is called
(A) diode (B) dipole (C) rectifier (D) photocell
- In an electric circuit , a $20\text{ M}\Omega$ resistance is connected in series to a capacitor of capacitance $2.5\text{ }\mu\text{F}$, the capacitor will deposit 0.63 times the equilibrium charge in
(A) 5 sec (B) 10 sec (C) 50 sec (D) 100 sec
- A wire of resistance $10\text{ }\Omega$ is cut into two equal parts. These two parts are then connected into parallel combination , the equivalent resistance will be
(A) $2.5\text{ }\Omega$ (B) $5\text{ }\Omega$ (C) $10\text{ }\Omega$ (D) $20\text{ }\Omega$
- Two parallel wires carrying currents in opposite direction will
(A) attract each other (B) repel each other (C) may attract or repel (D) have no effect
- The unit of magnetic flux density is
(A) Wb (B) Wb m^{-2} (C) T m^2 (D) T m^{-2}
- $\frac{B^2}{2\mu_0}$ is an expression of
(A) magnetic P.E (B) magnetic flux (C) magnetic energy density (D) magnetic flux density
- The principle of electric generator is based on
(A) Gauss's Law (B) Ampere's Law (C) Faraday's Law (D) Coulomb's Law
- In three phase A.C supply , coils are inclined at an angle
(A) 0° (B) 90° (C) 120° (D) 180°
- Which of the following device is used to locate buried metal objects ?
(A) metal detector (B) photodiode (C) operational amplifier (D) squid
- In ferromagnetic substances , a domain contains atoms of about
(A) 10^8 to 10^{12} (B) 10^{10} to 10^{14} (C) 10^{12} to 10^{16} (D) 10^{14} to 10^{18}
- In a certain circuit , the transistor has a collector current of 10 mA and a base current of $40\text{ }\mu\text{A}$. The current gain of the transistor will be
(A) 50 (B) 40 (C) 250 (D) 400
- The gain of an **op-amp** as inverting amplifier is
(A) $-\frac{R_2}{R_1}$ (B) $1 + \frac{R_2}{R_1}$ (C) $-\beta \frac{R_c}{r_{ie}}$ (D) $\frac{R_2}{R_1}$
- By using NAVSTAR , the location of an aircraft after an hour's flight can be predicted to about
(A) 2 m (B) 20 m (C) 50 m (D) 760 m
- When platinum wire is heated , it becomes cherry red at
(A) $500\text{ }^\circ\text{C}$ (B) $900\text{ }^\circ\text{C}$ (C) $1100\text{ }^\circ\text{C}$ (D) $1300\text{ }^\circ\text{C}$
- The shortest wavelength in Lyman series of hydrogen atom is
(A) $\frac{R_H}{4}$ (B) $\frac{1}{R_H}$ (C) $\frac{4}{R_H}$ (D) $\frac{3R_H}{4}$
- A pair of quark and antiquark makes a
(A) meson (B) baryon (C) Lepton (D) gauge boson
- The half-life of uranium – 238 is
(A) 1620 years (B) 3.8 days (C) 23.5 minutes (D) 4.5×10^9 years

PHYSICS		TIME: 2 HRS 40 MINUTES
GROUP : SECOND	SUBJECTIVE PART	MARKS: 68
SECTION – I		

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

- If a point charge q of mass m is released in a non-uniform electric field with field lines pointing in the direction will it make a rectilinear motion.
- Do electrons tend to go to region of high potential or of low potential?
- What is the change in electric field between the plates of charged capacitor by inserting dielectric material?
- Why gravitational force is very weak as compared to electrostatic force? Explain.
- How can you use a magnetic field to separate isotopes of chemical element?
- Suppose that a charge q is moving in a uniform magnetic field with a velocity v . Why is there no work done by the magnetic force that acts on the charge?
- Explain lamp and scale arrangement in determining the deflection of moving coil of galvanometer.
- Write two uses of cathode ray oscilloscope.
- What do you understand by "background radiation"? State two sources of this radiation.
- Why are heavy nuclei are unstable?
- Why solid state detector is useful for detecting low energy particles?
- Calculate the decay constant of radon gas having half-life of 3.8 days.

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

- Differentiate between Ohmic and non-Ohmic devices.
- A platinum wire has resistance of $10\ \Omega$ at 0°C and $20\ \Omega$ at 270°C . Find the value of temperature coefficient of resistance of platinum wire.
- Why does the resistance of a conductor rise with temperature?
- Differentiate between peak value and P – P value of A.C. voltage.
- Why is power dissipated zero in a pure inductor and pure capacitor circuit?
- What is meant by A.M and F.M?
- How N-type semiconductor material forms?
- Define retativity and coercivity.
- Write a note on superconductors.
- Write down applications of photoconductor.
- Why charge carriers are not present in the depletion region?
- Why a photodiode is operated in reverse biased state?

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

- Four unmarked wires emerge from a transformer. What steps would you take to determine the turns ratio?
- How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?
- How can we reduce the fluctuations of the output of D.C generator?
- State the principle of complementarity.
- Define work function. Write down its mathematical relation with threshold frequency.
- We do not notice de Broglie wavelength for a pitched cricket ball. Explain why?
- Does the dilation mean that time really passes more slowly in moving system or that it only seems to pass more slowly?
- Explain why laser action cannot occur without population inversion between atomic levels?
- Find the speed of electron in the first Bohr Orbit.

SECTION-II**Note: Attempt any Three questions from this section (Part A = 5 Marks & Part B=3 Marks 8 x 3 = 24)**

Q.5.(A)	Define capacitance. What are the factors on which it depends? Derive its relation for a parallel plate capacitor. Write the effect of medium on capacitance.
(B)	A charge of 90 C passes through a wire in 1 hour and 15 minutes. What is the current in the wire?
Q.6.(A)	What do you understand by electromagnetic induction? State and explain the Faraday's Law of electromagnetic induction.
(B)	A power line 10.0 m high carries a current 200 A. Find the magnetic field of wire at the ground.
Q.7.(A)	Derive the expression for resonance frequency in R - L - C series circuit give the properties of series resonance.
(B)	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 I_C / I_E , if the value of current gain β is 100.
Q.8.(A)	What is an energy band? Discuss the classification of solids on the basis of their electrical properties using band theory.
(B)	What is the de – Broglie wavelength of an electron whose kinetic energy is 120 eV.
Q.9.(A)	What is G.M counter? Explain its construction and working. Also discuss why it is not suitable for fast counting?
(B)	Find the wavelength of the spectral line corresponding to the transition in hydrogen from $n = 6$ state to $n = 3$ state.

