Faisalabad Board Group-I *(First Annual Examination 2025)*

Objective	Intermediate Part Second	Roll No. _____
Paper Code	PHYSICS (Objective) Group - I	
8473	Time: 20 Minutes	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 the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many question as given in objective types question paper and leave other circle blank.

Q1.

Sr.	Questions	A	B	C	D
1	Formula for half-life is:	$T_{\frac{1}{2}}=\dfrac{0.693}{\lambda}$	$T_{\frac{1}{2}}=\dfrac{\lambda}{0.693}$	$T_{\frac{1}{2}}=0.693\lambda$	$T_{\frac{1}{2}}=\dfrac{0.245}{\lambda}$
2	The half-life of radon gas is:	3 days	3.2 days	3.6 days	3.8 days
3	The continuous spectrum is due to an effect known as:	Bremsstrahlung radiation	Photoelectric effect	Zeeman effect	Compton effect
4	Electron microscope makes practical use of the:	Compton effect	Photoelectric effect	Wave nature of electrons	Polarization
5	When platinum wire is heated, it appears yellow at about:	500°C	900°C	1100°C	1300°C
6	The open loop gain of an amplifier is:	0^5	10^4	10^3	10^2
7	A photodiode can turn its current ON and OFF in:	Microsecond	Nanosecond	Megasecond	Millisecond
8	When magnetic flux density B increases from zero to its maximum value and material is magnetized fully. This stage is called:	Saturation	Remanence	Coercivity	Hysteresis
9	If the current and voltage are in phase, then power factor is:	0	1	2	$\sqrt{2}$
10	An A.C. voltmeter reads 250V. What is its peak value if the frequency of alternating voltage is 50Hz?	355.5V	354.5V	353.5V	352.5V
11	The formula for self-inductance of the solenoid is:	$L=\dfrac{\mu_o nA}{\ell}$	$L=\mu_o n^2 A\ell$	$L=\dfrac{\mu_o n^2 A}{\ell}$	$L=\dfrac{\mu_o n^2 \ell}{A}$
12	Lenz's law is in accordance with law of conservation of:	Mass	Charge	Energy	Momentum
13	The device which displays the waveform of voltage or current varying with time is called:	Ammeter	Voltmeter	Avometer	Cathode ray oscilloscope
14	The magnetic force on a moving charge in a magnetic field is:	$\vec{F}=q(\vec{v}\times\vec{B})$	$\vec{F}=I(\vec{L}\times\vec{B})$	$\vec{F}=q\vec{E}+q(\vec{v}\times\vec{B})$	$\vec{F}=q\vec{E}$
15	For non-ohmic device, the graph between V and I is:	Straight line	Curve	Parabola	Hyperbola
16	1 eV is equal to:	1.6×10^{-19}J	1.6×10^{-19}C	1.6×10^{-19}V	$1.6\times10^{-19}\mu$C
17	The heart of machine is:	Toner	Drum	Heated pressure roller	Lamp

(SECTION - I)

Q2. **Write short answers to any EIGHT parts.**   16

(i) How can you identify that which plate of the capacitor is positively charged?

(ii) If a point charge q of mass m is released in a non-uniform electric field pointing in the same direction, will it make a rectilinear motion?

(iii) Draw charge versus voltage graph for a parallel plate capacitor. How would you determine capacitance from it?

(iv) Write the outcome of experiment of Millikan and what did he conclude from it?

(v) Why the resistance of an ammeter should be very low?

(vi) Why does the picture on a TV screen become distorted when a magnet is brought near the screen?

(vii) Explain with diagram including phantom magnet that parallel current loops attract or repel each other.

(viii) What is meant by sensitivity of a galvanometer? How can we increase it in a practical galvanometer?

(ix) How can radioactivity help in treatment of cancer?

(x) A particle which produces more ionization is less penetrating. Why?

(xi) How the plutonium fuel is fed to a fast nuclear reactor?

(xii) How did James Chadwick discover neutron? Give reaction and schematics of reaction.

Q3. **Write short answers to any EIGHT parts:**   16

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

(ii) Under what conditions emf of a cell and terminal potential difference become equal?

(iii) What is thermistor? Describe its two uses.

(iv) How many times per second will an incandescent lamp reach maximum brilliance when connected to a 50Hz source?

(v) Differentiate between peak value and peak to peak value.

(vi) Explain power factor.

(vii) Define modulus of elasticity. Show the units of modulus of elasticity and stress are the same. Also discuss its three kinds.

(viii) Write a short note on super-conductors.

(ix) Distinguish between soft magnetic material and hard magnetic material.

(x) The anode of a diode is 0.2V positive with respect to its cathode it forward biased.

(xi) Why is the base current in a transistor very small?

(xii) Write symbol and truth table of exclusive NOR gate.

Q4. **Write short answers to any SIX parts:**   12

(i) Does the induced emf always act to decrease the magnetic flux through a circuit?

(ii) Four unmarked wires emerge from a transformer. What steps would you take to determine the turns ratio?

(iii) Explain the working of electromagnetic induction heater.

(iv) Will bright light eject more electrons from a metal surface than dimmer light of the same colour?

(v) Can pair production take place in vacuum? Explain.

(vi) Find the energy of a photon in joules whose wavelength is 550nm. ($h = 6.63 \times 10^{-34}$Js, $C = 3 \times 10^8$ms^{-1})

(vii) State Stefen-Boltzmann law. Also write its mathematical relation.

(viii) What do we mean when we say that the atom is excited?

(ix) Find the speed of electron in the first Bohr orbit of hydrogen atom.

SECTION - II

Note: Attempt any THREE questions. Each question carries 08 marks.

Q5. (a) State Gauss's law. Applying Gauss's law, find the electric intensity between two oppositely charged parallel plates.   5

(b) A rectangular bar of iron is 2.0cm by 2.0cm in cross section and 40cm long. Calculate its resistance if the resistivity of iorn is 11×10^{-8} Ωm.   3

Q6. (a) What is Lorentz force? Describe how can we determine the e/m ratio of an electron?   5

(b) A solenoid has 250 turns and its self-inductance is 2.4mH. What is the flux through each turn when the current is 2A? What is the induced emf when the current changes at 20A^{-1}?   3

Q7. (a) Discuss the passage of A.C. through series resonance circuit and find the expression for resonance frequency.   5

(b) The current going into the base of a transistor is 100μA. Find the collector current I_C, its emitter current I_E and ratio I_C/I_E if the current gain β is 100.   3

Q8. (a) Define and explain Compton effect. Also discuss the relation between Compton shift and Compton wavelength.   5

(b) The length of a steel wire is 1.0m and its cross sectional area is 0.03×10^{-4}m^2. Calculate the work done in stretching the wire when a force of 100N is applied within the elastic region. Young's modulus of steel is 3.0×10^{11} Nm^{-2}.   3

Q9. (a) Explain population inversion and laser action.   5

(b) A sheet of lead 5.0mm thick reduces the intensity of a beam of γ-rays by a factor. 0.4. Find half value thickness of lead sheet which will reduce the intensity tto half of its initial value.   3