

P-455

PHYSICS Part-II HSSC-12th-Swat-2026 Time: 20 Minutes Marks: 18 Multiple Choice Questions 01 Mark for each	Paper Code ① ② ●	Roll No. of the Student <table border="1" style="width: 100%; height: 40px; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> </tr> </table> Serial No. Of the Answer Book _____						

SECTION-A

1. Attempting all MCQs is compulsory. This paper along with the OMR sheet must be returned to the superintendent after due time.
2. Fill the circle (A) (B) (C) (D), which one is correct with blue or black ball point in separate OMR Sheet like ●
3. If more than one circle in the OMR sheet is filled then no credit will be given to such answer.

- i. The Compton shift in wavelength for photons scattered at an angle of 60° with respect to the incident photons is:

(A) h/mc ● $2h/mc$ (C) $h/2mc$ (D) Zero
- ii. When ultraviolet radiation is incident on a metal surface, no photoelectrons are emitted. If another beam of radiation causes photoelectrons to be emitted from the surface, it may be:

(A) Visible light (B) Infrared light (C) Radio waves ● x-rays
- iii. The shortest wavelength in Balmer series of hydrogen spectrum corresponds to:

(A) $n=1$ (B) $n=2$ (C) $n=3$ ● $n=\infty$
- iv. The sharp peaks observed in an x-ray spectrum is due to the:

(A) Deceleration of electrons by nuclei (B) Collision of electrons with nuclei ● Transitions of electrons in inner shells (D) Heating effect of target anode
- v. A radioactive substance has half-life of 3 minutes. If X is the original amount of substance, the substance left after 12 minutes will be:

(A) $X/2$ (B) $X/4$ (C) $X/8$ ● $X/16$
- vi. The collector is the part of a bipolar junction transistor which is:

(A) Large in size and heavily doped (B) Moderate in size and heavily doped ● Large in size and moderately doped (D) Small in size and lightly doped
- vii. The materials which have filled valence band, empty conduction band and a smaller forbidden energy gap are:

(A) Insulators ● Semiconductors (C) Conductors (D) Superconductors
- viii. The maximum stress a material can withstand under tension without breaking is called:

(A) Elastic limit (B) Proportional limit ● Ultimate tensile strength (D) Breaking stress
- ix. The Young modulus of a material is numerically equal to the applied stress when its length L becomes:

(A) L (B) $1.5L$ ● $2L$ (D) $2.5L$
- x. If the frequency of A.C source in a purely inductive circuit is decreased, the current in the circuit will:

● Increase (B) Decrease (C) Remain constant (D) Stop to flow
- xi. The impedance of an RL series A.C circuit in which $R=8\Omega$ and $X_L=6\Omega$ is:

(A) 14Ω (B) 48Ω ● 10Ω (D) 2Ω
- xii. The iron core used in transformer is laminated to:

(A) Increase the magnetic field (B) Reduce flux loss in air (C) Reduce residual magnetism ● Reduce heating effect of eddy currents
- xiii. A 30cm long wire carrying 5A current placed perpendicularly in a uniform magnetic field of 0.5T will experience magnetic force of:

(A) 0.25N (B) 0.5N ● 0.75N (D) 0.95N
- xiv. If the external resistance is equal to the internal resistance of a cell having e.m.f (E) in a closed circuit, the terminal voltage of the cell is:

(A) Zero (B) E ● $E/2$ (D) 2E
- xv. The particular temperature at which the thermoelectric e.m.f returns to zero is called:

(A) Critical temperature (B) Curie temperature (C) Neutral temperature ● Inversion temperature
- xvi. The rate of change of potential between two points with respect to distance indicates the strength of:

(A) Potential ● Electric field (C) Electric flux (D) Permittivity of medium
- xvii. An electric field is directed towards north. An electron kept in the field will experience an electric force towards:

(A) East (B) West (C) North ● South
- xviii. Two charges placed in air exert electrostatic force F on each other. If they are placed in a medium having dielectric constant 4, the force between them will be:

● Less than F (B) More than F (C) Equal to F (D) Zero

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PHYSICS Part-II

HSSC-12th-Swat-2026

Note: Time allowed for section B and C is 2 hours and 40 minutes.

SECTION "B"

Marks: 40

Attempt any Ten Questions out of the following. Each question carries equal marks.

1. Why does the resistivity of a metallic conductor increase with rise in temperature, whereas the resistivity of a semiconductor decreases with rise in temperature?
2. State Ohm's law and express its mathematical form. Why does the electrical resistance of an Ohmic conductor remain constant?
3. The magnetic flux linked with a coil of 200 turns increases uniformly from zero to 8×10^{-3} Wb in 0.2s. Calculate the magnitude of the induced e.m.f in the coil.
4. Define induced e.m.f. State any three factors that affect the magnitude of the induced e.m.f in a coil.
5. Explain why a magnet falls quickly through a long tube of cardboard but falls more slowly through a long metal tube.
6. Define the following terms associated with magnetic hysteresis:
(i) Retentivity (ii) Residual magnetism (iii) Coercive force (iv) Reluctance
7. Define p-type semiconductor. Why is the number of holes more than the number of electrons in a p-type of semiconductor?
8. Given that the constant α of a transistor is 0.9, calculate the change in collector current corresponding to a change of 0.4 mA in the base current in a common emitter configuration.
9. What is an atomic spectrum? Distinguish line emission spectrum from line absorption spectrum. Why is a line spectrum used for the identification of a substance?
10. Calculate the longest wavelength of the photons emitted in the Balmer series of hydrogen atom. ($R_H = 1.0974 \times 10^7 \text{ m}^{-1}$)
11. Define the following terms associated with nuclear physics.
(i) Radioactivity (ii) Half-life of a radioactive substance
(iii) Nuclear fission chain reaction (iv) Nuclear reactor
12. A radioactive isotope has a decay constant of $1.4 \times 10^{-10} \text{ s}^{-1}$. Calculate the half-life of the sample in seconds.
13. Give the meanings of the following statements.
(i) nuclear decay is a random process (ii) nuclear decay is a spontaneous process

SECTION "C"

Marks: 27

Note: Attempt any Three of the following Questions. Each question carries 9 Marks.

14. (a) Prove that the net electric flux through a closed surface is equal to the total charge enclosed by the surface divided by the permittivity of free space. 5
(b) Calculate the electric field intensity at a distance of 50cm from a point charge of magnitude $100 \mu\text{C}$. 4
15. (a) Derive an expression for the radius (r) of the circular path of a charged particle (q) moving with uniform speed (v) in a uniform magnetic field (B). 5
(b) State the four factors that affect the magnitude of the torque acting on a current carrying coil placed in a uniform magnetic field. 4
16. (a) An alternating voltage V is applied to RL series AC circuit. Draw the phasor diagram of the circuit and show that the impedance of this circuit depends on both the resistance and the inductive reactance. 5
(b) A 10Ω resistor, a 4mH inductance and a $20 \mu\text{F}$ capacitor are connected in series to a 220 V alternating voltage source. Calculate the resonant frequency of the circuit. 4
17. (a) What is de-Broglie hypothesis? Describe the experiment of Davisson and Germer to confirm de-Broglie hypothesis of wave nature of particles. 5
(b) Differentiate between pair production and pair annihilation by an example of each phenomenon. 4