

Preview — sample solved questions (partial)

This preview shows a sample of the solved pack so you can judge its quality. It is NOT the full solved paper.

BISE Lahore — 10th Class Physics — Annual 2024 — Group I (Solved)

Solutions written originally from the Punjab Textbook Board (PTB) Class 10 Physics textbook. Every numerical was solved twice independently; both workings agree. See sources.md for provenance and review notes.

GROUP I — OBJECTIVE (Answer Key with Reasons)

Q.1 The relation between v , f and λ of a wave is:

Answer: (B) $f\lambda = v$ — Wave speed is equal to frequency multiplied by wavelength ($v = f\lambda$).

Q.2 The loudness of a sound is most closely related to its:

Answer: (D) Amplitude — The larger the amplitude of a sound wave, the louder the sound.

Q.3 Image formed by a camera is:

Answer: (A) Real, inverted and diminished — A camera lens forms a real, inverted and smaller image on the film/sensor.

Q.4 Capacitance is defined as:

Answer: (C) Q/V — Capacitance $C = Q/V$, the charge stored per unit potential difference.

Q.5 What happens to the intensity or the brightness of the lamps connected in series as more lamps are added:

Answer: (B) Decreases — Adding lamps in series increases total resistance, current decreases, so each lamp becomes dimmer.

Q.6 The turn ratio of a transformer is 10. It means:

Answer: (C) $N_s = 10N_p$ — Turn ratio = $N_s/N_p = 10$, so the secondary coil has 10 times more turns than the primary.

Q.7 The logical operation performed by this gate is: (figure: an AND-shaped gate with a small circle at its output)

Answer: (A) NAND — An AND gate followed by a NOT (the small circle) gives a NAND gate.

Q.8 From which of the following we can get information almost about everything:

Answer: (D) Internet — The internet is a worldwide network from which information on almost any topic can be obtained.

Q.9 The half-life of a certain isotope is one day. What is the quantity of isotope after two days:

Answer: (B) One-quarter — After day 1 one-half remains; after day 2 one-half of that remains, i.e. one-quarter.

Q.10 Which compound is used for diagnosis of brain tumor:

Answer: (B) I-131 — Radioactive iodine-131 is used as a tracer to locate/diagnose brain tumours (and to check the thyroid gland).

Q.11 Which refers to computer programmes and the manuals that support them:

Answer: (C) Software — By definition, the programmes and their supporting manuals are called software.

Q.12 To make burglar alarm we use:

Answer: (B) OR gate — In a burglar alarm, the alarm rings when any one of the sensor switches is ON, which is the OR operation.

Group I Objective Key: 1-B, 2-D, 3-A, 4-C, 5-B, 6-C, 7-A, 8-D, 9-B, 10-B, 11-C, 12-B

GROUP I — SUBJECTIVE

Part-I — sample

Q.2

(i) Define time period and frequency.

- **Time period:** The time taken by a vibrating body to complete one vibration is called its time period. It is denoted by T and its unit is the second (s).
- **Frequency:** The number of vibrations completed in one second is called frequency. It is denoted by f and its unit is hertz (Hz). Relation: $f = 1/T$.

(ii) If 100 waves pass through a point of a medium in 20 seconds, what is the frequency of the waves? Frequency = number of waves $\div$ time taken $f = 100 \div 20 = 5 \text{ Hz}$ (Check: time for one wave $T = 20/100 = 0.2 \text{ s}$, so $f = 1/0.2 = 5 \text{ Hz}$. ✓)

(iii) Think of several examples of motion in everyday life that are simple harmonic motion. Examples: the swing (jhula) moving to and fro; the pendulum of a wall clock; a mass hanging from a spring moving up and down; the vibrating strings of a guitar; a tuning fork's prongs vibrating.

(iv) Write some uses of capacitors. Capacitors are used: (1) in tuning circuits of radios and

televisions; (2) in ceiling fans and electric motors for starting; (3) in the flash of a camera; (4) in power supplies to smooth/filter current; (5) to store electric charge in electronic circuits.

(v) Write two characteristics of series combination of capacitors.

- The charge on each capacitor is the same, because the same charge flows to each plate in the series path.
- The total potential difference is the sum of the potential differences across each capacitor ($V = V_1 + V_2 + V_3$), and the equivalent capacitance is smaller than the smallest capacitor: $1/C_{eq} = 1/C_1 + 1/C_2 + 1/C_3$.

(vi) What is the difference between fixed capacitor and variable capacitor?

- **Fixed capacitor:** Its capacitance has a fixed value that cannot be changed, because the area of its plates and the distance between them are fixed.
- **Variable capacitor:** Its capacitance can be changed, usually by rotating one set of plates so that the overlapping area changes — for example, while tuning a radio.

(vii) What is the difference between cell and battery?

- **Cell:** A single device that converts chemical energy into electrical energy. It has one pair of electrodes (e.g. a dry cell of 1.5 V).
- **Battery:** A combination of two or more cells joined together to obtain a larger voltage or current (e.g. a car battery of several cells).

(viii) Define resistance and write its unit.

Resistance is the property of a conductor which opposes the flow of electric current through it. It is equal to the ratio of potential difference to current: $R = V/I$. Its SI unit is the **ohm (Ω)**.