

SECTION 'B' (Short-Answer Questions) (25)

NOTE: Attempt any Five part questions from this section. All questions carry equal marks. The use of scientific calculator is allowed. All notations are used in their usual meanings. Draw diagram where necessary.

2. i) Show that coefficient of linear expansion is one-third the coefficient of volume expansion.

ii) How many electrons per second pass through the cross section of a wire carrying a current of 0.7 ampere?

iii) A galvanometer has a resistance of 50Ω and it deflects full scale when a current of 500 micro ampere flows in it. How can it be converted into ammeter of range 15 ampere and voltmeter of range 300 volts?

iv) With the help of diagram give the normal working of npn transistor.

v) Light of wavelength 486.3nm is emitted by a hydrogen atom in Balmer series. What transition of hydrogen atom is responsible for this radiation? ($R_H = 1.097 \times 10^7 \text{ m}^{-1}$)

vi) Sodium surface is shined with light of wavelength $3 \times 10^{-7} \text{ m}$. If the work function of Na is 2.46eV, Find the K.E of the photoelectrons and cut off wavelength

λ_c , $h = 6.63 \times 10^{-34} \text{ J.s}$, $c = 3 \times 10^8 \text{ m/s}$, $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$.

vii) It is more difficult to start a fusion reaction than the fission reaction why?

viii) A proton of mass $1.67 \times 10^{-27} \text{ kg}$ and charge $1.6 \times 10^{-19} \text{ C}$ is to be held motionless between two horizontal parallel plates. The potential difference applied between plates is $1.02 \times 10^{-8} \text{ volts}$. Calculate the distance between plates.

ix) Give the construction and working of Wilson Cloud chamber.

SECTION "C" (Detailed Answer Questions)(18)

NOTE: Attempt any One question from this section. Draw diagrams, where necessary. The use of scientific calculator is allowed. All notations are used in their usual meanings.

3. a) What is Carnot engine? Derive an expression for the efficiency of Carnot engine.

b) What is transformer? On what principle does it work? Derive mathematical relationship between emf and number of turns in the coils.

c) State the basic postulates of the special theory of relativity. Explain the four important results arrived at by Einstein on the basis of this theory.

4 a) What is meant by the capacitance of a capacitor? Derive an expression for the the capacitance of a parallel plate capacitor in the presence of air is dielectric between its plates.

b) What is galvanometer? Prove that current passing through the coil of galvanometer is directly proportional to the angle of deflection of the coil.

c) State the basic postulates of Bohr's theory of atomic structure. Derive an expression for the radius of the nth orbit of a hydrogen atom.

نوٹ: سال 2020 میں گیارہویں اور بارہویں جماعت کے امتحانات نہیں ہوئے تھے۔