

PHYSICS 2021

(AS PER CONDENSED SYLLABUS)

TIME: 2 Hours

(85 Marks)

NOTE:

- i) This section consists of 42 part questions and all are to be answered. Each question carries ONE marks.
- ii) Do not copy the part questions in your answer book. Write only the answer in full against the proper number of the question and its part.

SECTION 'A' (Multiple Choice Questions)(42)

1. Select the correct answer for each from the given options:

(i) The mass of fissionable material needed for self-sustaining chain reaction is called:

- * Atomic mass
- * Sub-critical mass
- * Critical mass ✓
- * Super critical mass

(ii) Transistor is a semi conducting device which has :

- * Two terminals
- * Four terminals
- * Three terminals ✓
- * Five terminals

(iii) In order to increase the number of electrons in photoelectric effect, this should be increased:

- * Intensity of light ✓
- * Work function
- * Threshold frequency
- * Wavelength of light

(iv) The magnitude of drift speed of electron is of the order of:

- * 0.1 m/s
- * 0.01 m/s ✓
- * 0.001 m/s
- * 0.0001 m/s

(v) For an ideal gas at constant temperature, the graph between V and $1/p$ is:

- * Hyperbola
- * Parabola
- * Straight line ✓
- * Circle

(vi) The life time of metastable state is of the order of:

- * 10^{-8} s
- * 10^{-4} s ✓
- * 10^{-3} s
- * 10^{-2} s

(vii) X - rays are produced if heavier atoms are bombarded by:

- * Protons
- * Electrons ✓
- * Neutrons
- * Positrons

(viii) This quantity is called Compton's wavelength:

- * h/m_0c^2
- * hc/m_0
- * h/m_0c ✓
- * $\frac{m_0c}{h}$

(ix) This factor is Lorentz factor:

- * $1 - \frac{v^2}{c^2}$
- * $\sqrt{1 - \frac{v^2}{c^2}}$ ✓
- * $\sqrt{1 - \frac{c^2}{v^2}}$
- * $\sqrt{\frac{v^2}{c^2} - 1}$

(x) Transistor in a circuit is used as:

- * An oscillator
- * A half wave rectifier
- * An amplifier ✓
- * A full wave rectifier

(xi) To convert galvanometer into voltmeter:

- * A high value resistance is connected in series ✓
- * A high value resistance is connected in parallel
- * A low value resistance is connected in series
- * A low value resistance is connected in parallel

(xii) The sensitivity of a galvanometer can be increased by:

- * Increasing magnetic field ✓
- * decreasing of number of turns in the coil
- * making suspension wire thick
- * Decreasing area of coil

(xiii) In step down transformer:

- * $N_s > N_p$
- * $N_s < N_p$ ✓
- * $N_s = N_p$
- * $\frac{N_s}{N_p} = 1$

(xiv) Electrical conductor contains:

- * only free electrons
- * both free bounded electrons ✓
- * only bounded electrons
- * Neither free nor bounded electrons

(xv) The capacitance of a parallel plate capacitor does not depend upon:

- * Area of plates
- * Distance between the plates
- * Nature of plates ✓
- * Medium between the plates

(xvi) The electric field intensity between two similarity charge parallel plates is:

- * $\frac{\sigma}{\epsilon_0}$
- * $\frac{\sigma}{2\epsilon_0}$
- * Zero ✓
- * $\frac{2\sigma}{\epsilon_0}$

(xvii) In amplitude modulation, amplitude of a wave:

- * only increase
- * increases as well as decreases ✓
- * only decrease
- * neither increases nor decreases

(xviii) The quantity of heat required to raise the temperature of unit mass of substance through one degree centigrade is called:

- * Molar specific heat
- * Specific heat ✓
- * Heat capacity
- * Latent heat

(xix) A thermodynamic process in which heat exchange is not allowed is called:

- * Isochoric
- * Isobaric
- * Isothermal
- * Adiabatic ✓

(xx) The atomic number of a radioactive element is increased by the emission of:

- * α - particle
- * positive β particle
- * negative β particle ✓
- * γ - rays

(xxi) A Greiger counter contains:

- * Argon and Alcohol ✓
- * Argon only
- * Alcohol only
- * Water vapours

(xxii) Three capacitors of $3\mu F$ each are connected in series the equivalent capacitance of the circuit is:

- * $1\mu F$ ✓
- * $3\mu F$
- * $6\mu F$
- * $9\mu F$

(xxiii) If the current passing through a wire held in a uniform magnetic field is doubled, the force acting on the wire will become:

- * Half
- * Double ✓
- * Four times
- * Six times

(xxiv) Resistors of 3Ω , 5Ω and 7Ω are connected in parallel. If the P.D across 5Ω resistor is $6V$, the P.D across the 7Ω resistors is:

- * $3V$
- * $6V$ ✓
- * $7V$
- * $8V$

(xxv) The radius of the 1st orbit of hydrogen atom is:

- * 0.53 nm
- * 0.053 nm ✓
- * 0.0053 nm
- * 0.00053 nm

(xxvi) If the temperature of cold body is decreased, the efficiency of Carnot engine will:

- * decrease
- * remain constant
- * increase ✓
- * become zero

(xxvii) Two equal charges each of one coulomb are held $1m$ apart in free space exert a force of magnitude:

- * One Newton
- * $8.85 \times 10^{-12}N$
- * 9×10^9N ✓
- * $6.67 \times 10^{-11}N$

(xxviii) Electrons volt (eV) is a unit of:

- * electric charge
- * energy ✓
- * electric potential
- * voltage

(xxix) The smallest total resistance which can be obtained by the combination of 2Ω and 8Ω resistance is:

- * 1.6Ω ✓
- * 6Ω
- * 10Ω
- * 16Ω

(xxx) tesla (T) is the unit of:

- * potential difference
- * torque
- * energy
- * magnetic flux density ✓

(xxxi) The core of transformer is laminated to reduce the loss

- * Flux leakage
- * copper loss
- * Eddy current
- * hysteresis loss ✓

(xxxii) The mutual induction is the working principle of:

- * A.C generator
- * rectifier
- * transformer ✓
- * dynamo

(xxxiii) It is an active device:

- * resistor
- * capacitor
- * inductor
- * transistor ✓

(xxxiv) This is a motion:

- * rotating
- * vibrating
- * accelerating
- * moving with a uniform velocity ✓

(xxxv) This moves with speed of light:

- * photon ✓
- * proton
- * positron
- * electron

(xxxvi) The minimum energy of a photon required for a pair production is:

- * $1.02keV$
- * $10.2keV$
- * $102keV$
- * $1020keV$ ✓

(xxxvii) A positron is an anti-particle of:

- * proton
- * electron ✓
- * neutron
- * photon

(xxxviii) LASER is produced due to:

- * stimulated emission of radiation ✓
- * stimulated absorption of radiation
- * spontaneous emission of radiation
- * spontaneous absorption of radiation

(xxxix) In radioactive decay law $N = N_0 e^{-\lambda t}$, λ :

- * wavelength
- * decay constant ✓
- * half-life
- * wave number

(xl) The process in which heavy nucleus splits into two lighter nuclei is called:

- * fission ✓
- * fusion
- * mass defect
- * radioactivity

(xli) The track formed in Wilson Cloud Chamber due to beta particles is:

- * a thin and broken line ✓
- * scattered dots
- * at thick and continuous line
- * a thick and broken line

(xlii) Ammeter is used to measure:

- * current ✓
- * resistance
- * potential difference
- * capacitance