

Unit: 1. Electrostatics (25 marks)

1 mark → 4 Questions 5 mark → 1 Question 51
 3 mark → 2 Question 31, 32 10 mark → 1 Question 63

UNIT – I. Electrostatics – 1 mark Questions

- An example of conductor is -----
 a) glass b) **human body**
 c) dry wood d) ebonite [S-08]
- Which of the following is not a dielectric? ----
 a) Ebonite b) Mica
 c) Oil d) **Gold** [J-07]
- The law which govern the forces between the charges is ----
 a) Ampere's law b) Faraday's law
 c) **Coulomb's law** d) Ohm's law (S-07)
- The unit of permittivity is ----- [DPM, M-08, J-08, S-08, J-11, S-12]
 a) $NC^{-2}m^{-2}$ b) NC^2m^{-2}
 c) Hm^{-1} d) **$C^2N^{-1}m^{-2}$**
- The unit of relative permittivity is -----
 a) $C^2N^{-1}m^{-2}$ b) Nm^2C^{-2}
 c) **No unit** d) $NC^{-2}m^{-2}$ [J-12]
- The value of relative permittivity of air is --- [M-12]
 a) $8.854 \times 10^{-12} C^2N^{-1}m^{-2}$ b) $9 \times 10^9 N^{-1}m^{-2}$
 c) **1** d) 8.854×10^{12}
- The permittivity of vacuum ϵ_0 equals ----
 a) $9 \times 10^9 Nm^2C^{-2}$ b) $1 C^2N^{-1}m^{-2}$
 c) $1/9 \times 10^9 C^2N^{-1}m^{-2}$ d) **$1/4\pi \times 9 \times 10^9 C^2N^{-1}m^{-2}$**
- The quantization of electric charge is given ---- [S-08]
 a) **$q = ne$** b) $q = cv$
 c) $q = e/n$ d) $q = c/v$
- The unit of number of electric lines of force passing through a given area is ---- [M-11]
 a) no unit b) NC^{-1}
 c) **Nm^2C^{-1}** d) Nm
- The unit of electric field intensity is ----- [O-06, J-08, M-09]
 a) NC^{-2} b) NC
 c) **Vm^{-1}** d) Vm
- The direction of electric field at a point on the equatorial line due to an electric dipole is -----
 a) along the equatorial line towards the dipole
 b) along the equatorial line away from the dipole
 c) **parallel to the axis of the dipole and opposite to the direction of dipole moment** d) parallel to the axis of the dipole and in the direction of dipole moment [J-07]
- The intensity of electric field at point is equal to ---- [O-10]
 a) the force experienced by a charge q
 b) the workdone in bringing unit positive charge from infinity to that point
 c) the positive potential gradient
 d) **the negative potential gradient**
- The electric field intensity at a short distance r from a uniformly charged infinite plane sheet of charge is – [J-12, S-12]
 a) proportional to r b) proportional to $1/r$
 c) proportional to $1/r^2$ d) **independent of r**
- The electric field intensity at a distance r from an infinitely long uniformly charged straight wire is directly proportional to ---[J-10]
 a) r b) r^2
 c) r^2 d) r^{-2}
- The unit of electric dipole moment is – [S-12]
 a) volt/metre (v/m) b) coulomb/metre (c/m)
 c) volt . metre d) **coulomb . metre**
- An electric dipole is placed in a uniform electric field with its axis parallel to the field. It experiences ----
 a) only a net force b) only torque

- both a net force and torque d) **Neither a net force and a torque** [DPM, M-06, 07, S-07, 08, M-08]
- An electric dipole is placed in a non-uniform electric field with its experiences ----
 a) only a net force b) only torque
 c) **both a net force and torque** d) Neither a net force and a torque
- An electric dipole of moment p is placed in a uniform electric field of intensity E at an angle θ with respect to the field. The direction of torque is ---- [M-10]
 a) along the direction of p b) opposite to the direction of P
 c) along the direction E d) **perpendicular to the plane containing P and E**
- If a point lies at a distance x from the mid-point of the dipole, the electric potential at this point is proportional to --- [M-11]
 a) $1/x^3$ b) $1/x^2$
 c) $1/x^4$ d) $1/x^{3/2}$
- The electric potential energy (U) of two point charges is ----
 a) $\frac{q_1q_2}{4\pi\epsilon_0r^2}$ b) $\frac{q_1q_2}{4\pi\epsilon_0r}$ c) $PE \cos \theta$ d) $PE \sin \theta$ [J-06, J-11]
- The torque (τ) experienced by an electric dipole placed in a uniform electric field (E) at an angle θ with the field is -- [J-09]
 a) $PE \cos \theta$ b) $-PE \cos \theta$
 c) **$PE \sin \theta$** d) $2 PE \sin \theta$
- Electric potential energy of an electric dipole in an electric field is given as --- (M-07)
 a) $pE \sin \theta$ b) $-pE \sin \theta$
 c) $pE \cos \theta$ d) **$-pE \cos \theta$**
- The negative gradient of potential is ---- [J-09]
 a) electric force b) torque
 c) electric current d) **electric field intensity**
- The electric field outside the two oppositely charged plane sheets each of charge density σ is ---- [M-06, S-09, J-11]
 a) σ/ϵ b) $-\sigma/2\epsilon$
 c) $2\sigma/\epsilon$ d) **zero**
- The unit electric flux is ---- [M-06, J-09]
 a) **Nm^2C^{-1}** b) $Nm^{-2}C^{-1}$
 c) Nm^2C d) $Nm^{-2}C$
- Which of the following is a scalar --- [J-06, J-08, M-09, 12, O-11]
 a) electric force b) electric field
 c) dipole d) **electric potential**
- A hollow metallic spherical shell carrying electric charge produce no electric fields at points -----
 a) on the surface of the sphere b) **inside the sphere**
 c) at infinite distance from the centre of the sphere
 d) outside the sphere [J-06, M-10, 12]
- Four charge s +q, +q, -q, and -q respectively are placed at the corners A, B, C, and D of a square of side a. The electric potential at the centre O of the square is ----- [O-06]
 a) $\frac{1}{4\pi\epsilon_0} \frac{q}{a}$ b) $\frac{1}{4\pi\epsilon_0} \frac{2q}{a}$ c) $\frac{1}{4\pi\epsilon_0} \frac{4q}{a}$ d) **ZERO**
- The capacitance of a capacitor is --- [O-10]
 a) directly proportional to charge q given to it
 b) inversely proportional to its potential
 c) directly proportional to charge q and inversely proportional to its potential V
 d) **independent both charge q and potential V**
- When the charge given to the capacitor is doubled, its capacitance ---- [M-12]
 a) increases twice b) decreases twice
 c) increases four times d) **does not change**
- A dielectric medium is placed in an electric field E_0 . The field induced inside the medium is ----
 a) acts in the direction of electric field E_0
 b) **acts opposite to E_0** c) acts perpendicular to E_0
 d) is zero [J-11]

32. A non-polar dielectric is placed in an electric field (E). Its induced dipole moment --- [O-11]
 a) zero b) **acts in the direction of E** c) acts opposite to the direction of E d) acts perpendicular to E
33. A lightning arrestors works on the principle of--- [O-98,O-06]
 a) **corona discharge** b) diffusion of charge
 c) discharge of electricity d) separation of charges

UNIT – I. Electrostatics – 1 mark - numerical

1. The capacitance of a parallel plate capacitor increases from 5 μF to 60 μF when a dielectric is filled between the plates. The dielectric constant of the slab is ----- [J-08,O-10,M-11]
 a) 65 b) 55
 c) **12** d) 10
2. The magnitude of charge acting on a charge of $2 \times 10^{-10} \text{ C}$ placed in a uniform electric field of 10 Vm^{-1} is ----- [M-09]
 a) **$2 \times 10^{-9} \text{ N}$** b) $4 \times 10^{-9} \text{ N}$
 c) $2 \times 10^{-10} \text{ N}$ d) $4 \times 10^{-10} \text{ N}$
3. Intensity electric field produces a force of 10^{-5} N on a charge of 5 μC is ----- [M-11]
 a) $5 \times 10^{-11} \text{ NC}^{-1}$ b) 50 NC^{-1}
 c) **2 NC^{-1}** d) 0.5 NC^{-1}
4. The electric field intensity is 400 V/m at a distance of 2 m from a point charge. it will be 100 V/m at a distance of ---
 a) 50 cm b) 4 cm [M-07,J-12,S-12]
 c) **4 m** d) 1.5 m
5. The number of lines that radiate outwards from one coulomb charge is --- [DPM]
 a) **1.13×10^{11}** b) 8.85×10^{-11}
 c) 9×10^9 d) infinite
6. The number of lines of force emerging from one micro coulomb of charge is ----- [S-07]
 a) **1.129×10^5** b) 1.6×10^{-19}
 c) 6.25×10^{-18} d) 8.85×10^{-12}
7. The ratio of electric potentials at points 10 cm and 20 cm from the centre of an electric dipole along its axial line is ----- [J-10]
 a) 1:2 b) 2:1
 c) 1:4 d) **4:1**
8. Torque on a dipole in a uniform electric field is maximum when the angle between P and E is ----- [J-06,S-09]
 a) 0° b) **90°**
 c) 45° d) 180°
9. The potential energy of two equal point charges of magnitude 2 μC placed 1 m apart in air is --- [J-06]
 a) 2 J b) 0.36 J
 c) 4 J d) **0.036 J**
10. On moving a charge of 20 C by 2 cm, 2J of work is done, then the potential difference between the points is -----
 a) 0.5 V b) **0.1 V**
 c) 8 V d) 2 V
11. The work done in moving 4 μC charges from one point to another in an electric field is 0.012J. The potential difference between them is --- [M-06]
 a) **3000 V** b) 6000 V
 c) 30 V d) $48 \times 10^3 \text{ V}$
12. The workdone in moving 500 μC charge between two points on equipotential surface is – [J-07, M-08,M-10,J-10,O-11,M-12,J-12]
 a) **zero** b) finite +ve
 c) finite –ve d) infinite
13. When a point charge of 6 μC is moved between two points in an electric field, workdone is $1.8 \times 10^5 \text{ V}$. The potential difference between the two points is --- (S-09)
 a) 1.08 V b) 1.08 μV
 c) **3 V** d) 30 V

14. When an electric dipole of dipole moment P is aligned parallel to the electric field E then the potential energy of the dipole is given as ----- [J-08]
 a) PE b) zero
 c) **-PE** d) PE /2

15. A capacitor of capacitance 6 μF is connected to a 100 V battery. The energy stored in the capacitor is ---[M-08]
 a) 30 J b) 3 J
 c) **0.03 J** d) 0.06 J

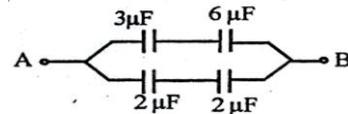
16. The effective capacitance of two capacitors connected in series is 1.5 μF . If the capacitance of one capacitor is 4 μF , then the capacitance of the other is --- [S-07,09]
 a) **2.4 μF** b) 0.24 μF
 c) 0.417 μF d) 4.17 μF

17. The capacitance of a parallel plate capacitor increases from 5 μF to 50 μF when a dielectric is filled between the plates. The permittivity of dielectric is ---- [J-09]
 a) **$8.854 \times 10^{-12} \text{ C}^2\text{N}^{-1}\text{m}^{-2}$** b) $8.854 \times 10^{-11} \text{ C}^2\text{N}^{-1}\text{m}^{-2}$
 c) 12 d) 10

18. Three capacitances 1 μF , 2 μF and 3 μF are connected in series. The effective capacitance of the capacitors is -- [M-10]
 a) 6 μF b) 11/6 μF
 c) **5/11 μF** d) 1/6 μF

19. n capacitors of capacitance C connected in series. The effective capacitance is ---- [O-12]
 a) n/C b) **C/n**
 c) nC d) C

20. In the given circuit, the effective capacitance between A and B will be ----- [J-07]



- a) 3 μF b) 36/13 μF
 c) 13 μF d) 7 μF

Unit: 2. Current Electricity (20 marks)

- 1 mark → 1 Question 5 mark → 1 Question **52,53**
 3 mark → 1 Questions **33, 34,35,** 10 mark → **No Ten mark Qtn**

UNIT – 2. Current Electricity - 1 mark Questions

1. The relation between current and drift velocity is ----[O-10]
 a) $I = nAV_d/e$ b) **$I = nAV_d e$**
 c) $I = neV_d/A$ d) $I = nAV_d E$
2. In case of insulators, as the temperature decreases, resistivity
 a) **increases** b) decreases [DPM,,M-08, M-09]
 c) becomes zero d) remains constant
3. The unit of conductivity is ----- [J-07]
 a) mho b) ohm
 c) ohm-m d) **mho-m⁻¹**
4. The transition temperature of mercury is ---- [J-09]
 a) 4.2°C b) **4.2 K**
 c) 2.4°C d) 2.4 K

UNIT – 2. Current Electricity – 1 mark Problems

1. If the length of copper wire has certain resistance R, then on doubling the length its specific resistance -----
 a) will be doubled b) will be 1/2th
 c) will be four times d) **will remain the same** [DMP,S-09,M-10,M-11,O-11]
2. When the diameter of a conductor is doubled, its resistance -
 a) decreases twice b) **decreases four times**
 c) decreases sixteen times d) increases four times [M-12]
3. Resistance of a metal wire of length 10 cm is 2 Ω . If the wire stretched uniformly to 50 cm, the resistance is ---- [M-06]
 a) 25 Ω b) 10 Ω
 c) 5 Ω d) **50 Ω**

- When two $2\ \Omega$ resistances are connected in parallel their effective resistance is ----- [J-11]
 - $2\ \Omega$
 - $4\ \Omega$
 - $1\ \Omega$**
 - $0.5\ \Omega$
- The color code of carbon resistor is red-red-black. The resistance of the resistor is – [J-06]
 - $2.2\ \Omega$
 - $22\ \Omega$**
 - $220\ \Omega$
 - $2.2\ \text{k}\ \Omega$
- The brown ring at one end of a carbon resistor indicates a tolerance of --- [M-07]
 - 1%**
 - 2%
 - 5%
 - 10%
- The resistance of the filament of a $110\ \text{W}$, $220\ \text{V}$ electric bulb is
 - $440\ \Omega$**
 - $220\ \Omega$ [M-09]
 - $484\ \Omega$
 - $848\ \Omega$
- A toaster operating at $240\ \text{V}$ has a resistance of $120\ \Omega$. The power is --- [J-10]
 - $400\ \text{W}$
 - $2\ \text{W}$
 - $480\ \text{W}$**
 - $240\ \text{W}$
- A cell of emf $2.2\ \text{V}$ sends a current of $0.2\ \text{A}$ through a resistance of $10\ \Omega$. The internal resistance of the cell is -
 - $0.1\ \Omega$
 - $1\ \Omega$**
 - $2\ \Omega$
 - $1.33\ \Omega$ [J-12]
- When n resistors of equal resistance (R) are connected in series the effective resistance is ---- [S-12]
 - n/R
 - R/n
 - $1/nR$
 - nR**

Unit: 3. Effects of Electricity (20 marks)

1 mark → 2 Questions 5 mark → 1 Question 54
 3 mark → 1 Question 36 10 mark → 1 Question 64

UNIT – 3. Effects of Electricity – 1 mark Questions

- Joule's law of heating is -- [M-08]
 - $H = I^2t/R$
 - $H = V^2Rt$
 - $H = IR^2t$**
 - $H = VIt$
- In the experiment to verify Joule's law when the current passed through the circuit is doubled keeping resistance (R) constant and time of passage of current (t) constant, the temperature of the liquid is ----
 - increases twice
 - increases four times
 - increase sixteen times.
 - decreases four times** [S-12]
- Nichrome is used as heating element, because -----
 - low resistance
 - low melting point (J-06, J-08, M-12, S-12)
 - high specific resistance**
 - high conductivity
- Peltier effect is the converse of ----- [M-07]
 - Joule effect
 - Raman effect
 - Thomson effect
 - Seebeck effect**
- Peltier coefficient of a junction of a thermocouple depends on
 - the current in the thermocouple
 - the time for which current flows
 - the temperature of the junction**
 - the charge that passes through the thermocouple [J-09, J-12]
- Unit of peltier coefficient is ---- [S-09]
 - ohm
 - mho
 - volt**
 - ampere
- For a given thermocouple the neutral temperature --[J-09, O-10]
 - depends upon the temperature of cold junction
 - depends upon the temperature
 - the temperature of junction**
 - the charge that passes through the thermocouple .
- In which of the following pairs of metals of a thermocouple the e.m.f is maximum? --- [J-07]
 - Fe –Cu
 - Cu – Zn
 - Pt – Ag
 - Sb - Bi**
- Fuse wire is an alloy of --- [M-08]
 - Lead & Tin**
 - Tin and copper

- Lead and copper
 - Lead and Iron
- Fuse wire --- [S-11]
 - is an alloy of lead and copper
 - has low resistance
 - has high resistance**
 - has high melting point
 - Thermopile is used to ----- [S-08]
 - measure temperature
 - measure current
 - detect thermal radiation**
 - measure pressure
 - Which of the following principles used in a thermopile ----
 - Thomson effect
 - Peltier effect
 - Seebeck effect**
 - Joule's effect [S-07]
 - The magnitude and direction of the magnetic Lorentz force is given by --- [J-09]
 - $F = (v \times B)$
 - $F = q/(v \times B)$
 - $F = q(v \times B)$**
 - $F = V (v \times B)$
 - When the number of turns (n) in a galvanometer is doubled, current sensitivity ---- [O-10]
 - remains constant
 - decreases twice
 - increases twice**
 - increases four times
 - The unit of reduction factor of tangent galvanometer is ----
 - no unit
 - tesla
 - ampere**
 - ampere/degree [M-06]
 - An ideal voltmeter has --- [S-07, J-10, J-11]
 - infinite resistance
 - finite resistance between zero & G
 - resistance greater than G but less than infinity
 - an infinite resistance**
 - The galvanometer can be converted into voltmeter by connecting -
 - low resistance in series
 - high resistance in parallel
 - high resistance in series**
 - low resistance in parallel
 - Phosphor bronze wire is used for suspension in moving coil galvanometer, because it has ---- [S-09]
 - high conductivity
 - high resistivity
 - large couple per unit twist
 - small couple per unit twist**
 - Which of the following equations represents Biot-Savart law --
 - $d\vec{B} = \frac{\mu_0 Idl}{4\pi r^2}$
 - $d\vec{B} = \frac{\mu_0 Idl \sin \theta}{4\pi r^2}$
 - $d\vec{B} = \frac{\mu_0 Idl \times r}{4\pi r^2}$
 - $\frac{\mu_0 Idl \times r}{4\pi r^3}$ [M-10]
 - Magnetic induction at a distance a from an infinitely long straight conductor carrying current i and placed in a medium of permeability μ is ---- [J-11]
 - $\frac{\mu_0 I}{4\pi a}$
 - $\frac{\mu_0 I}{2\pi a}$
 - $\frac{\mu I}{4\pi a}$
 - $\frac{\mu I}{2\pi a}$**
 - The torque experienced by a rectangular current loop placed perpendicular to a uniform magnetic field is ---- [M-07]
 - maximum
 - zero**
 - finite minimum
 - infinity
 - The period of charged particle inside a cyclotron does not depend on ---- [M-11]
 - the magnetic induction
 - the charge of the particle
 - the velocity of the particle**
 - the mass of the particle

UNIT – 3. Effects of Electricity – 1 mark Problems

- Which of the following produces large joule heating effect ----
 - 1 A current through $2\ \Omega$ resistor for 3 second
 - 1 A current through $3\ \Omega$ resistor for 2 second
 - 2 A current through $1\ \Omega$ resistor for 2 second
 - 3 A current through $1\ \Omega$ resistor for 1 second** [M-12]
- In a thermocouple, the temperature of the cold junction is 0°C , the temperature of inversion is 520°C . The neutral temperature is ---- [DPM]
 - 500°C
 - 270°C**
 - 54°C
 - 510°C
- In a thermocouple, the temperature of the cold junction is 20°C , and the neutral temperature is 270°C . Then the temperature inversion is ----
 - 520°C**
 - 540°C

- c) 500°C d) 510°C [J-08,S-08,M-10]
4. In a thermocouple, the temperature of the cold junction is -30°C , and the neutral temperature is 270°C . Then the temperature inversion is - [S-11]
 a) 520°C b) 540°C
 c) 500°C d) **570°C**
5. In a thermocouple, the temperature of the cold junction is 20°C , the temperature of inversion is 600°C , then the neutral temperature is - [S-06]
 a) **310°C** b) 320°C
 c) 300°C d) 315°C
6. Of the following which has small resistance? [J-06,M-09,J-12]
 a) voltmeter b) ammeter of range $0 - 10 \text{ A}$
 c) moving coil galvanometer d) **ammeter of range $0 - 10 \text{ A}$**
7. In a TG, for a constant current the deflection is 30° . The plane of the coil is rotated through 90° . Now for the same current, the deflection will be ----- [DPM,J-07]
 a) **0°** b) 30°
 c) 60° d) 90°
8. In a TG a current 1 A , produces a deflection of 30° . The current required to produce a deflection of 60° is --- [O-06]
 a) **3 A** b) 2 A
 c) $\sqrt{3} \text{ A}$ d) $1/\sqrt{3} \text{ A}$
9. An electron is moving with a velocity of $3 \times 10^6 \text{ m/s}$ perpendicular to a magnetic field of induction 0.5 T . The force experienced by the electron is ---- [M-11]
 a) **$2.4 \times 10^{-13} \text{ N}$** b) $13.6 \times 10^{-27} \text{ N}$
 c) $13.6 \times 10^{-11} \text{ N}$ d) zero

Unit: 4. EMI & AC (25 marks)

1 mark → 4 Questions 5 mark → 1 Question 55
 3 mark → 2 Questions 37, 38 10 mark → 1 Question 65

UNIT – 4. EMI & AC – 1 mark Questions

1. The angle between A and plane area of the coil is ----
 a) π b) **$\pi/2$** [M-06, J-09]
 c) 2π d) 0°
2. Electromagnetic induction is not used in ----
 a) iron box b) **room heater**
 c) transformer d) thermopile
 [DPM,M-06,J-07,M-08,J-09]
3. EMI is not used in --- [S-08, J-09,M-12,J-12]
 a) transformer b) **room heater**
 c) AC generator d) choke coil
4. Lenz's law is in accordance with the law of ----
 a) **conservation of energy** b) conservation of charge
 c) conservation of momentum d) conservation of angular momentum
 [M-07,M-08,11,12,J-12]
5. The unit of henry can also be written as -----
 a) V A s^{-1} b) Wb A
 c) $\Omega \text{ s}$ d) **all of these** [DPM, J-06,J-11,M-12]
6. The generator rule is ---- [O-06, J-07]
 a) **FRHR** b) **FRHR**
 c) Maxwell's cork screw rule d) right hand palm rule
7. Transformer works on ---- [M-07,S-07,J-10,M-11]
 a) both AC and DC b) AC more effectively than DC
 c) **AC only** d) DC only
8. In a transformer, eddy current loss can be minimized by using
 a) laminated core made of Mumetal b) **laminated core made of stelloy**
 c) shell tupe core d) thick copper wires [M-08]
9. The co-efficient of self induction of a solenoid is independent of ---- [S-12]
 a) the number of turns of solenoid b) **area of the cross section of the solenoid**
 c) the length of solenoid d) the current passing through the coil.

10. Which of the following cannot be stepped up in a transformer? ---- J-08,S-09
 a) **input current** b) input voltage
 c) **input power** d) all of these
11. The power loss is less in transmission line when ----- [O-06]
 a) voltage is less but current is more b) both voltage and current are more
 c) **voltage is more but current is less**
 d) both voltage and current are less
12. self inductance of a straight conductor is ----
 a) **zero** b) infinity c) very large d) very small
 [M-07,M-09,J-10,O-11,J-12]
13. Which of the following devices does not allow d.c to pass through ---- [DPM, J-09, M-10,O-10,J-11,O-11,M-12]
 a) **capacitor** b) inductor
 c) resistor d) all the above
14. In a three phase AC generator the three coils are fastened rigidly together and are displaced from each other by an angle --- a) 90°
 b) 180° c) **120°** d) 360° [S-08]
15. The effective value of alternating current is ---
 a) $I_0/2$ b) **$I_0/\sqrt{2}$** c) $I_0/2$ d) $2I_0$ [J-10]
16. A rectangular coil is uniformly rotated in a uniform magnetic field such that the axis of rotation is perpendicular to the direction of the magnetic field. When the plane of the coil is perpendicular to the magnetic field ---- [O-10]
 a) (i) magnetic flux is zero (ii) induced emf is zero
 b) (i) magnetic flux is maximum (ii) induced emf is maximum
 c) **(i) magnetic flux is maximum (ii) induced emf is zero**
 d) (i) magnetic flux is zero (ii) induced emf is maximum
17. In an A.C circuit ---- [M-09]
 a) **the average value of current is zero**
 b) the average value of square of current is zero
 c) the average power dissipation is zero
 d) the rms current is $\sqrt{2}$ times of peak current
18. In a.c circuit with an inductor -- [J-06]
 a) voltage lags the current by $\pi/2$ b) voltage leads the current by $\pi/2$
 c) voltage and current are in phase d) **current lags the voltage by $\pi/2$**
19. In a.c circuit voltage leads the current by a phase of $\pi/2$, then the circuit has ---- [M-11]
 a) **only an inductor (L)** b) only a capacitor (C)
 c) Only resistor (R) d) L, C and R in series
20. In an A.C circuit the applied emf $I = I_0 \sin(\omega t - \pi/2)$ lags behind the emf $e = E_0 \sin(\omega t + \pi/2)$ by ---- [O-06]
 a) 0 b) $\pi/4$
 c) $\pi/2$ d) **π**
21. In an A.C circuit the applied emf $e = E_0 \sin(\omega t + \pi/2)$ leads the current $I = I_0 \sin(\omega t - \pi/2)$ by ---- [DMP]
 a) $\pi/2$ b) $\pi/4$
 c) **π** d) 0
22. In LCR circuit when $X_L = X_C$, the current ----- [M-07]
 a) is zero b) **is in phase with the voltage**
 c) leads the voltage d) lags behind the voltage
23. In LCR series circuit at resonance --- [S-09,10]
 a) impedance (Z) is maximum b) current is minimum
 c) **impedance (Z) is equal to R** d) $\gamma_0 = 1/\sqrt{LC}$
24. In RLC circuit, at resonance ----- [S-08,10]
 a) current is minimum b) **impedance is maximum**
 c) circuit is purely inductive d) **current is in phase with the voltage**
25. In a series LCR circuit, at resonance ----- [S-10]
 a) **$X_L = X_C$** b) $X_L > X_C$
 c) $X_L < X_C$ d) $\omega = \frac{1}{LC}$
26. The resonant frequency of RLC circuit is γ_0 . The inductance is doubled. The capacitance also doubled. Now the resonant frequency of the circuit is ----- [J-11]

- a) $2\gamma_0$
 c) $\gamma_0/4$
27. When the frequency of AC increases, the capacitive reactance offered by capacitor connected in the circuit -----
 a) increases
 c) remains the same
28. In an AC circuit with capacitor only, if the frequency of the signal is zero, then the capacitive reactance is ----- [J-07]
 a) **infinity**
 c) finite maximum
29. The Q- factor of an a.c circuit containing a resistance R, inductance L, and capacitor C is ----- [J-08, M-09]
 a) $Q = 1/\sqrt{LC}$
 c) $1/R \times \sqrt{C/L}$
30. For a D.C circuit the value of capacitive reactance is -----
 a) zero
 c) $\pi/2$
31. The part of the A.C generator that passes the current from the coil to the external circuit is ----- [M-10,S-12]
 a) field magnet
 c) slip-rings
32. The core used in audio frequency choke is ---- [S-07,09]
 a) **iron**
 c) lead
33. The average power consumed over one cycle in an A.C circuit is --- [M-06]
 a) $E_{rms} I_{rms}$
 c) $E_{rms} I_{rms} \sin\phi$

UNIT – 4. EMI & AC – 1 mark Problems

1. If the flux associated with a coil varies at the rate of 1wb/minute then the induced emf is ----- [M-06]
 a) 1V
 c) 60V
2. An emf of 12 V is induced when the current in the coil changes at the rate of 40 As⁻¹. The coefficient of self-induction of the coil is ---- [S-09,10,M-11]
 a) **0.3 H**
 c) 30 H
3. An emf 12 V is induced when the current in the coil changes from 2 A to 6A in 0.5 s. The coefficient of self-induction of the coil is ---- [J-06]
 a) **1.5 H**
 c) 0.3H
4. RMS value of AC flowing through a resistor is 5 A. Its peak value is ---- [M-10]
 a) 3.536 A
 c) **7.07 A**
5. The rms value of a voltage with peak value 311 V is -- [M-12]
 a) **220 V**
 c) 180 V
6. The rms value of an AC voltage with a peak value of 311 V --
 a) 110
 c) 50
 b) **220 V**
 d) 70.7 V [S-07]
7. A DC of 5A produces the same heating effect as an AC of ----
 a) 50 A rms current
 c) **5 A rms current**
 b) 5 A peak current
 d) $5\sqrt{2}$ peak current [S-08,M-09,S-12]
8. A DC of 5A produces the same heating effect as an AC of ----
 a) 50 A rms current
 c) 15 A rms current
 b) 5 A peak current
 d) **none of these** [M-09]
9. In a step up transformer, the input voltage is 220 V and the output voltage is 11 kV. The ratio of number of turns of primary to secondary is --- [O-06,J-07]
 a) 50 : 1
 c) 25 : 1
 b) **1 : 50**
 d) 1 : 25

10. A power of 11,0000 W is transmitted at 220 V. The current through the line wire is --- [M-08]
 a) **50 A**
 c) 500 A
11. The area of a coil of cross section 0.5 m² with 10 turns is in a plane which is perpendicular to a uniform magnetic field of 0.2 wb/m². The magnetic flux through the coil is --[J-09, M-10]
 a) 100 Wb
 c) **1 Wb**
 b) 5 A
 d) 0.5 A
12. Reactance offered by 300 mH inductor to an AC supply of frequency 50 Hz is --- [S-07]
 a) 1046 Ω
 c) 9420 Ω
 b) **94.2 Ω**
 d) 104.6 Ω
13. In LCR series a.c circuit, the phase difference between current and voltage is 30°. The reactance of the circuit is 17.32 Ω . The value of resistance is ---
 a) **30 Ω**
 c) 17.32 Ω
 b) 10 Ω
 d) $17.32\sqrt{3}\Omega$
14. In an AC circuit average power consumed is 200 W and the apparent power is 300 W. The power factor is ----[J-10]
 a) 1.5
 c) .033
 b) **0.66**
 d) 1

Unit: 5. EMW & WO (25 marks)

1 mark → 4 Questions 5 mark → 1 Question 56
 3 mark → 2 Questions 39, 40 10 mark → 1 Question 66

UNIT – 5. EMW & WO – 1 mark Questions

1. In an electromagnetic wave the phase difference between electric field E and magnetic field B is --
 a) $\pi/4$
 c) π
 b) $\pi/2$
 d) **0°** [DMP, J-06,S-08,M-09,J-10,M-11]
2. In an electromagnetic wave ---- [J-09,S-12]
 a) **power is equally transferred along the electric and magnetic fields**
 b) power is transmitted in a direction perpendicular to both the fields
 c) power is transmitted along the electric field
 d) power is transmitted along the magnetic field
3. Electromagnetic waves are ---- [S-09,10,J-11]
 a) **transverse**
 c) longitudinal
 b) may be longitudinal or transverse
 d) neither longitudinal nor transverse
4. The existence of emw was confirmed experimentally by ----
 a) **Hertz**
 c) Huygens
 b) Maxwell
 d) Planck [M-06, O-11]
5. Which of the following is used to study crystal structure ----
 a) microwave
 c) ultraviolet rays
 b) **infrared rays**
 d) **X-rays** [S-12]
6. Which one of the following is not an electromagnetic wave? --
 a) X-rays
 c) U-V rays
 b) **γ -rays**
 d) **β -rays** [O-06]
7. Which of the following gives rise to continuous emission spectrum? ---- [M-08]
 a) **electric filament lamp**
 c) gases in discharge tube
 b) sodium vapour lamp
 d) calcium salt in Bunsen burner
8. The velocity of light in vacuum is ----- [J-06]
 a) $\sqrt{\mu_0\epsilon_0}$
 c) $\sqrt{\mu_0/\epsilon_0}$
 b) **$1/\sqrt{\mu_0\epsilon_0}$**
 d) $\sqrt{\epsilon_0/\mu_0}$
9. The wavelength of D₁ and D₂ lines emitted by sodium vapour lamp is --- [M-06]
 a) **589.96 nm, 589 nm**
 c) 589.3 nm, 589 nm
 b) 589 nm, 589.6 nm
 d) 589 nm, 589.3 nm
10. If C is velocity of light in vacuum, the velocity in a medium with refractive index μ is – [O-06]
 a) μC
 c) μ/C
 b) **C/μ**
 d) $1/\mu C$

11. Of the following, which one is uniaxial crystal? -----[O-06]
 a) mica b) Aragonite
 c) Topaz d) **Quartz**
12. Atomic spectrum should be ----- [M-07,S-09,J-12,S-12]
 a) **pure line spectrum** b) emission band spectrum
 c) absorption line spectrum d) absorption band spectrum
13. Waves from two coherent sources interfere with each other. At a point where the trough of one wave superposes with the trough of the other wave, the intensity of light is ----[M-11]
 a) **maximum** b) minimum
 c) zero d) no change
14. Radiations used in physiotherapy are -----[M-07]
 a) ultraviolet b) **infra**
 c) radiowave d) microwaves
15. Electric filament give rise to ----- [J-07]
 a) line spectrum b) **continuous spectrum**
 c) band spectrum d) line absorption spectrum
16. Dark lines in solar spectrum is called ---- [O-10]
 a) Raman line b) **Fraunhofer lines**
 c) Stoke's line d) Anti-stokes line
17. In Raman effect, the spectral line with lower frequency than the incident frequency is [S-07]
 a) Fraunhofer line b) Rayleigh line
 c) **Stoke's line** d) anti-stoke's line
18. In Raman effect, if the scattered photon gains energy, it gives rise to ---- [S-08]
 a) Stoke's line b) **anti-Stokes line**
 c) Stoke's and anti-Stokes' line d) Rayleigh's line
19. In Raman effect, the incident photon makes collision with an excited molecule of the substance. The scattered photon gives rise to ---- [M-10]
 a) Stoke's line b) **anti-stoke's line**
 c) Rayleigh line d) Zeeman line
20. In Young's double slit experiment, the separation between the slits is halved, and the distance between the slits and the screen is doubled. Then the fringe width is ----- [J-07]
 a) unchanged b) halved
 c) doubled d) **quadrupled**
21. Soap bubbles exhibit brilliant colors in sunlight due to ----
 a) scattering of light b) diffraction of light
 c) polarization of light d) **interference of light** [M-09]
22. When a drop of water is introduced between the glass plate and plano convex lens in Newton's ring system, the ring system ----- [M-06,J-07,10,11,J-12]
 a) **contracts** b) expands
 c) remains same d) first expands, then contracts
23. The phenomenon of light used in the formation of Newton's rings is ----- [S-07]
 a) diffraction b) **interference**
 c) refraction d) polarization
24. The radii of Newton's dark rings are in the ratio -----[M-09]
 a) 1:2:3 b) $\sqrt{1}:\sqrt{2}:\sqrt{3}$
 c) **$\sqrt{1}:\sqrt{3}:\sqrt{5}$** d) 1:4:9
25. A diffraction pattern is obtained using a beam of red light. What happens if the red light is replaced by blue light? ---- [J-07,J-08,M-11,O-11,M-12]
 a) Bands disappear b) No change c) **Diffraction pattern becomes narrower and crowded together**
 d) Diffraction pattern becomes broader and farther apart
26. In plane transmission grating, the unit of grating element is ---
 a) no unit b) **metre**
 c) metre⁻¹ d) degree [J-06]
27. In the grating formula $\sin\theta = Nm\lambda$, the unit of N is ---
 a) metre b) **metre⁻¹**
 c) no unit d) (metre)² [J-09,10]

28. The transverse nature of light is demonstrated by the phenomenon of ---
 a) interference b) diffraction
 c) **polarization** d) reflection [M-08,J-10]
29. Unpolarised light passes through a tourmaline crystal. The emergent light is analyzed by an analyser. When the analyser is rotated through 90°, the intensity of light--- [M-06]
 a) remains uniformly bright b) remains uniformly dark
 c) varies between maximum and minimum
 d) **varies between maximum and zero.**
30. In case of fraunhofer diffraction, the wavefront undergoing diffraction is ---
 a) spherical wavefront b) cylindrical wavefront
 c) elliptical wavefront d) **plane wavefront** [S-08]
31. An example of uniaxial crystal is -----
 a) selenite b) mica
 c) topaz d) **calcite** [O-11]
32. Which of the following is not an optically active material? -----
 a) Quartz b) **sugar crystals**
 c) turpentine oil d) **calcium chloride** [S-09]
33. An example of uniaxial crystal is -----[S-07]
 a) **tourmaline** b) mica
 c) topaz d) selenite
34. Of the following, which one is biaxial ----- [DPM]
 a) tourmaline b) ice
 c) calcite d) **mica**
35. A ray of light travelling in a rarer medium and reflected at the surface of denser medium automatically undergoes -
 a) a phase change of $\pi/2$ b) a phase change of 2π
 c) path difference of λ d) **path difference of $\lambda/2$** [O-10]
36. The nature of wavefront corresponding to extraordinary ray inside a calcite crystal is [J-11]
 a) plane b) spherical
 c) **elliptical** d) cylindrical
37. A nicol prism is based on the principle of ----- [DPM]
 a) refraction b) reflection
 c) double refraction d) **diffraction**
38. In nicol prism, the ordinary ray is prevented from coming out of Canada balsam by the phenomenon of ----- [J-12]
 a) reflection b) **polarization**
 c) diffraction d) total internal reflection
39. The optical rotation does not depend on ---- [S-07]
 a) concentration of the solution b) frequency of the light used
 c) **the temperature of the solution**
 d) **intensity of the light used**
40. Of the following, optically active material is -----
 a) **sodium chloride** b) calcium chloride
 c) sodium d) chlorine [M-07]

UNIT – 5. EAW & WO – 1 mark Problems

1. If the wavelength of light is reduced to one fourth, then the amount of scattering will – [DPM,J-09M-10]
 a) increased by 16 times b) decrease by 16 times
 c) **increased by 256 times** d) decrease by 256 times
2. A ray of light passes from a denser medium into a rarer medium. For an angle of incidence of 45°, the refracted ray grazes the surface of separation of the two media. The refractive index of the denser medium is ----- [O-06]
 a) 3/2 b) 1/√2
 c) **√2** d) 2
3. If the velocity of light in a medium is 2.25×10^8 m/s, then the refractive index of the medium will be ----- [J-08]
 a) 1.6 b) 0.5
 c) **1.33** d) 1.73
4. The refractive index of glass is 1.5. The taken for light to pass through glass plat of thickness 10 cm is ---- [M-11]
 a) 2×10^{-8} s b) 2×10^{-10} s

- a) 3s
c) **3d**
17. In Sommer field atom model, for a given value of n, the number of values l can take is
a) n
c) **n - 1**
18. If 'a' and 'b' are semi-major and semi-minor axes of the ellipse respectively and 'l' is the orbital quantum number, then the expression to find the possible elliptical orbits is ---- [M-07]
a) **$b/a = (l+1)/n$**
c) $a/b = (l+1)/n$
19. When an electron jumps from M shell to K shell it gives -----
a) K_{α}
c) L_{α}
20. When an electric field is applied to an atom each of the spectral lines split into several lines. This effect is known as --
a) Zeeman effect
c) Raman effect
21. In hydrogen atom which of the following transitions produces maximum wavelength [M-08,m-12]
a) $2 \rightarrow 1$
c) **$6 \rightarrow 5$**
22. In hydrogen atom which of the following transitions produces maximum frequency --
a) **$2 \rightarrow 1$**
c) $4 \rightarrow 3$
23. In an X-ray tube, the intensity of emitted X-ray beam is increased by ----
a) **increasing the filament current**
c) increasing the target potential
24. X-ray is ----- [M-07, J-09,M-10,J-11,12]
a) **phenomenon of conversion of kinetic energy into radiation**
c) conversion of mass into energy
25. The energy of Photon of characteristic X-ray from a Coolidge tube comes from ----
a) the KE of the free electrons of the target
c) the KE of the striking electron
26. The value of stopping potential when the frequency of light is equal to the threshold frequency is ----- [M-06]
a) maximum
c) minimum
27. The ionization potential of Hydrogen atom is ---- [M-09]
a) **13.6 eV**
c) 13.6 V
28. The first excitation potential energy or the minimum energy require to excite the atom from the ground state of hydrogen atom is ----
a) 13.6 eV
c) 3.4 eV
29. At the threshold frequency, the velocity of electrons is -----
a) **zero**
c) maximum
30. chromium ions doped in the ruby rod ----- [M-06,J-06,10,S-08,M-09,10,M-12]
a) absorbs red light
c) **absorbs green light**
31. In holography, which of the following is (are) recorded on the photographic film? ---- [O-06,S-09,J-11, J-07,12,S-12]
a) frequency and amplitude
c) **phase and amplitude**
32. A 3D image of an object can be formed by ----- [S-08]
a) atomic spectrography
b) **holography**

- b) 3p [M-10]
d) None of these
33. Maser materials are ---- [J-08]
a) diamagnetic ions
c) ferromagnetic ions
34. If γ is the frequency of characteristic X-ray line emitted by a target element of atomic number Z, then Mosley's law is ----
a) $\gamma \propto Z$
c) $\gamma \propto \sqrt{Z}$
35. Arrange the spectral lines H_{α} , H_{β} , H_{γ} , H_{δ} in the increasing order of their wavelength:--- [J-12]
a) H_{α} , H_{β} , H_{γ} , H_{δ}
c) H_{β} , H_{α} , H_{δ} , H_{γ}
- b) **paramagnetic ions**
d) non-magnetic ions
- b) **$\gamma \propto Z^2$**
d) $\gamma \propto Z^3$ [O-11]
- b) **H_{δ} , H_{γ} , H_{β} , H_{α}**
d) H_{α} , H_{β} , H_{δ} , H_{γ}

UNIT - 6. Atomic Physics - 1 mark Problems

1. A narrow electron beam passes undeviated through an electric field E of 3×10^4 V/m and an overlapping magnetic field of 2×10^{-3} Wb/m². The electron motion, electric field and magnetic field are mutually perpendicular. The speed of electron is --
a) 60 ms^{-1}
c) **$1.5 \times 10^7 \text{ ms}^{-1}$**
2. In Millikan's experiment, The minimum WL of X-rays produced from a Coolidge tube is 0.062 nm. Then the P.D between the cathode and target material is --
a) 2000 V
c) 2×10^5 V
3. In Millikan's experiment, the plates are kept at a distance of 16 mm and are maintained at a potential difference of 10000 V. The electric intensity is ----
a) 62.5 V/m
c) **$6.25 \times 10^3 \text{ V/m}$**
4. In Millikan's experiment, an oil drop of mass 4.9×10^{-14} kg is balanced by applying a potential difference of 2 kV between two plates which are 2 mm apart. The charge of the drop is equal to --- [DPM]
a) $1.96 \times 10^{-18} \text{ C}$
c) 12 C
5. If R is Rydberg's constant, the shortest wavelength of Paschen series is ----- [J-10]
a) R/9
c) 16/R
6. The ratio of radii of first three orbit of Bohr's orbit is ----
a) 1 : 2 : 3
c) 1 : 8 : 27
7. The energy of electron in the first orbit of hydrogen atom is -13.6 eV. Its potential energy is ---- [J-06]
a) -13.6 eV
c) **-27.2 eV**
8. A Coolidge tube operates at 24800 V. The minimum Wavelength of X-ray radiation emitted from Coolidge tube is
a) $6 \times 10^{18} \text{ m}$
c) $0.6 \times 10^{-10} \text{ m}$
9. The minimum WL of X-rays emitted from X-ray tube operating at 1000 kV is ---- [M-09]
a) **0.0124 A⁰**
c) 1.24 A⁰
10. For the first order X-ray diffraction, the wavelength X-ray is equal to the lattice spacing at a glancing angle of -- [S-07]
a) 15⁰
c) 45⁰
11. If the potential difference between cathode and the target of Coolidge tube is 1.24×10^5 V, then the minimum wavelength of continuous X-rays is ---- [DPM]
a) 10 A⁰
c) **0.1 A⁰**
12. A Coolidge tube operates at 18600 V. The maximum frequency of X-ray radiation emitted from it is ---- [S-07]
a) **$4.5 \times 10^{18} \text{ Hz}$**
b) 45 x 10¹⁸ Hz

c) 4.05×10^{18} Hz

d) 45.5×10^{18} Hz

Unit: 7. DNR & M and Relativity (15 marks)

1 mark → 1 Question 5 mark → 1 Question 58, 59

3 mark → 1 Questions 43 10 mark → No Ten mark Qtn

UNIT – 7. DNR & Relativity – 1 mark Questions

- Photo electric effect can be explained on the basis of -----
 a) corpuscular theory b) wave theory [DPM,M-10,J-10]
 c) electromagnetic theory d) **quantum theory**
- In the photoelectric phenomenon if the ratio of the frequency of incident radiation incident on a photosensitive surface is 1 : 2 : 3, the ratio of the photoelectric current is ----- [M-12]
 a) 1 : 2 : 3 b) $\sqrt{1} : \sqrt{2} : \sqrt{3}$
 c) 1 : 4 : 9 d) **1 : 1 : 1**
- The value of stopping potential when the frequency of light is equal to the threshold frequency is ----- [M-06, M-09, S-12]
 a) maximum b) **zero**
 c) minimum d) infinity
- The wave length of matter wave is independent of ----
 a) mass b) velocity [DPM, J-08,S-09,M-11]
 c) momentum d) **charge**
- According to the theory of relativity, the length of a rod in motion --
 ----- [J-06,J-07,09,10]
 a) **is less than its rest length** b) is same as its rest length
 c) is more than its rest length d) may be more or less than or equal rest length depending upon the speed of the rod
- When the momentum of a particle increases, its de-Broglie wavelength ----- [J-12]
 a) increases b) **decreases**
 c) does not change d) infinity
- At the threshold frequency, the velocity of photoelectrons is --
 a) maximum b) minimum
 c) infinity d) zero [O-06]
- Photon has --- [J-08]
 a) **energy but zero mass** b) mass but zero energy
 c) zero mass and zero energy d) infinite mass and energy
- A particle which has zero mass but has energy is --- [M-08]
 a) electron b) **photon**
 c) proton d) neutron
- At threshold frequency, the velocity of electrons is -----[S-09]
 a) **zero** b) maximum
 c) minimum d) infinite
- If C is the velocity, ν the frequency and λ the wavelength of a radiation, then its frequency is defined as --- [O-10]
 a) the number of waves in a distance of one metre
 b) the number of waves in a distance of λ
 c) the number of waves in a distance of C
 d) **the number of waves produced in a period of T second**
- The de-Broglie wavelength of electron accelerated with a potential V is --- [O-10,11]
 a) $\lambda = h/\sqrt{Vem}$ b) **$\lambda = h/\sqrt{2Vem}$**
 c) $\lambda = h/m\sqrt{2Vem}$ d) $\lambda = h/m\sqrt{Ve/m}$
- The KE of the moving particle is E, then the de-Broglie wavelength is ----- [M-12]
 a) **$\lambda = h/\sqrt{2mE}$** b) $\sqrt{2mE}/h$
 c) $h\sqrt{2mE}$ d) $\lambda = h/\sqrt{2m}$
- An electron of mass 'm' and charge 'e' accelerated from rest through a potential difference of 'V' volt, then its final velocity is ---- [S-08]
 a) $\sqrt{Ve/m}$ b) $\sqrt{Ve/2m}$
 c) **$\sqrt{2eV/m}$** d) $2Ve/m$

- A graph is drawn between frequency of radiation (ν) along the x-axis and its stopping potential (V_0) along the y-axis. The nature of the graph is --- [M-11]
 a) **a straight line** b) a parabola
 c) an ellipse d) a circle
- A photon of frequency ' γ ' is incident on a metal surface of threshold frequency ' γ_0 '. The kinetic energy of the emitted photon is ----- [S-07,08]
 a) **$h(\gamma - \gamma_0)$** b) $h\gamma$
 c) $h\gamma_0$ d) $h(\gamma + \gamma_0)$
- According to the theory of relativity, the only constant in all frames is ---- [M-09, O-06,M-07]
 a) mass b) length
 c) **velocity of light** d) time
- Einstein's photoelectric equation is --- [J-09]
 a) $W + h\nu = \frac{1}{2} m v_{\max}^2$ b) $W = \frac{1}{2} m v_{\max}^2$
 c) $h\nu + \frac{1}{2} m v_{\max}^2 = W$ d) **$W + \frac{1}{2} m v_{\max}^2 = h\nu$**
- Electron microscope works on the principle of --- [M-10]
 a) photoelectric effect b) particle nature of electron
 c) **wave nature of moving electron** d) dual nature of matter
- When a material particle of mass ' m_0 ' attains the velocity of light, its mass becomes -
 a) 0 b) $2m_0$
 c) $4m_0$ d) **infinity**

UNIT – 7. DNR & Relativity – 1 mark Problems

- The work function of a photoelectric material is 6.626×10^{-19} J. The threshold frequency is --- [M-07]
 a) **1×10^{19} Hz** b) 10×10^{-19} Hz
 c) 1×10^{-19} Hz d) 10×10^{19} Hz
- The work function of a photoelectric material is 3.3eV. The threshold frequency will be equal to --- [M-08,J-11]
 a) **8×10^{14} Hz** b) 8×10^{10} Hz
 c) 5×10^{20} Hz d) 4×10^{14} Hz
- A photon of energy 2E is incident on a photosensitive surface of photoelectric workfunction E. The maximum KE of photoelectron emitted is ---- [J-11]
 a) **E** b) 2E
 c) 3E d) 4E
- Two photons, each of energy 2.5 eV are simultaneously incident on the metal surface. If the work function of the metal is 4.5 eV, then from the surface of the metal ---- [J-06]
 a) one electron will be emitted b) two electron will be emitted
 c) **more than two electrons** d) **not a single electron will be emitted**
- The momentum of the electron having wavelength 2 \AA is ----
 a) $3.3 \times 10^{24} \text{ kgms}^{-1}$ b) $6.6 \times 10^{24} \text{ kgms}^{-1}$
 c) **$3.3 \times 10^{-24} \text{ kgms}^{-1}$** d) $6.6 \times 10^{-24} \text{ kgms}^{-1}$ [J-07]
- When an electron is accelerated with potential difference V, its de-Broglie wavelength is directly proportional to --- [S-12]
 a) V b) V^{-1} c) $V^{1/2}$ d) **$V^{1/2}$**

Unit: 8. Nuclear Physics (25 marks)

1 mark → 4 Questions 5 mark → 1 Question 60

3 mark → 2 Questions 44, 45 10 mark → 1 Question 68

UNIT – 8. Nuclear Physics – 1 mark Questions

- Isotope have ---- [O-10]
 a) same mass number but different atomic numbers
 b) same proton number and neutron number
 c) **same proton number and different neutron numbers**
 d) same neutron number and different proton numbers
- Which of the following are isotones? ----- [M-11]
 a) ${}_{92}\text{U}^{235}$ and ${}_{92}\text{U}^{138}$ b) ${}_{8}\text{O}^{16}$ and ${}_{7}\text{N}^{14}$
 c) ${}_{6}\text{C}^{14}$ and ${}_{7}\text{N}^{14}$ d) **${}_{7}\text{N}^{14}$ and ${}_{6}\text{C}^{13}$**
- When mass number increases, nuclear density ----- [J-11]
 a) increases b) decreases

- c) **remains constant** d) may increase (or) decrease
4. Positive rays of the same element produces two different traces in Bainbridge spectrometer. The positive ions have ---
 a) same mass with different velocities b) same mass with same velocity
 c) **different masses with same velocity** d) different masses with different velocities [M-12]
5. The energy equivalent of 1 amu is ---- [J-09]
 a) **931 MeV** b) 931 meV
 c) 931 eV d) 913 MeV
6. The binding energy of ${}_{26}\text{Fe}^{56}$ nucleus is --- [S-07, J-10, J-11]
 a) 8.8 MeV b) 88 MeV
 c) **493 MeV** d) 41.3 MeV
7. The penetrating power is maximum for ---- [O-06]
 a) α - particle b) β - particles
 c) **γ - rays** d) protons
8. The ionization power is maximum for ---- [DPM, M-12, O-10]
 a) neutrons b) **alpha particles**
 c) gamma rays d) beta particles
9. Arrange the α, β and γ rays in the increasing order of their ionizing power: ---- [M-11]
 a) **$\alpha \beta \gamma$** b) $\beta \alpha \gamma$
 c) $\gamma \beta \alpha$ d) $\gamma \alpha \beta$
10. In a β decay, ---- [M-09, S-09]
 a) atomic number decreases by one b) mass number decreases by one
 c) proton number remains the same d) **neutron number decreases by one**
11. When ${}_{5}\text{B}^{10}$ is bombarded with neutron an α particle is emitted, the residual nucleus is [DPM]
 a) **${}_{3}\text{Li}$** b) ${}_{1}\text{H}^2$
 c) ${}_{1}\text{H}^3$ d) ${}_{2}\text{He}^4$
12. Nuclear force is due to the continuous exchange of particles called ---- [M-06, M-09, S-09]
 a) leptons b) **mesons**
 c) hyperons d) photons
13. The particles which exchange between the nucleons and responsible for the origin of the nuclear force are ----
 a) photons b) leptons
 c) mesons d) baryons [J-07]
14. The nucleons in a nucleus is attracted by --- [J-12]
 a) gravitational force b) **electrostatic force**
 c) **nuclear force** d) magnetic force
15. Which of the following is massless and chargeless but carrier of energy and spin? ---- [J-12]
 a) **neutrino** b) muon
 c) pion d) kaon
16. The mean life of (τ) and half-life ($T_{1/2}$) of a radioactive element are related as ---
 a) $\tau = 2T_{1/2}$ b) **$\tau = T_{1/2} / 0.6931$**
 c) $\tau = 0.6931 T_{1/2}$ d) $T_{1/2} / 2$ [M-08]
17. The half-life of certain radioactive element disintegration constant 0.06931 per day is ---- [S-07]
 a) **10 days** b) 14 days
 c) 1 day d) 100 days
18. The radioisotopes used in agriculture is ----
 a) **${}_{15}\text{P}^{32}$** b) ${}_{11}\text{Na}^{23}$
 c) ${}_{15}\text{P}^{31}$ d) ${}_{11}\text{Na}^{24}$ [J-06, J-08, S-08S-09, M-11, S-12]
19. Anemia can be diagnosed by ---
 a) ${}_{15}\text{P}^{31}$ b) ${}_{15}\text{P}^{32}$
 c) **${}_{26}\text{Fe}^{59}$** d) ${}_{11}\text{Na}^{24}$ [M-07, J-07, J-09, M-10, J-11]
20. Which of the following is used to detect the presence of blocks in blood vessels? ---
 a) ${}_{15}\text{P}^{31}$ b) ${}_{15}\text{P}^{32}$
 c) ${}_{26}\text{Fe}^{59}$ d) **${}_{11}\text{Na}^{24}$** [M-08]
21. According to the law of disintegration $N = N_0 e^{-\lambda t}$, the number of radioactive atoms that have been decayed during a time t is ----
 a) N_0 b) N
 c) **$N_0 - N$** d) $N_0/2$ [O-10]
22. The unit of disintegration constant is ----
 a) no unit b) second
 c) **second⁻¹** d) curie [M-12]
23. In proton-proton cycle four protons fuse together to give ----
 a) an α particle, two electrons, two neutrinos and energy of 26.7 MeV
 b) an α particle, two positrons, two neutrinos and energy of 26.7 MeV
 c) **a helium atom, two positrons, two neutrinos and energy of 26.7 MeV**
 d) an α particle, two positrons, two anti-neutrinos and energy of 26.7 MeV [S-12]
24. The coolant used in fast breeder reactor is ----
 a) ordinary water b) heavy water
 c) **liquid sodium** d) boron carbide [O-10]
25. In a nuclear reactor, cadmium rods are used to ----
 a) speed up neutrons b) slow down neutrons
 c) **absorb neutrons** d) remove heat
26. Slow neutrons are neutrons having energies between ---
 a) 1000 eV to 2000 eV b) 2000 eV to 0.5 eV
 c) **0 to 1000 eV** d) 0.5 MeV to 10 MeV
27. The explosion of atom bomb is based on ----
 a) **Uncontrolled fission reaction** b) controlled fission reaction
 c) fusion reaction d) thermonuclear reaction [J-09, M-10, J-10, M-11]
28. Hydrogen bomb is based on the principle of ----
 a) nuclear fission b) **nuclear fusion**
 c) nuclear force d) carbon nitrogen cycle [O-11, M-12]
29. The moderator used in nuclear reactor is ---- [M-07]
 a) Cadmium b) Boron carbide
 c) **Heavy water** d) Uranium (${}_{92}\text{U}^{235}$)
30. Which of the following is not moderator ---- [J-07]
 a) **Liquid sodium** b) Ordinary water
 c) Graphite d) Heavy water
31. The fuel used in Kamini (Kalpakkam mini reactor) is ----
 a) mixture of carbides of uranium and plutonium
 b) mixture of oxides of uranium and plutonium
 c) **${}_{92}\text{U}^{233}$** d) ${}_{92}\text{U}^{235}$ [S-09]
32. The fuel used in Kamini reactor is ---
 a) ${}_{92}\text{U}^{238}$ b) **${}_{92}\text{U}^{233}$**
 c) ${}_{92}\text{U}^{239}$ d) low enriched [S-07]
33. The cosmic ray intensity is maximum at a latitude of ----
 a) 0° b) 45°
 c) **90°** d) 60° [O-11]
34. The nuclear force between a proton and another proton inside the nucleus is ----
 a) zero b) **short range**
 c) repulsive d) long range [O-11]
35. Which of the following belongs to Baryon group? ---
 a) photon b) electron
 c) pion d) **proton** [M-10]
36. Which of the following is lepton ----
 a) **electron** b) proton
 c) neutron d) π - meson [M-06]
37. Particle that has no charge and no mass but travels with velocity of light is ----
 a) baryon b) meson
 c) lepton d) **photon** [S-08]
38. Based on quark model a neutron is represented as --
 a) uud b) udd
 c) udd' d) u'du [J, O-06] --omitted
39. The nuclear fission can be explained by ----
 a) shell model b) **liquid drop model**
 c) quark model d) Bohr atom model [J-11]

UNIT – 8. Nuclear Physics – 1 mark Problems

- The mass defect of certain nucleus is 0.03 amu. Then its binding energy is ----
 a) 27.93 eV b) 27.93 keV
 c) 27.93 GeV d) **27.93 MeV** [J-12]
- The value of 1 amu is ----- [O-06,S-08]
 a) 931 eV b) mass of carbon atom
 c) mass of one proton d) **1.66×10^{-27} kg**
- The nuclei ${}_{13}\text{Al}^{27}$ and ${}_{14}\text{Si}^{28}$ are examples of ----
 a) isotopes b) isobars
 c) **isotones** d) isomers [S-07,M-08]
- If the nuclear radius is 2.6×10^{-15} m, the mass number will be -
 a) 2 b) 4
 c) **8** d) 16 [J-08]
- The radius of nucleus is 5.2 F. The number of nucleons in the nucleus is ----
 a) 2 b) 104
 c) **64** d) 128 [S-12]
- In the nuclear reaction, ${}_{80}\text{Hg}^{198} + X \rightarrow {}_{79}\text{Au}^{198} + {}_1\text{H}^1$, X stands for --- [J-08, M-09]
 a) Proton b) electron
 c) **neutron** d) deuteron
- In the nuclear reaction, ${}_4\text{Be}^9 + X \rightarrow {}_{12}\text{C}^{12} + {}_1\text{n}^0$, X stands for ---
 a) Proton b) **alpha particle**
 c) electron d) deuteron [M-10]
- In the following nuclear reaction, ${}_7\text{N}^{14} + {}_0\text{n}^1 \rightarrow X + {}_1\text{H}^1$ the element X is ----
 a) ${}_6\text{N}^{14}$ b) ${}_6\text{C}^{14}$
 c) ${}_6\text{O}^{14}$ d) ${}_7\text{C}^{13}$ [M-06]
- If 1 kg of substance is fully converted into energy, the energy produced is ----
 a) **9×10^{16} J** b) 9×10^{24} J
 c) 1 J d) 3×10^{18} J [O-10]
- The numbers of α and β particles emitted when an isotope of ${}_{83}\text{Bi}^{214}$ undergoes α and β decays to form ${}_{82}\text{Pb}^{206}$ are respectively
 a) 6, 8 b) 4, 3
 c) **8, 6** d) 3, 4 [M-07]
- An element ZX^A successively undergoes three α decays and four β decays and gets converted to an element Y. The mass number and atomic number of the element Y are respectively
 a) **A - 12, Z - 2** b) A - 12, Z + 2
 c) A-12, Z+2 d) A - 8, Z + 2 [J-07]
- ${}_{13}\text{Al}^{27} + {}_2\text{He}^4 \rightarrow X + {}_0\text{n}^1$ the element X is -----
 a) ${}_{15}\text{Si}^{30}$ b) ${}_{15}\text{P}^{30}$
 c) ${}_{15}\text{S}^{30}$ d) ${}_{15}\text{Si}^{29}$ [O-06]
- The time taken by the radioactive element to reduce $1/e$ time is ----
 a) half life b) **mean life**
 c) half life / 2 d) twice the mean life [DPM,M-12]
- The time taken by the radioactive element to reduce $e^{-1/2}$ times its original amount is its ----- [J-06]
 a) half life period b) half life period/2
 c) mean half-life period d) **mean life period/2**
- The half-life of certain radioactive element disintegration constant 0.06931 per day is [S-07,12, J-12]
 a) **10 days** b) 14 days
 c) 1 day d) 100 days
- The half-life of radioactive element is 300 days. The disintegration constant of radioactive element is ----
 a) 0.00231 day b) **0.00231 / day**
 c) 0.0231 / day d) 0.0231 day [M-09]
- One atomic mass unit is equal to ----
 a) 931 eV b) mass of carbon atom c) **1.66×10^{-27} kg**
 d) mass of oxygen atom [J-06]

- The mean life of radon is 5.5 days. Its half-life is ----
 a) 8 days b) **2.8 days**
 c) 0.38 days d) 3.8 days [J-09]
- The half-life period of N^{13} is 10.1 minute. Its life time is -----
 a) 5.05 minute b) 20.2 minute
 c) $10.1/0.6931$ d) **infinity** [O-10]

Unit: 9. Semiconductor devices & Applications (30 marks)

1 mark → 3 Questions 5 mark → 1 Question 61
 3 mark → 4 Questions 46,47,48,49 10 mark → 1 Question 69

UNIT – 9. Semiconductor Devices & their Applications –1 mark Questions

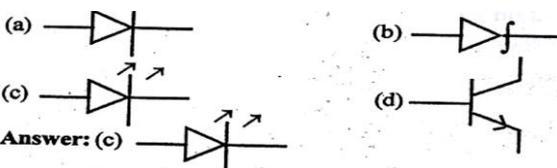
- The potential barrier of silicon PN junction diode is approximately - ---- [J-06]
 a) 0.3 V b) **0.7 V**
 c) 1.1 V d) **10 V**
- The color of light emitted by LED depends on ----
 a) its reverse bias b) amount of forward current
 c) its forward bias d) **type of semiconductor** [J-06]
- The forbidden energy gap for silicon is of the order of ----
 a) 0.7 eV b) 0.4 eV
 c) **1.1 eV** d) 10 eV [O-06,M-10,09,O-10]
- The forbidden gap energy for Ge is of the order of ---
 a) 1.1 eV b) **0.7 eV**
 c) 0.3 eV d) 10 eV [M-06]
- The forbidden energy gap for conductors is ---
 a) 0.7 eV b) 1.1 eV
 c) **zero** d) 3 eV [M-10]
- An example of n-type semiconductor is -----[dmp]
 a) pure Ge b) pure Si
 c) **Si doped with P** d) Ge doped with B
- In an N-type semiconductor donor level lies ---
 a) **just below the conduction band** b) just above the conduction band
 c) just below the valence band d) just above the valence band [S-12]
- In the forward characteristic curve, a diode appears as ----
 a) a high resistance b) a capacitor
 c) an OFF switch d) **an ON switch** [J-11,S-12]
- Avalanche breakdown is primarily dependent on the phenomenon of ---- [S-07,m-12,J-1,2M-11,12]
 a) **collision** b) ionization
 c) doping d) recombination
- In a Colpitt's oscillator circuit ----- [J-08]
 a) **capacitive feedback is used** b) tapped coil is used
 c) no tuned LC circuit is used d) no capacitor
- Barkhausen condition for maintenance of oscillation is ----
 a) **$\beta = 1/A$** b) $A\beta = \alpha$
 c) $A = \beta$ d) $A\beta = 1/\sqrt{2}$ [M-07,S-09]
- The condition for an oscillator is ----
 a) $A\beta = 0$ b) **$A = 1/\beta$**
 c) $A\beta = \alpha$ d) $A + \beta = 0$ [M-06]
- In a transistor, the value of $(1/\alpha - 1/\beta)$ is equal to -----
 a) α b) β
 c) β/α d) **1** [M-11]
- In junction transistor the emitter region is heavily doped since emitter has to supply to the base ---
 a) minority carriers b) **majority carriers**
 c) acceptor ions d) donor ions [S-07]
- In a PN junction diode on the side of N but very close to the junction there are ----
 a) donor atoms b) acceptor atoms
 c) **immovable positive ions** d) immovable negative ions [J-12]

16. In common emitter amplifiers, the phase reversal between input and output voltages is ---
 a) 0° b) 90°
 c) 270° d) 180° [J-08]
17. The phase reversal between the input and the output voltages in single phase CE amplifier is ----
 a) $\pi/2$ b) 2π
 c) π d) $3\pi/2$ [O-11]
18. The color emitted by an LED depends on ----
 [J-06,S-08,J-10,O-10,J-11,M-12]
 a) its reverse bias b) the amount of forward current
 c) its forward bias d) **type of semiconductor material**
19. An oscillator is --- [M-08,J-09,J-10,O-10]
 a) **An amplifier with feedback** b) a converter of AC to DC
 c) nothing but an amplifier d) an amplifier without feedback
20. Of the following the donor atoms are ---
 a) Silicon & Germanium b) **aluminium & gallium**
 c) bismuth & arsenic d) boron & indium
21. An example for non-sinusoidal oscillator is ---- [M-09]
 a) **Multivibrator** b) RC oscillator
 c) Colpitts oscillator d) Crystal oscillator
22. The reverse saturation current in PN junction diode is only due to -
 a) **minority carriers** b) majority carriers
 c) acceptor ions d) donor ions [J-09,O-11]
23. In the pin configuration of IC 741, pin 3 represents ----
 a) inverting input b) **non-inverting input**
 c) $-V_{cc}$ d) output [[M-10]
24. A logic gate which has an output '1' when the inputs are complement to each other is -
 a) AND b) NAND
 c) NOR d) **EXOR** [S-07]
25. A logic gate for which there is 'Low' output only when both the inputs are 'High' is ----
 a) AND b) NAND
 c) **NOR** d) EXOR
26. A logic gate for which there is an output only when both the inputs are zero is ----
 a) NAND b) **NOR**
 c) EXOR d) AND [J-11]
27. According to law of Boolean algebra, the expression $(A+AB)$ is equal to ----
 a) **A** b) AB
 c) B d) \bar{A} [M-09,11]
28. The Boolean expression for NAND gate operation is ----
 a) $Y = A + B$ b) $Y = A.B$
 c) $Y = A$ d) **$Y = \overline{A.B}$** [S-09]

UNIT - 9. Semiconductor Devices & their Applications - 1 mark Problems

1. In a CE transistor circuit, the base current (I_b) of the transistor is $50 \mu A$ and the collector current (I_c) is 25 mA. Then the current gain is ---
 a) 50 b) **500**
 c) 20 d) 200 [S-08]

The symbol to represent LED is --- [J-07]



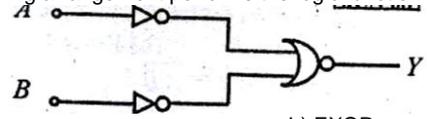
Answer: (c)

3. In CE single stage amplifier, the voltage gain at mid-frequency is 10. The voltage gain at upper cut-off frequency is ---
 a) 10 b) 14.14
 c) **7.07** d) 20 [O-06,09]

4. What will be the input for the Boolean expressions $(A + B) (A.B) = 1$? ----
 a) 0, 1 b) 1, 0
 c) 0, 0 d) **1, 1** [dmp]

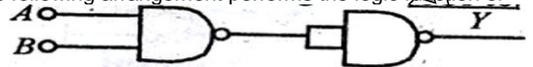
5. The Boolean expression \overline{ABC} can be simplified as ----
 a) $\overline{A.B.C}$ b) $\overline{A} . \overline{B} . \overline{C}$
 c) $AB + BC + CA$ d) **$\overline{A + B + C}$** [M-06,J-10]

6. The following arrangement performs the logic function of --



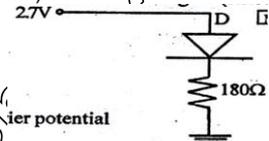
- a) **AND** b) EXOR
 c) OR d) NAND [J-08]

7. The following arrangement performs the logic function of --



- a) **AND gate** b) NAND gate
 c) OR gate d) NOR gate [S-08]

8. Find the voltage across the resistor as shown in the fig. (silicon diode is used) ----



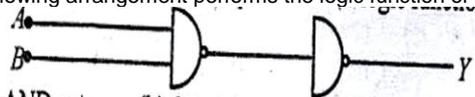
- a) 2.4 V b) **2.0 V**
 c) 1.8 V d) 0.7 V [M-07]

9. The output (Y) of the logic circuit given below is ---



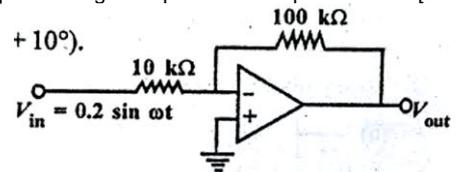
- a) **$\overline{A + B}$** b) A.B
 c) $(A + B)$ d) A + B [M-07]

10. The following arrangement performs the logic function of --



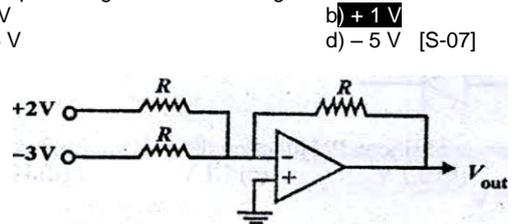
- a) **AND gate** b) OR gate
 c) NAND gate d) EX-OR gate [O-06,M-10,S-11,J-12]

11. The output of the given operational amplifier is : ---- [J-07]



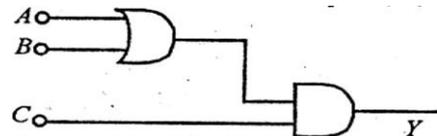
- a) **$-2 \sin \omega t$** b) $2 \sin \omega t$
 c) $-2 \sin (\omega t + 10^\circ)$ d) $2 \sin (\omega t + 10^\circ)$

12. The output voltage of the OPAMP given below is ----



- a) -1 V b) **+1 V**
 c) +5 V d) -5 V [S-07]

13. The output Y of the following circuit is one (1), the inputs ABC must be ----



- a) 010 b) 100
 c) **101** d) 110 [J-09,S-12]

Unit: 10. Communication Devices (20 marks)

1 mark → 2 Questions 5 mark → 1 Question 62
 3 mark → 1 Questions 50 10 mark → 1 Question 70

UNIT – 10. Communication System – 1 mark Questions

- Skip distance is the shortest distance between ----
 a) **the point of transmission and the point of reception**
 b) the uplink station and the down link station
 c) the transmitter and the target
 d) the receiver and the target. [S-08]
- The radio waves after refraction from different parts of ionosphere on reaching the earth are called as ----
 a) ground waves b) **sky waves**
 c) space waves d) microwaves
- In amplitude modulation, the bandwidth is -----
 a) equal to the signal frequency b) **twice the signal frequency**
 c) thrice the signal frequency
 d) four times the signal frequency [M-12]
- In amplitude modulation ----
 a) **the amplitude of the carrier wave varies in accordance with the amplitude of the modulating signal**
 b) the amplitude of the carrier wave remains constant
 c) the amplitude of the carrier wave varies in accordance with the frequency of the modulating signal
 d) the modulating frequency lies in the audio range. [S-12]
- Through which mode of propagation, the radio waves can be sent form one place to another-----
 a) Ground wave propagation b) sky wave propagation c) space wave propagation d) **All the above** [dmp]
- High frequency waves follow ---- [M-06,J-06]
 a) the ground wave propagation b) the line of straight direction
 c) **ionospheric propagation**
 d) the curvature of the earth
- In TV, blanking pulse is applied to ----- [M-06,S-09,M-11]
 a) horizontal plates b) vertical plates
 c) **control grid** d) filament
- In TV transmission, the picture tube should not be scanned during the return journey of the scanning. This is done by
 a) **blanking pulse** b) saw tooth potential
 c) horizontal synchronizing pulse d) vertical synchronizing pulse [dmp]
- The RF channel in a radio transmitter produces -----
 a) audio signals b) **high frequency carrier waves**
 c) both audio signal and high frequency carrier waves
 d) low frequency carrier waves. [M-07,M-09,M-10,O-11]
- In interlaced scanning time taken to scan one line is ---
 a) 20 ms b) **64 μs**
 c) 50 ms d) 100 μs [J-08]
- Man made 1st artificial satellite ---- (S-07)
 a) Aryabhata b) **Sputnik**
 c) Venera d) Rohini
- The printed documents to be transmitted by fax are converted into electrical signals by the process of ---
 [M-08,J-08,S-08,J-09,10,O-10,M-11,O-11,J-12]
 a) reflection b) **scanning**
 c) modulation d) light variation
- The audio frequency range is ---- [M-08]
 a) 20 Hz to 200000 Hz b) **20 Hz to 2000 Hz**
 c) 20 Hz to 2000000 Hz d) **20 Hz to 20000 Hz**
- The purpose of dividing each frame into two fields so as to transmit 50 views of the picture per second is ----
 a) the fact that handling of higher frequencies is easier
 b) that 50 Hz is the power line frequency in India
 c) to avoid unwanted noises in the signals
 d) **to avoid flicker in the picture** [J-08,M-12]
- The principle used for transmission of light signals through optical fibre is --- [O-06,M-10, S-12]
 a) refraction b) diffraction

- c) polarization d) **Total internal Reflection**

- Draw the block diagram of an oscillator and mention its components. Of 105.03 MHz, when modulated by a signal. The carrier swing is ----
 a) 0.03 MHz b) **0.06 MHz**
 c) 0.03 kHz d) 60 MHz [[M-09]
- Digital signals are converted into analog signals using -----
 a) FAX b) **modem**
 c) cable d) coaxial cable [M-07,S-09]
- In the AM super heterodyne receiver system the value of the intermediate frequency is equal to ----
 a) 445 kHz b) **455 kHz**
 c) 485 kHz d) 465 kHz [J-09]
- In FM receivers, the intermediate frequency is -----
 a) 455 kHz b) 455 MHz
 c) 10.7 kHz d) **10.7 MHz** [O-10,12]
- In AM super heterodyne receiver, the local oscillator frequency is 1.245 MHz. The tuned station frequency is ----
 a) 455 kHz b) **790 kHz**
 c) 69 kHz d) 990 kHz [J-06]

GOVT. BOYS HR. SEC. SCHOOL-CHROME PET. XII PHYSICS