V S AQ's (2 MARKS)
Ray Optics and Optical Instruments

1. Define focal length and radius of curvature of a concave lens.

A. Focal Length:- Focal length of concave lens is the distance between optical centre and the principle focus of the lens. Radius of Curvature: Radius of curvature of concave lens is the radius of the sphere from which the lens is separated.

2. What do you understand by the terms 'focus' and principal 'focus' in the context of lenses?

A. Focus:- The beam of light through the lens converse at a point or appears to diverse from a point, this point is called focus. Principal Focus:- The point on the principal axis where all the rays coming from object paralellel to the principal axis are diveraged or coveraged by lens is called principal focus.

3. What is optical density and how is it different from mass density?

A. Optical density:- When a light ray refract one medium to other medium then the ratio of the velocity of light in the refracted medium to the velocity of the light in the incident medium is called optical density. Optical density is different from mass density. Mass density is the mass per volume. Optical density explains the transparent nature of the medium. For example mass density of turpentine is less than that of water, but its optical density is higher.

4. What are the laws of reflection through curved mirrors?

A. Laws of reflection:-

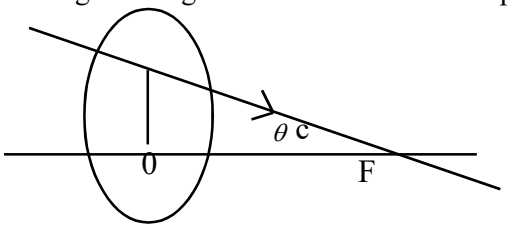
i) The incident ray, reflected ray and normal to the reflecting surface at the point of incident all lie in the same plane.

ii) The angle of incidence is equal to the angle of reflection i.e. $\angle i = \angle r$

5. Define power of a convex lens. What are its units?

A. Power of Convex lens:- The tangent angle of deviation of a light ray, which is coming from a unit height from the centre of lens and converges (or) appears to divrages through its focus is known as the power of convex lens

Power (P) = $\tan\theta = \frac{1}{F}$, units ; dioptre .



6. A Concave mirror of focal length 10cm is placed at a distance 35 cm from a wall. How for from the wall should an object be placed so that its real image is formed on the wall?

A. Focal length = 10cm

Image distance = 35 cm

Object distance from pole mirror U=?

$$\frac{1}{F} = \frac{1}{\mu} + \frac{1}{v} \Rightarrow \frac{1}{U} = \frac{1}{V} + \frac{1}{F} \Rightarrow u = \frac{Fv}{v-f}$$

$$= \frac{10 \times 35}{35 - 10} = \frac{350}{25} = 14\,cm$$

From the wall. the distance of object =35-14=21 c.m.

7. Concave mirror produced an image of a long vertical pin, placed 40 cm from the mirror, at the position of the object, Find the focal length of the mirror?

A. Given that U=V=-40 cm

$$\frac{1}{F}=\frac{1}{u}+\frac{1}{v}=\frac{1}{-40}+\frac{1}{-40}=\frac{-1}{-20}=\frac{-20}{cm}$$

= -20 c.m

8. A small angled prism of 4° diviates a ray through 2.48. Find the refractive index of the prism.

A. $d=(n_{21}-1)A \Rightarrow 2.48=(n_{21}-1)4 \Rightarrow n_{21}=1.62$

Q-9. What is dispersion ? Which colour gets relatively more dispersed?

A. The Phenomenon of splitting of white light into seven constituent colours (VIBGYOR) is known as dispersion. violet colour is relatively more disperson.

10. The focal length of a concave lens is 30 cm where should an object be placed so what its image is 1/10 of its size?

A) F=30 cm , V=$\frac{U}{10}$

$$\frac{1}{V}-\frac{1}{U}=\frac{1}{F}$$

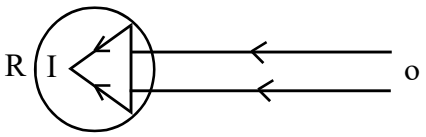
$$\frac{10}{U}-\frac{1}{U}=\frac{1}{-30} \Rightarrow \frac{9}{U}=\frac{1}{-30}$$

$$\Rightarrow U=-270cm$$

Q-11. What is myopia? How can it be corrected?

Ans: Myopia:- If the image of distant object is focussed before the retina then it cannot be seen clearly. This defect of eye is called myopia.

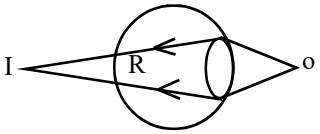
correction:- This defect can be corrected by using concave lens.



Q-12. What is hypermetropia? How can it be corrected?

Hypermetropia:- If the image of near object is formed behind the retina then it cannot be seen clearly. This defect of eye is called hypermetropia.

Correction:- This defect can be corrected by using. Convex lens.



Electric Charges and Fields

Q-13. What is meant by the statement that ' Charge is quantized?
Ans: The Minimum charge that may be transferred from one body to the other is equal to the charge of electron.(1.6×10^{-19} C). The charge is available in multiples of charge on elctron i.e.; $Q=\pm ne$ Hence charge is said to be quantized.
Q-14. Repulsion is the sure test of charging than attraction. Why?
Ans: Positively charged body can attracts both negatively charged and neutral bodies. But positively charged body can only repel another positively charged body.
Hence repulsion is sure test of electrification.
Q-15. How many electrons constitute 1C of charge?
Ans: Charge of electron $e=1.6\times10^{-19}$ C

$$\Rightarrow n=\frac{1}{1.6\times10^{-19}}=6.25\times10^{18}\text{electrons}$$

16) What happens to the weight of a body when it is charged posively?
Ans: When a body is charged positively, its weight decreases due to the removal of electrons even though the effect is small.
17) What happens to the force between two charges if the distance between them is
a) Halved b) doubled...?
Ans:

$$a)F\propto\frac{d}{d^2}$$

$$a)\frac{F2}{F1}=\left[\frac{d}{d_2}\right]^2\Rightarrow\frac{F2}{F1}=\left[\frac{d}{d/2}\right]^2\Rightarrow\frac{F2}{F1}=\left[\frac{2d}{d}\right]^2$$

$$\frac{F2}{F1}=4\Rightarrow F2=4F1$$

$\therefore$ The force between the charges becomes four times.

$$b)\frac{F2}{F1}=\left[\frac{d1}{d_2}\right]^2\Rightarrow F2=\frac{F1}{4}$$

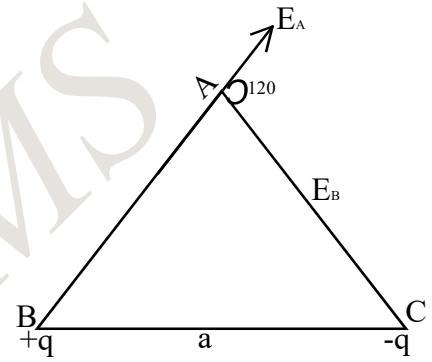
$\therefore$ The force is reduced to $\frac{1}{4}^{th}$ of its original value.

18) The elctric lines of force do not intersect. Why?
Ans: The tangent drawn to electric lines of force gives the direction of electric field at that point. If the electric lines of force intersect, then at the point of intersection electric field will act in two different direction, which is not possible. Hence Electric lines of force do not intersect.

19) Consider two charges +q placed at B and C of an equilateral triangle ABC. For this system, the total charges is zero. But electric field at A which is equidistant from B and C is not zero. Why ?

Ans : Net charge = +q-q=0
Let 'a' be the side of the triangle.

The electric intensity at a due its the charge +q is given by $E = \frac{1}{u\,\pi\,\varepsilon\,o}\frac{q}{a^2}$
(Along AC)



The angle between these intensities is 120"

The resultant intensity is given by $E = \frac{1}{u\pi\varepsilon o}\ \frac{q}{a^2}$ (// to BC gram A)

20) Electrostatic field lines of force do not form closed loops. If they form closed then the work done in moving a charge along a closed path will not be zero. From the above two stalements can you guess the nature of electrostatic force?
Ans: Electrostatic force is a conservative froce (constant)

Q-21. State Gauss's law in electrostatics

Ans: Gauss's Law: " The electric flune (ϕ) = through any closed surface is equal to $\frac{1}{\varepsilon 0}$ times the net charge enclosed by the surface" $\phi = \oint \vec{E}\ .\ \vec{d}s = \frac{1}{\varepsilon\ 0}q$

This is integral form of Gausse's law, Here ε_o is the permittivity of free space.

Q-22. When will be the electric flux negative and is it positive?
Ans: For a closed body, inward flux is taken to be negative and outward.
Flux is taken to be positive.

WAVE OPTICS

Q-23. What is fresnel distance?
Ans: Fresnel Distance: The distance beyond which divergence of beam of width 'a' become significant is called fresnel distance.

$$\text{Fresnel distance } Z \approx \frac{a^2}{\lambda}$$

Q-24. Give the Justification for validity of ray optics?

Ans: $Z_F \leq \frac{a^2}{\lambda}$ is the validity of ray optics.

If the distance between aperture and screen is much smaller than Z_F *i.e.,* $\frac{a^2}{\lambda}$ diffraction pattern cannot be observed so ray optics is applicable.

Q-25. What is Polarization of light?

Ans: Polarization of light:- The Phenomena of restricting the vibration of a transverse wave into a particular direction is called polarization. Polarization establishes the fact that the waves are transverse in nature.

Q-26. What is Malus law ?

Ans: Malus Law: The Intensity of polarised light transmitted through the analysis varies as the square of the cosine of the angle between the plane of transmission of the polarised and the analyser $I=I_o \cos^2\theta$. Where θ=angle between the axis of the polarizer and analyser.

Q-27. Explain Brewsters Law.

Ans: Brecuster's Law : It states that "The tangent of the angle of polarisation is equal to the refractive index of the reflecting medium". $\mu = \tan i_p \longrightarrow$ angle of polarisation.

Q-28. When does a monochromatic beam of light incident on a reflective surface gets completely transmitted?

Ans:- When the monochromatic beam of light incident on the surface of the prism at brewsters angle. Then no reflection and there will be total transmission of light.

ELECTROSTATICS POTENTIALAND CAPACITANCE

Q-29. Can there be electric potential at a point with zero electric intensity ? Give an example.

Ans: Yes. There can be exist electric potential with zero electric intensity.

example: inside a charged spherical conductor, electric intensity is zero but there electric potential is not zero

Q-30. Can there be electric intensity at a point with zero electric potential? Give an example.

Ans: Yes. There an exist electric intensity with zero electric potential.

Example: When two dissimilas charges of some magnitude are separated by a certain distance at a mid point potential is zero. But electric field strength is not zero.

ELECTRIC POTENTIAL AND CAPACITANCE.

Q-31. What are meant by equipotential surface?

Ans: Equipotential surface: Equipotential surface in an electric field is a surface on which the potential is same at every point

(or)

The locus of all points which have the same electric potential is called equipotential surface. Work done in taking a charge from one point to other is zero

.

Q-32. Why is the electric field always at right angles to the equipotential surface? Explain.

Ans: The electric field always is right angles to the equipotential surface. If not, it would have a nonzero component along the surface. Hence work has to be done to move a test charge against this component. This is against to the definition and hence the electric field always at right angles to the equipotential surface.

33. Three capacitors of capactances $1\mu F, 2\mu F$ and $3\mu F$ are connected in parallel?

a) What is the ratio of charges? b) What is the ratio of potential differences?

Ans: (a) In Parallel combination potential is constant

Q1:Q2:Q3=C1:C2:C3 ($\therefore Q1 : Q2 : Q3 = 1 : 2 : 3$

b) As potential is constant ratio is V1:V2:V3=1:1:1.

34. Three capacitors of capacitances $1\mu F, 2\mu F, 3\mu F$ are connected in series.

(a) Ratio of charges (b) Ratio of Potential differences?

Ans: (a) In Series combination, charge is same on all capacitors. Q1:Q2:Q3=1:1:1

(b) $V1 : V2 : V3 = \frac{1}{1} : \frac{1}{2} : \frac{1}{3} = 6 : 3 : 2$

35. What happens to the capacitance of a parallel plate capacitor. If area of its plates is doubled?

Ans: Capacity of parallel plate capacitor $C = \frac{\varepsilon_o A}{d}$

$$\frac{C_2}{C_1} = \frac{A_2}{A_1} = \frac{2A}{A} = 2$$

$$\therefore C_2 = 2C1$$

Hence the capacity becomes doubled.

36. The dielectric strength of air is $3x10^6 \ Vm^{-1}$ at certain pressure. A parallel plate capacitor with air in between the plate has a plate seperation of 1cm. Can you change the capacitor to $3x10^6 V$?

$$\Rightarrow E = \frac{V}{d} \Rightarrow V = Ed = 3x10^4 \text{ Volts}$$

Hence, the capacitor cannot be charged to $3 x 10^6 V$.

DUAL NATURE AND RADIATION MATTER

37. What are cathode rays?

Cathode rays:- cathode rays are a stream of fast moving electrons in a discharge tube, when the pressure of the gas is reduced to 0.01mm of Hg and high potential differences about 10 kv is applied between the electrodes.

38. What important the fact that Millikans experiment established?

Importance of Millikan's experiment:- Millikan's experiment established that electric charge is

39. What is work function?

Work function:- It is defined as the minimum amount of energy required to liberate an electron from the given photo. surface. It depends only on nature of metal surface.

40. What is photo electric effect?

Photo Electric effect:- When suitable wavelength of light is incident on alkali metals, they emit the electrons from their surfaces. This phenomemon is called photo electric effect.

41. Give Examples of "Photosensitive substances".

Why are they called So?

Ans: Photosensitive Substances:- Some Alkali metals like lithium, sodium, potassium etc; are examples of photosensitive substances.

They are sensitive even for visible light and emits electrons when they are illuminated by light.

42. Writedown Einstein's photoelectric equation.

Ans:- Einstein's photo electric equation:- Einstein's applied the law of conservation of energy to the photon absorption by an electron in metal

$$h\upsilon = \phi_o + \frac{1}{2}MV^2 \Rightarrow \frac{1}{2}MV^2 = h\upsilon - \phi_o$$

43. Write down the de-broglie's relation and explain the terms there in.

Ans: The ratio between the plank's constant (h) and the momentum of the particle (P) is called de Broglic wavelength

$$\lambda = \frac{h}{p} = \frac{h}{mv}$$

Where V=Velocity of the particle
and m=mass of the particle

Q-44. State Heisenberg's Uncertainity principle.

Ans: Heinsenberg's Uncertainity principle:- According to Heisenberg's principle:- According to Heisenberg's Uncertainity principle, it is impossible to measure simultaneously both the position and the momentum of the particle Let ΔX *and* ΔP be the Uncertainity in the simultaneous measurement of the position & momentum of the particle, then

$$\Delta X \Delta P \approx h;$$

Where $\hbar = \frac{h}{2\pi}$ and $h=6.63\times10^{-34}$ J-S is the plank's constant

Magnetism and Matter:

Q-45. A Magnetic dipole placed in a magnetic field experience a net force. What can you say about the nature of the magnetic field?

Ans: When a magnetic dipole is placed in a non-uniform magnetic field, then it experiences a net forced and torque. Hence the magnetic dipole experiences both translatory and rotatory motions.

Q-47. What happens to the compass needles at the earth's poles?
Ans:- At the Earth's poles the horizontal component of Earth's magnetic field is zero.
Hence the compass needles align in any direction.
Q-47. What do you understand by the magnetisation of a sample?
Ans:- Magnetization of sample:- Magnetisation of a sample 'M' is defined as the net magnetic moment per unit volume.

$\frac{m}{v}$ 'M' is a vector with units Am^{-1}

Q-48. What is the magnetic moment associated with a solenoid?

Ans: The Magnetic moment of a solenoid M=NIA, $M = n(2l)I(\pi a^2)$ Where 'a' is the radius of the solenoid, 'n' is no of turns per unit length, 2l is length of solenoids, I is current.

Q-49. What are the units of magnetic moment, magnetic induction and magnetic field?
Ans:- Magnetic moment Am^{-2} (or) JT^{-1}
Magnetic induction A/m (or) Tesla (or) Gauss
Magnetic field A/m (or) Tesla
Q-50. Magnetic lines form continous closed loops why?
A) . Magnetic lines move outside of the magnet in its field from N-Pole to S-pole and moves inside of the magnet from S-pole to N-pole Hence magnetic lines are the continous closed loops.
Q-51. Define Magnetic declination?
A) It is Defind as the acute angle between the magnetic meridians and geographical meridian at a place is called magnetic declination.
Q-52. Define Magnetic inclination or angle of dip?
A) It is the angle between the direction of earth magnetic field and the horizontal component of earth's magnetic field is called magnetic inclination (OR) angle of dip.
Q. Classify the following materials with regard to magnetism : Manganese, Cobalt, Nickel, Bismuth, Oxygen and copper?
Ans: Ferro magnetic materials : cobalt, nickel
Paramagnetic materials : Manganese, Oxygen
Dia Magnetic materials : Copper, Bismuth

Moving Charges and Magnetism

Q-53. A Circular coil of radius 'r' having N turns carries a current 'i' what is its magnetic moments.

Ans: Magnetic moment ofthe coil M=n i A $M = niA = ni\pi r^2$ M is along the axis of the coil A is area of the coil.

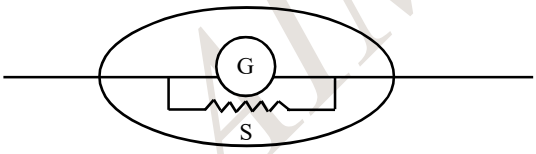
Q-54. What is the force on a conductor of length ' l ' carrying a current '*i*'placed in a magnetic field of induction B? When does it become maximum?
Ans:- The force on a conductor of Length 'l' carrying current 'i' when it is placed in a magnetic field of induction B is given by F=Bil $\sin\theta$.
The force is maximum when θ =90°

F = Bil sin 90 ° = Bil
Q-55. distinguish between ammeter and voltmeter.

Ammeters	Voltmeter
i) A small resistance connected in parallel to a galvanometer constitues moments	i) A high resistance connected in series to a galvanometer constitutes voltmeter.
ii) Ammeters is a device used to measure current in amperes.	ii) Voltmeter is a device and to measure potential difference in volts
iii) Ammeter is always connected in series in a circuit.	iii) Voltmeter is always connected in parallel in circuit.
iv) The resistance of an ammeter is low.	iv) The resistance of an voltmeter is very large.

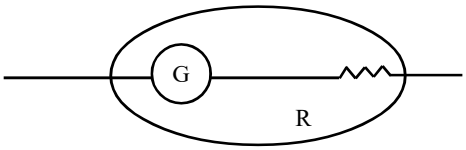
56) How do you convert a moving coil galvanometer into a ammeter

A) MCG can be converted into ammeter by connnecting a low resistance in parallel to it.



Q-57. How do you convert a moving coil goluanometer into a voltmeter?

A) MCG can be converted into voltmeter by connecting a high resistance in series to it



Current Electricity:

Q-58. Why is manganin, used for making standard resisters?

A) Temperature Co-effiecient of resistance of manganin is very less. So its resistance is almost constant over wide range of temperature. Due to this reason manganin is used to prepare standard resistors.

Q-59. The sequance of bonds marked on a carbon resistor all : red, red, red, silver. What is its resistance of tolerance?

A) Resistance : 22×10^2

Tolerance : $\pm 10\ \%$

Q-60. Write the colour code of a carbon resistor of resistance 23 Kilo ohms?

RC 23 Kilo Ohms $=23 \times 10^3$ ohms

Colour code: Red, Orange, Orange

Q-61. Why are household appliances connected in parallel?

Ans: If the house hold appliances are connected in parallel, the potential difference across each is same as that of applied voltage. If one of the appliance is fused. The remaining appliances will continue to work because applied voltage is not effected.

Electromagnetic Induction

Q-62. Define magnetic flux:

Ans: Magnetic flux: The Total number of magnetic lines of force passing through a normal surface placed in a magnetic field is called magnetic flux.

Magnetic flux $\varnothing = \vec{B} . \vec{A} = BA\cos\theta$

Where θ is the angle between area vector and the uniform magnetic field $\vec{B}$.

Q-63. State faradays laws of elctromagnetic induction.

Ans: Faraday's Laws:

a) Whenever magnetic flux linked with a coil changes, emf is induced in it.

b) The induced emf is proportional to tthe negative rate of change of magnetic flux linked with the coil.

$\varepsilon \alpha \frac{-d\phi}{dt}$ (or) $\varepsilon = \frac{-d\phi}{dt}$ (Proportionality constant K=I)

For N turns $\varepsilon = -N\frac{d\varnothing}{dt} = -N\frac{\varnothing_2 - \varnothing_1}{t}$

Q-64. State lenz's law.

Ans: lenz law: The direction of induced emf is always such that it tends to oppose the change in the magnetic flux that caused it e= $\frac{d\phi}{dt}$

Q-65. What are eddy currents?

Ans: Eddy currents: When the large magnetic field in a metal changes with time, induced emf is produced which makes metal to move on closed paths these are called eddy currents.

Q-66. Define 'inductance.

Ans: Inductance : The ratio of magnetic flux - linkage to current is called inductance. $L = \frac{Q}{i}$

The S.I unit of inductance is Henry.

Q-67. What do you understand by "Self Inductance."

Ans: Self Inductance

The Production of induced emf in isolated coil due to change in current in the same coil is known as self inductance.

$$e \propto \frac{d\varnothing}{dt} \Rightarrow e = \frac{-L\,di}{dt}$$

Where 'L' is constant known as coefficient of self inductance.

Alternating Current :

Q-68. A transformer converts 200v ac into 2000 v ac. calculate the number of turns in the secondary if the primary has 10 turns.

Vp= 200v; vs = 2000 v; Np=10; Ns=?

$\frac{Ns}{Np} = \frac{Vs}{Vp}$ or $\frac{Ns}{10} = \frac{2000}{200} \Rightarrow Ns = 100$

Q-69. What type of transformer is used in a 6V bed lamp?
Ans: A step down transformer is used in a 6V bed lamp?
Q-70. What is the phenomenon involved in the working of a transformer?
Ans: Transformer works on the principle of mutual induction between two coils linked by a common magnetic flux.
Q-71. What is tranformer ratio?
Ans: The ratio of output emf to the input emf in a transformer is called transformer ratio.
This is equal to the ratio between number of turns in the secondary to the number of turns in the primary.

Transformer ratio $\frac{V_s}{V_p}$ = $\frac{\text{Number of turns in secondary (Ns)}}{\text{Number of turns in primary (Np)}}$

Q-72. Write the expression for the reactance of (i) an inductor and (ii) a capacitor

A. i) Inductive reactance (x_L) =WL ii) Capacitive reactance (xc) = $\frac{1}{W\ C}$

Q-73. What is the phase difference between Ac emf and current in the following pure resistor, pure inductor and pure capacitor.
Ans: a) In pure resistor a.c circuit, there is no phase difference between emf and current.

b) In pure inductor a.c circuit, current lags behind the e.m.f $\frac{\pi}{2}$ radian (or) $90°$

c) In pure capacitor a.c circuit, current leads emf by $\frac{\pi}{2}$

Q-74.Define power factor. On which factors does power factor depend?
Ans: Power factor:- Power factor is defind as the ratio of true power to apparent power of an A.C. Circuit.
Q-75. What is meant Wattless component of current ?
Ans: Wattless component of current:
The Power dissipated in the circuit is zero even though a current flowing in the circuit. This current is called wattless current since this current does not perform any work, this current may also be called ideal current. Such a current flows only in purely inductive or in purely capacitive circuits.
Q-76. When does LCR series circuit have minimum impedence?

Ans: When $X_L = X_c$ Or $Lw = \frac{1}{cw}$ then $\tan\varnothing = 0$ or $\varnothing = 0°$

Thus there is no phase difference between current and potential difference therefore, the given LCR ckt is equivalent to a given resistive circuit. The impedence of such LCR circuit is given by Z=R. Which is minimum.
Q-77. What is the phase difference between voltage and current when the power factor in LCR series circuit is unity?

Ans: When the power Cos $\varnothing$ = 1 (or) then $\varnothing = 0°$ Hence the phase difference between voltage and current is $0°$.

ELECTROMAGNETIC WAVES:

Q-78. What is the average wave length of X-Ray?

Ans: X-Rays covers the range of wave length from 1 nm to 10^{-3} nm.

Average wavelength $\frac{=1+0.001}{2}$ $\frac{1.001}{2} = 0.5005\text{nm}$

Q-79. Give any one use of infrared rays.

Ans:

1. Infrared rays are used in physical therapy.
2. Infrared rays from sun keeps the earth warm and hence help to sustain life on earth due to green house effect.

Q-80. What happens to electromagnetic radiation if the wave length is doubled, What happens to the energy of photon?

Ans- $E = \frac{hc}{\lambda} \Rightarrow E \alpha \frac{1}{\lambda} \Rightarrow \frac{E_1}{E_2} = \frac{\lambda_2}{\lambda_1} \Rightarrow \frac{E}{E_2} = \frac{2\lambda}{\lambda} = E_2 = \frac{E}{2}$

the energy of photon reduces to half of its initial value.

Electromagnetic Waves:-

Q-81. What is the principle of production of electromagnetic waves?

Ans: Principle of production of electromagnetic waves:-

According to maxwell, accelerated charges, in perpendicular electric and magnetic fields. produce. Electro magnetic waves. The field change within time and space.

Q-82. What is the ratio of speed of infarred rays and ultraviolet rays in vaccum?

Ans: Both infrared rays and ultraviolet rays travel with speed of light in vaccum. Hence the ratio of their speed is 1:1.

Q-83. What is the relation between the amplitiudes of the electric and magnetic fields in free space for an electromagnetic wave?

Ans:- If E_o and B_o are the amplitudes of the electric and magnetic field then relation is $\frac{E_o}{B_o} = C$

where 'C' is velocity of light in vaccum.

Q-84. What are the applications of microwaves?

Ans: Applications of microwaves: Microwaves are used.

a) in radar and telecommunications.

b) To analyse the fine details of the molecular structure

c) Basing on the microwaves, speed guns are designed which are used to time fast balls, and in Tennis serves and automobiles

d) microwave oven is a domestic appliance to cook of the food items.

Q-85. Microwaves are used in radars why?

Ans: The wavelength of microwaves are short. Hence these are used in rador systems which are used in aircraft navigation.

Q-86. Give two uses of infrared rays?

Ans: 1. To take photographs in fog 2. In physiotherapy

3. In both for military purpose and to observe growth of crops.

Semi Conductor Electronics

Q-87. What is a n-type semi conductor? What are the majority & Minority charge carries in it?
Ans: n-type semiconductor:- The semiconductor formed by doping pentavalent element to it, is called n-type semiconductor, Electrons are the majority charge carriers and holes are minority charge carriers in it.

Q-88. What is intrinsic and extrinsic semiconductors?
Ans: Intrinsic Semiconductor: Pure semiconductors are called intrinsic semiconductors
ex:- Ge, Si etc.
Extrinsic semiconductors: The semiconductors doped with impurity care called extrinsic semiconductors Ex:- P-type and n-type.

Q-89. What is P -type semiconductor? What are the majority and minority charge carriers in it?
Ans: P-Type semiconductor : When trivalent impurity is added to a pure semiconductor then it is called P-Type semiconductor.
Majority charge carriers: In n-type semiconductor majority charge carriers are holes.
Minority charge carriers :- In P-tyype semiconductor minority charge carriers are electrons.

Q-90. What is a P-n junction diode? Define depletion layer?
Ans: P-n Junction diode:- When P - type and n-type semiconductor are separated by junction and it is has two terminal is called p-n junction diode.
Depletion layer:- A region without any charge carriers are formed a p-n junction due to the recombination of electrons and holes is called depletion layer.

Q-91. How is a battery connected to a junction diode in 1) forward and 2) reverse biase?
Ans : P-region is connected to positive terminal of a battery and n-region is connected to negetive terminal of a battery. Then it is called forward biase. The current will be an order of few milli amperes.
Reverse Biase:- P-Region is connected to negative terminal of a battery and n-region is connected to a positive terminal of a battery. Then it is called reverse biase.

Q-92. What is maxmum percentage of rectification in half wave and full wave rectifiers?
Ans:-
1. Maximum efficiency of half-wave rectifier is 40.6%
2. Maximum efficiency of full - wave rectifier is 81.2%

Q-93. What is zener voltage (V_z) and how will a zener diode be connected in circuits generally?
Ans: Zener voltage:- In a p-n junction diode in the reverse biase current increases suddenly due to the rupture (breakage) of co-valent bonds. This break down voltage is called Zener voltage.
A Zener diode is connected in circuits in reverse bias.

Q-94. Write the expressions for efficiency of a full wave rectifier and half wave rectifier.
Ans: 1 for full-wave rectifier, efficiency

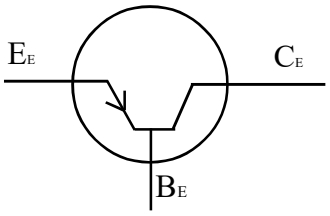
$$n = \frac{0.812RL}{rf + RL}$$

2. For half-wave rectifier, efficiency

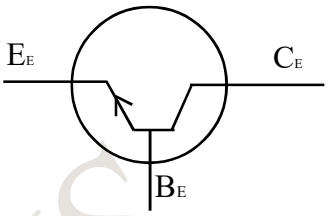
$$n = \frac{0.406RL}{rf + RL}$$

Where rf= forward resistance of diode and RL = load resistance.

Q-95. What happens to width of the depletion layer in a P-n junction diode when its
1) forward biased
2) reverse biased
Ans: 1. In forward bias condition, width of depletion layer decreases.
2. In reverse bias condition, width of depletion layer increases.
Q-96. Draw the circuit symbols for P-N-P and N-P-N transitors?
Ans: The symbols of P-N-P and N-P-N transittor are given below:-



P-N-P Transitor



N-P-N Transitor

Q-97. In which bias a zemer diode can be used as voltage regulator?
Ans: Zener diode can be used as a voltage. regulator by operating it in the breakdown region in reverse bias condtion.
Q-98. Define amplifier and amplification factor?
Ans: Amplifier: Amplifier is a device used to raise the strength of weak signals.
Amplification factor:- Amplification factor is the ratio between output to the input voltage

$$A = \frac{\Delta VcE}{\Delta VBE}$$

Q-99. Which gates are called universal Gates?
Ans: NAND gate and NOR gate are known as the basic building blocks of logic gates or universal gates.
Because any logic gate can be constructed by using only NAND gates or NOR gates.
Q-100. Write the truth table of NAND gate. How does it differ from AND gate.
Ans:
1. NAND gate:-

A	B	Y=A.B
O	O	1
1	O	1
O	1	1
1	1	O

2. AND gate:-

A	B	Y=A.B
O	O	O
1	O	O
O	I	O
1	1	1

Communication Systems

Q-101. What are the basic blocks of a communication system

Ans: Basic blocks of commuunication system are

1) Transmitter 2) Transmission channel 3) Receiver

Q-102. What is world wide web (WWW)?

Ans: A world wide web (WWW): WWW may be regarded as the encylopedia of knowledge accessible to every round the clock throughout the year.

Tim berners - Lee invented the world wide web.

Q-103. Mention the frequency range of speech signals?

Ans: For speech signals, the adequate frequency range is between 300HZ and 3100 HZ speech signals require a bandwidth of 2800 HZ.

Q-104. What is sky wave propogation.

Ans: Long distance short wave communication is possible by ionosphere reflection called sky wave propogation. is used in the inosphere frequency ranges from few MHz to about 30 MHz

Q-105. Mention the various parts of ionosphere.

Ans: Different parts of ionosphere

S.No.	Name of the layer	Height over earths surface
1	Part of stratosphere (D)	65-75 km
2	Part of stratosphere (F)	100 km
3	Part of mesosphere (F1)	170 -190 km
4	Thermosphere (F2)	300 km at night, 250-400 km during day time

Q-106. Define modulation. Why is it necessary?

A) Modulation:-

The Process of combining audio frequency (low frequency) signal with high frequency signal is called modulation. modulation is neccessary for the following reasons.

1) to reduce the size of antenna
2) to increase the effective power radiated by antenna.
3) to avoid the mixing up of signals from different transmitters.

Q-107. Mention the basic methods of modulation?

A The basic methods of modulation are?

1) amplitude modulation (AM).
2) Frequency modulation (FM) and
3) Phase Modulation (PM)

Q-108. Which type of communication is employed in mobile phones?

Ans: The mobile phones space wave communication is used.

*******The End******