

Unit-1 (True / False)

1. Unit of a capacitor is Farad (True / False)
2. Electric lines of forces do not move tangent to their path. (True / False)
3. Work done on an equipotential is not equal to zero. (True / False)
4. S.I. Unit of Electric field intensity is N/C. (True / False)
5. Capacitor is used to store electric charges (True / False)
6. Is torque is a vector quantity (True / False)
7. Glass rod attains negative charge when it is rubbed with silk cloth. (True / False)
8. Two opposite charges are repel from each other. (True / False)
9. Is electric field is a vector quantity. (True / False)
10. Energy of a capacitor is $\frac{1}{2}cv^2$ (True / False)
11. Do the coulombs law and gauss's law complinart each other. (True / False)
12. Two equipotential surfaces never interest each other (True / False)
13. Vande-Graff generator accelerates only positive charges particles (True / False)
14. S.I. Unit of polarization vector in Cm^{-2} (True / False)
15. The net charge on a current carrying conductor is zero. (True / False)
16. The capacity of a capacitor is $\frac{A\Sigma_0}{d}$ (True / False)
17. If three capacitors are connected in parallel the capacitor is equal to their sum. (True / False)
18. Dielectric constant of water is 81 (True / False)

19. The value of ϵ_0 is $8.85 \times 10^{-12} \text{C}^2 \text{N}^{-1} \text{M}^{-2}$ (True / False)

Unit -1 (2 marks)

1. Is electric field intensity a vector or scalar quantity.
2. What is the nature of symmetry of field due to a single point charges.
3. What is intensity of electric field inside a charged spherical shell.
4. Name the device used to store electric charges.
5. Name any polar molecule.
6. Three capacitances $1 \mu\text{F}$, $2 \mu\text{F}$, and $3 \mu\text{F}$ are connected in parallel. The equivalent capacitance is
(a) $\frac{5}{6} \mu\text{F}$ (b) $6 \mu\text{F}$
(a) $\frac{1}{6} \mu\text{F}$ (b) $\frac{11}{16} \mu\text{F}$
7. Coulomb's force between two point charges varies with distance 'r' between them as.
(a) r (b) $\frac{1}{r}$ (c) r^2 (d) NC^2
8. S.I. unit of electric field intensity is
(a) NC (b) NC^2
(c) NC^{-1} (d) $\text{N}^{-1} \text{C}$
9. S.I. unit of electric dipole moment is
(a) Am (b) Am^{-1}
(c) Cm (d) Cm^{-1}
10. Torque experienced by an electric dipole of dipole moment \vec{P} in a uniform electric field E is

- a) $\vec{T} = \vec{E} \times \vec{P}$ (b) $\vec{T} = \vec{E} \times \vec{P}$
(c) $T = \vec{P} \times \vec{E}$ (d) $T = \vec{P} \cdot \vec{E}$
11. Electric flux ϕ through a closed surface enclosing an electric dipole is
(a) $\epsilon_0 q$ (b) q
(c) $\frac{q}{\Sigma_0}$ (d) Zero
12. Work done in moving a positive charge on a equipotential surface is
(a) Negative (b) Positive
(c) Zero (d) infinite
13. S.I. unit of electric potential is
(a) NC^{-1} (b) Volt (c) JC (d) $J^{-1}C$
14. Vande-graff generator is used to accelerate
(a) positively charged particle
(b) Negative charged particle
(c) Neutral charged particle
(d) None of these
15. Dielectrics in a capacitor, would.
(i) Increases Capacity of a capacitor
(ii) Decreases
(iii) No change
(iv) None of these
16. Dielectric material must be

- (a) resistor (b) Insulator
(c) conductor (d) semiconductor
17. Unit of charge is
(a) coulomb
(b) Ampere
(c) Volt
(d) None of these
18. Which type of charge will attain on glass rod, when it is rubbed with silk cloths.
(a) Positive
(b) Negative
(c) Neutral
(d) All above
19. Value of permittivity (Σ_0) is
(a) $8.85 \times 10^{-12} \text{ N}^{-1} \text{ m}^{-2} \text{ C}^2$
(b) 9×10^{19}
(c) $1.6 \times 10^{-19} \text{ C}$
(d) $9.1 \times 10^{-31} \text{ kg}$
20. Dielectric Constant for water is
(a) 80
(b) 18
(c) 81
(d) None of these

21. S.I. Unit of electric field intensity \vec{E} is
- (a) NC^{-1}
 - (b) C
 - (c) N
 - (d) None of these
22. Energy in a capacitor can be stored in the form of
- (a) $\frac{1}{2}CV^2$
 - (b) $2CV^2$
 - (c) CV^2
 - (d) $\frac{1}{2} CV$
23. Device used to store electric Charges is
- (a) Resistor
 - (b) Capacitor
 - (c) Transistor
 - (d) diode
24. Printer that uses electric charges is called
- (a) Inkjet
 - (b) Laser
 - (c) Desk-jet
 - (d) None of these
25. Number of electric lines of passing at certain are known as.
- (a) Electric field

- (b) Electrostatic
 - (c) Electric flux
 - (d) electric lines of forces.
26. The lines of forces are said to be
- (a) Real
 - (b) Imaginary
 - (c) Drawn to trace the direction
 - (d) Not Significant.
27. The potential difference between two point is given by
- (a) $V = \frac{E}{Q}$ (b) $V = \frac{Q}{E}$ (c) $V = \frac{W}{Q}$ (d) $V = \frac{Q}{W}$
28. The charge on an electron is
- (a) $1.6 \times 10^{-19} C$ (c) $-1.6 \times 10^{-19} C$
(b) $9.1 \times 10^{-31} C$ (d) $-9.1 \times 10^{-31} C$
29. Dielectric introduced in the capacitor, helps to _____ the capacitance of the capacitor.
- (a) Increases
 - (b) Decreases
 - (c) Remain Same
 - (d) None of these

Unit -1 Maths 3 : Very Short

- Q.1 Define 1 Coulomb. of Charge
- Write down the difference between a conductor and Insulator.
 - Write down the principle of a capacitor
 - Define electric dipole.
 - Define quantisation of charge.
 - Find the equivalent capacitor if 2pF, 3 pF and 4 pF are connected in parallel.
 - Define Gauss Law.
 - State any two properties of electric charges.
 - Prove the no work can be done on the equipotential surface.
 - Define dielectrics.
 - Why nichrome wire is used in heater or in electric appliances.
 - What does $q_1 + q_2 = 0$ signify.
 - Define electric flux.

4 marks

- Write down the principle of vandegraff generator and its two uses.
- What are dielectrics. How they effect the capacity of a capacitor.
- Define gauss law. Write its expression for infinite charge on a straight conductor.
- Distinguish between electric potential and potential difference.
- Prove that electric field in \perp to equipotential surface.

Chapter 2 (Current Electricity)

- Unit of current is Ampere. (True/ False)

2. Ohmic conductor obey Ohm's law (True/ False)
3. Resistivity of constantan wire is not high (True/False)
4. Insulators are bad conductors of heat and electricity. (True/False)
5. Resistance will decrease when temperature increases. (True/False)
6. Nichrome wire is not used in heaters. (True/False)
7. Tolerance of gold line in a resistor is $\pm 5\%$ (True/False)
8. The order of the drift-velocity of an electron in a conductor is 10^{-5} m/sec. (True/False)
9. Is current density is a vector quantity
10. House hold electric circuit is connected in series
11. Electron are negatively charged particle.
12. Copper Wires are better than aluminium wire.
13. Electric circuit generates heat after a longer use.
14. Electron are present in nucleus
15. S.I. unit of electric power is _____.
(a) Joule (b) Ampere (c) Watt (d) Ohm.
16. Instrument used for measuring electric current is
(a) Galvano meter (b) Ammeter (c) Voltmeter (d) Potentiometer.
17. What is the most commonly used conductor is
(a) Copper (b) Aluminum (c) Gold (d) Silver
18. Give the name of components which opposes the flow of current
(a) Capacitor (b) Resistor (c) Inductor (d) E.M.F.
19. S.I. Unit of Electric current is

(a) Ohms (b) Volt (c) Ampere (d) Watt.

20. An Ideal voltmeter would have an

- (a) Infinite resistance
- (b) Very low resistance
- (c) Double the resistance
- (d) Resistance equal to the circuit.

21. Resistance 'R' of wire of length 'L' is given by the relation.

- (a) $R = \frac{L}{\int A}$
- (b) $R = \frac{L}{A}$
- (c) $R = \int \frac{\ell}{A}$
- (d) None of these

3 marks (Very Short)

1. Write down the difference between Ohmic and non-ohmic conductors.
2. Write down the principle of wheat stone bridge.
3. Write down the principle of Potentiometer.
4. If three resistors 2Ω , 3Ω , and 5Ω are connected in series. Find the effective resistance.
5. Define ohm's Law.
6. Define drift velocity.
7. Define electric Power.
8. Define super-conductivity.
9. A copper wire is stretched so as to double its length. What is the effect on its resistivity.
10. What is the basis of junction law.

11. Why is the meter bridge given this name.
12. What is a slide wire bridge.
13. Write down the effect of temperature on resistance.
14. Write down the properties of a good conductors.
15. What are the limitation of ohm's law (any two).

4 marks

1. Define resistance. On which factor does it depends.
2. Write down the difference between e.m.f. and (P.D.) Potential difference.
3. State Kirchoff's Law.
4. Magnin or Eureka are used for making standard resistance coil. Why.
5. Write down the principle of Meter bridge and write the unit of resistance.
6. Why copper (Cu) is considered as good conductor for electricity.
7. Compare the e.m.f of two cells by using potentiometer.
21. Positive electrode is known as.
 - (a) Cathode
 - (b) Anode
 - (c) Anode tube
 - (d) Cathode tube.
22. Conductance is reciprocal of
 - (a) resistance
 - (b) Inductance
 - (c) reluctance
 - (d) Capacitance
23. Three resistors of 10Ω , 15Ω , 20Ω connected in parallel. the total resistance is
 - (a) 45Ω
 - (b) 55Ω
 - (c) 60Ω
 - (d) 40Ω
24. Best conductor of electricity is
 - (a) Iron
 - (b) Silver
 - (c) Copper
 - (d) Carbon
25. The filament of an electric bulb is made of

- (a) Carbon (b) Aluminum (c) Tungstan (d) Nickel
26. A closed switch has a resitance of
(a) Zero (b) Infinity (c) 50Ω (d) 100Ω
27. Electric current passing through the circuit produces
(a) Magnetic effect (b) Luminous effect
(c) Thermal effect (d) Chemical effect
28. The curve representing ohm's law is a
(a) Linear (b) Parabola
(c) Hyperbola (d) ellipse
29. given the name of material which contain lots of free e.
(a) Insulator (b) conductors
(c) Semi-conductors (d) None of these
30. In electric heating appliances, the material of heating element is
(a) Brass (b) Nichrome
(c) Silver (d) Copper
31. KWH is a unit of _____.
32. Power dissipated resistance is given by _____ in.
33. Out of Copper/ Paper, which is insulating natural _____.
34. S.I. unit of current is _____.
35. Bulb in a street light are connected in _____. (Series or parallel)

Unit -III

MAGNETIC EFFECTS OF CURRENT AND MAGNETISM

- _____ the Danish scientist discovered the magnetic effect of current.
[Ans. Oersted,]
- S.I. unit of magnetic field is
(a) weber (b) maxwell (c) tesla (d) gauss
- S.I. unit of magnetic flux is _____. (weber)
- State true or false : - magnetic susceptibility of diamagnetic substance is negative (True and False)
- Match the following :
Diamagnetism a) strongly attracted by magnet
Paramagnetism b) strongly repelled by magnet
Ferromagnetism c) weakly attracted by magnet
- _____ rule gives deflection of a compass needle placed near a current carrying wire.
- Magnetic field is a scalar quantity (True/ False)
- Work done by a magnetic field on a moving charge particle is _____.
- Magnetic field inside a current carrying solenoid is :-
(a) $\mu_0 nI$ (b) $\frac{1}{2} \mu_0 nI$ (c) 0 (d) $\frac{1}{3} \mu_0 nI$
- Two current carrying wires carrying current in same direction repel each other T/F
- S.I. unit of magnetic dipole moment is
(a) Am^2 (b) Am^{-1} (c) TmA^{-1} (d) Wm^{-2}

12. The value of constant $\frac{\mu}{4\pi}$ is
 (a) 10^{-7}TmA^{-1} (b) 10^7TmA^{-1} (c) 9×10^9 (d) $3 \times 10^8 \text{m/sec}$.
13. Dimensional formula for (magnetic field) B is _____. (True/ false)
14. At poles angle of Dip is 90° .
15. Magnetic Lorentz force on a moving charge particle of velocity v in a transverse magnetic field is
 (a) Zero (b) $q v B$ (c) $\mu_0 n I$ (d) $\frac{1}{2} \mu_0 n I$
16. The poles of the magnet in moving coil galvanometer are made concave to get _____ magnetic field.
17. Magnetic dipole moment is a scalar quantity. True / False
18. S.I. Unit of pole strength is
 (a) Am^2 (b) Am^{-1} (c) T (d) $\text{NA}^{-1} \text{m}^{-1}$
19. Ammeter is a high resistance device True / False
20. Voltmeter is a low resistance device True / False
21. Ammeter is always connected in series in the circuit True / False
22. Voltmeter is always connected in series in the circuit True / False
23. Unit of magnetic susceptibility is
 (a) Am^{-1} (b) Am^2 (c) Nounit (d) Wbm^{-2}
24. Match the following
- | | |
|---------------------------------|----------------------|
| 1. Magnetic flux (ϕ_B) | (a) Tesla |
| 2. Magnetic field (\vec{B}) | (b) Am^{-1} |

3. Magnetic susceptibility (χ_m) (c) Weber
4. Magnetic Intensity (\vec{H}) (d) No unit
25. The materials suitable for making electromagnets should have
- (a) high retentivity and high coercivity
 - (b) low retentivity and low coercivity
 - (c) high retentivity and low coercivity
 - (d) Low retentivity and high coercivity
26. A charge q moves in a region, where magnetic \vec{B} field and electric field \vec{E} both exist. Then total force on it is
- (a) $q\vec{E} + q(\vec{B} \times \vec{v})$ (b) $q\vec{B} + q(\vec{E} \times \vec{v})$ (c) $q\vec{E} + q(\vec{v} \times \vec{B})$ (d) $q(\vec{v} \times \vec{B})$
27. A charged particle moves with velocity \vec{v} in a uniform magnetic field \vec{B} . The magnetic force on the charged particle is
- (a) never zero
 - (b) Always zero
 - (c) Zero, if \vec{B} & \vec{v} are perpendicular
 - (d) Zero, if \vec{B} & \vec{v} are parallel.
28. To convert galvanometer into ammeter is used
- (a) A high resistance in parallel with its coil.
 - (b) A high resistance in series with its coil
 - (c) A low resistance in series with its coil
 - (d) A low resistance in parallel with its coil.
29. To convert a galvanometer into voltmeter we need.
- (a) A high resistance connected in parallel

- (b) a low resistance connected in series
 (c) a high resistance connected in series
 (d) a low resistance connected in parallel.
30. If number of turns, area and current through a coil are n , A and I respectively, then its magnetic moment is
- (a) nIA (b) n^2IA (c) nIA^2 (d) $\frac{nI}{\sqrt{A}}$
31. The magnetic moment of a diamagnetic atom is
- (a) equal to one (b) equal to zero
 (c) Greater than one (d) between zero and one.
32. A diamagnetic material in a magnetic field moves
- (a) perpendicular to the field (b) From weaker to stronger parts
 (c) from stronger to weaker parts (d) None of the above
33. if a diamagnetic substance is brought near north or south pole of a bar magnet, it is
- (a) attracted by both the poles (b) repelled by both the poles
 (c) attracted by the north pole but repelled by the south pole
 (d) repelled by north pole but attracted by south pole.
34. Angle of dip is 90° at
- (a) equator (b) poles (c) Both a & b (d) none of these
35. Domain formation is the basic feature of
- (a) ferromagnetism (b) diamagnetism
 (c) paramagnetism (d) all of the above
36. A permanent magnet attracts

- (a) all substances
 - (b) Only ferromagnetic Substances
 - (c) Some Substances and repel others
 - (d) ferromagnetic substances and repels all other
37. A tape recorder records sound in the form of
- (a) electrical energy
 - (b) Magnetic field on the tape
 - (c) Magnetic energy
 - (d) Variable resistance on the tape.
38. The best material for the core of a transformer is
- (a) Stainless steel
 - (b) mild steel
 - (c) hard steel
 - (d) soft iron
39. When a magnetic substance is heated, then it
- (a) remains the same
 - (b) Looses its magnetism
 - (b) becomes a strong magnet
 - (d) either (a) or (c)
40. If magnetic material, moves from stronger to weaker parts of magnetic field, then it is
- (a) Diamagnetic
 - (b) Paramagnetic
 - (c) Ferromagnetic
 - (d) none of above

41. Cyclotron is used to accelerate
- | | |
|-------------------|-------------------|
| (a) Electrons | (b) Neutrons |
| (c) Positive ions | (d) none of above |

Short Answer Type Questions

42. Why two magnetic field lines never intersect?
43. State Amper Circuital Law.
44. State Biot Savart's Law.
45. What are magnetic lines of force?
46. What is the basic difference between magnetic field and electric field?
47. What is a solenoid ?
48. What is a toroid ?
49. Write the principle of moving coil galvanometer?
50. What is radial magnetic field ?
51. Define current sensitivity of a moving coil galvanometer.
52. Define voltage sensitivity of a moving coil galvanometer
53. Define figure of merit of a galvanometer.
54. How can a galvanometer be converted into voltmeter ?
55. How can a galvanometer be converted into ammeter?
56. What is the basic difference between a magnetic line of force and electric line of force.
57. Name the elements of earth's magnetic field.

Numerical

Objective type

The magnetic field at a distance r from a long wire carrying current I is 0.4 tesla. The magnetic field at a distance $2r$ is

- (a) 0.1T (b) 0.2T (c) 0.8T (d) 1.6T

2. In S.I. system permeability has the units of

- (a) Weber metre⁻¹ ampere⁻¹
(b) Weber metre ampere
(c) Weber metre⁻¹ ampere⁻²
(d) Weber metre ampere

3. A proton and an alpha particle enter in a uniform magnetic field with the same velocity. The time period of rotation of alpha particle will be

- (a) four times that of proton
(b) two times that of proton
(c) three times that of the proton
(d) same as that of the proton

3 marks

52. A bar magnet has a magnetic moment of 10Am^2 if its magnetic length is 5 cm, calculate its pole strength.

[Ans: 200 Am.]

53. The vertical component of earth's magnetic field at a place is $\sqrt{3}$ times the horizontal component. What is the value of angle of dip at this place [Ans $\sqrt{3}$]

Short Type 4 marks

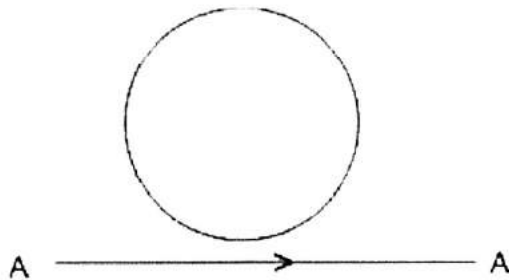
54. Why two parallel current carrying wires carrying current in same direction attract each other?
55. Why two parallel current carrying wires carrying current in opposite direction repel each other?
56. What is the main function of soft iron core used in a moving coil galvanometer?
57. How can a moving coil galvanometer be converted into voltmeter?
58. Write four properties of a bar magnet.
59. Why is am meter connected in series in a circuit.
60. Why is voltmeter connected in parallel in a circuit.
61. State four properties of magnetic lines of force.
62. Define the terms, angle of inclination and angle of declination.
63. Find an expression for magnetic dipole moment of an electron.

Unit IV

ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENTS

Objective type

1. Dimensional formula of magnetic flux is
a. $[ML^2T^2A^{-1}]$ b. $[M^{-1}L^2T^{-2}A^2]$ c. $[ML^2T^{-2}A^{-1}]$ d. $[ML^2T^{-2}]$
2. In Lenz's law there is conservation of
(a) Charge (b) Energy (c) momentum (d) Current
3. The current flows from A and B as shown in figure



- The direction of induced current in the loop is
- (a) Clock wise (b) anticlock wise (c) straight line
(d) none of these
4. Working of an ac generator is based on the principle of
(a) magnetic effect of current
(b) Heating effect of current
(c) Chemical effect of current
(d) electromagnetic Induclier
 5. In an A.c. circuit containing only capacitor, the current.
(a) Leads voltage by 180°

- (b) Remains in phase with voltage 180°
 (c) leads voltage by 90°
 (d) lags voltage by 90° [Ans. C]
6. The power factor varies between
 (a) 2 and 2.5 (b) 3.5 to 5 (c) 0 to 1 (d) 1 to 2
7. A transformer works on the principle of
 (a) convertor (b) Inverter (c) Mutual induction
 (d) Self induction
8. In a pure resistive circuit phase difference between current and voltage is
 (a) zero (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{4}$ (d) π
9. In a pure inductive circuit voltage leads current by phase of
 (a) zero (b) $\frac{\pi}{4}$ (c) π (d) $\frac{\pi}{2}$
10. In an ac circuit, with voltage V and current I, the power dissipated is
 (a) $\frac{1}{2}VI$ (b) $\frac{1}{\sqrt{2}}VI$ (c) VI (d) depends on the phase angle between V & I
11. If N is the number of turns of a coil, the value of the self inductance varies as
 (a) N^0 (b) N (c) N^2 (d) N^{-2}
12. 1 weber = _____ maxwell
13. S.I. unit of magnetic flux is _____.
14. Henry is S.I. unit of mutual inductance True /False
15. Lenz's law violates law of conservation of energy. True /False
16. Transformers are used only to control A.C. True /False

17. An E.M.F. is induced across a conductor if it remains stationary within a magnetic field . True /False
18. At resonance $X_L = X_C$ True /False
19. At resonance current in the circuit in minimum True /False
20. The dimensions of \sqrt{LC} are that of time. True /False
21. Relation between peak value and rms value of ac is, $I_{rms} = \underline{\hspace{2cm}}$
22. Average value of ac over a complete cycle is $\underline{\hspace{2cm}}$
23. Match the following :
- | | |
|--------------------|----------------------------|
| (a) A.C. Voltmeter | (i) DC voltage |
| (b) DC- voltmeter | (ii) Hot wire instrument |
| (c) Transformer | (iii) Particle accelerator |
| (d) Cyclotron | (iv) EMI |
24. Rms value of ac source $I = 6 \sin 314 t$ is $\underline{\hspace{2cm}}$.
25. Maximum value of ac source $I = 6 \sin 314 t$ is $\underline{\hspace{2cm}}$.
26. An inductor is used to control ac. True/ false
27. Inductor offers zero resistance to dc True/ false
28. Power factor of a pure inductive circuit is $\underline{\hspace{2cm}}$.
29. Power factor of a pure resistive current is $\underline{\hspace{2cm}}$.
30. Power factor of a pure capacitive circuit is $\underline{\hspace{2cm}}$.
31. Power factor of a LCR series circuits is $\underline{\hspace{2cm}}$.
32. In step up transformer number of turns in primary coil is greater than no. of turns in secondary coil. True/ false
33. The core of transformer is laminated to reduce heat loss due to $\underline{\hspace{2cm}}$.

34. If an ac main supply is given to be 220 V the average e.m.f during a positive half cycle will be
(a) 198V (b) 220V (c) 240 V (d) $220\sqrt{2}$ V.
35. In a circuit, the current lags behind the voltage by a phase difference of $\frac{\pi}{2}$. The circuit contains which of the following
(a) Only R (b) Only L (c) Only C (d) R & C

Very Short type (2 numericals)

1. Define electromagnetic induction.
2. Define magnetic flux
3. State Lenz's Law
4. State Flemming right hand rule.
5. What is basic cause of induced e.m.f in a circuit ?
6. What are eddy currents ?
7. Define S.I. unit of self inductance.
8. Define one henry.
9. Define S.I. unit of mutual Inductance.
10. Define mutual induction.
11. Define self induction.
12. A metallic wire 1 m in length is moving normally across a field of 0.1 tesla with a speed of 5 ms^{-1} . Find the emf between the ends of the wire.
13. A 100 mH coil carries a current of 1A. Find the energy stored in it.
14. Define power factor.
15. What do you mean by impedance of LCR circuit ?

16. Write the principle of transformer.
17. When are voltage and current in LCR circuit in phase ?
18. Define resonance frequency of LCR series circuit.
19. What is inductive reactance ?
20. What is capacitive reactance ?
21. What is the phase relationship between current and voltage in an inductor ?
22. What is the phase relationship between current and voltage in a capacitor ?
23. What is the phase relationship between current and voltage in pure resistive circuit ?
24. Which value of current an ac ammeter measures?
25. The magnetic flux linked with a coil (in wb) is given by the equation.

$$\phi = 5t^2 + 3t + 16$$

Find the e.m.f induced in the coil in fourth second.

[Ans.10v]

Short Answer Type

1. What is magnetic flux ? State its SI unit.
2. Why resistance coils are usually double wound ?
3. What causes sparking in switches, when light is put off ?
4. State the principle of ac generator.
5. State Lenz's Law. Does it violate law of conservation of energy ?
6. Why capacitor blocks dc?
7. Why cannot transformer work on dc?
8. Why is the core of a transformer laminated ?
9. What is copper loss in a transformer ?

10. Why 220 V ac is more dangerous than 220 V dc ?
12. How are energy losses reduced in a transformer ?

Physics Questionnaire for MR students Class XII

Unit 5 Electromagnetic waves

2 marks questions

Multiple choice questions with 1 correct Answer

1. The speed of electromagnetic waves is equal to

- (a) $3 \times 10^8 \frac{m}{s}$ (b) $332 \frac{m}{s}$ (c) $3 \times 10^8 \frac{Km}{s}$ (d) $3 \times 10^8 \frac{cm}{s}$

Answer : (a)

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2. What is the missing term in Ampere Circuital Law ?

- (a) Electric field (b) Magnetic Field (c) Displacement Current
(d) Conduction current

Answer : (c) Page No. 271

3. What is the source of electromagnetic waves ?

- (a) Stationary charge (b) charge moving with uniform velocity
(c) Accelerating charge (d) Moving neutrons

Ans : (c) page no. 274

4. Who first demonstrated the production of electromagnetic waves in laboratory ?

- (a) Maxwell (b) Hertz
(c) Einstein (d) Faraday

Ans : (b) page no. 274

5. What physical quantity is same for Xrays of wavelength $10^{-10}m$, red light of wavelength 6800 \AA and radiowaves of wavelength 500 m ?

(a) Energy (b) Frequency (c) Intensity (d) speed

Ans. : (d) Page No. 286 Q. 8.3

Q. 6 : The speed of electromagnetic waves in vacuum is given by

(a) $c = \sqrt{\frac{\mu_0}{\epsilon_0}}$ (b) $c = \sqrt{\mu_0 \epsilon_0}$ (c) $c = \frac{1}{\sqrt{\mu_0 \epsilon_0}}$ (d) $\sqrt{\frac{\epsilon_0}{\mu_0}}$

Answer (c) page 284

Q. 7 The electric part of an electromagnetic wave is given by $E = 3.1 \cos [1.8y + 5.4 \times 10^6 t] \hat{i}$. The direction of propagation of the wave is along

(a) -x axis (b) + y axis (c) + z axis (d) -y axis

Answer : d

Page No. 287 Q. 8.11

Q. 8 Which of the following electromagnetic wave is detected by human eye ?

(a) visible rays (b) Infrared rays (c) Ultraviolet rays
(d) X-rays

Answer : a page 282

Match the column

Q. 9 1. infrared rays (a) Nuclear reactions
 2. Visible rays (b) Hot bodies and molecules
 3. Gamma Rays (c) Detected by human eye

Answer : 1 (b), 2 (c), 3 (a) Page : 282, 283

Q. 10 1. Radio waves (a) Used in body diagnosis
 2. Micro waves (b) Used in radio & TV communication
 3. X rays (c) Radar System in aircraft navigation

Answer : 1(b), 2(c), 3(a)
page 281, 283

Q11.	Type of em wave	Wavelength range
1.	Radio waves	$10^{-3} \text{ nm} - 1 \text{ nm}$
2.	Light waves	$400 \text{ nm} = 700 \text{ nm}$
3.	X rays	$> 0.1 \text{ m}$

Answer : 1 (c) , 2 (b), 3 (a) Page : 283

Q. 12	Quantity	Equal to
1.	E_0	(a) Power/ Area
2.	P	(b) $B_0 C$
3.	I	(c) $\frac{U}{C}$

Where $E_0 \longrightarrow$ Amplitude of electric field
 $B_0 \longrightarrow$ Amplitude of Magnetic field
 $C \longrightarrow$ Speed of light
 $P \longrightarrow$ Momentum of em waves
 $I \longrightarrow$ Intensity of em waves
 $U \longrightarrow$ energy of em waves

Answer : 1 (b) , 2 (c), 3 (a) page 278, 279

Q. 13 Maxwell Equation	Original Law
1. $\oint \vec{E} \cdot d\vec{s} = \frac{Q}{\epsilon_0}$	(a) Ampere - Maxwell law
2. $\oint \vec{B} \cdot d\vec{s} = 0$	(b) Faraday Law
3. $\oint \vec{E} \cdot d\vec{l} = -\frac{d\Phi_B}{dt}$	(c) Gauss law in magnetism
4. $\oint \vec{B} \cdot d\vec{l} = \mu_0 i_c + \mu_0 \epsilon_0 \frac{d\Phi_E}{dt}$	(d) Gauss law in Electrostatics

Answer : 1 (d), 2 (c) , 3 (b) , 4 (a) page 273

Q. 14 Suppose the electric field part of an electromagnetic wave in vacuum is $E = 3.1 \cos [1.8y + 5.4 \times 10^6 t]$ Then match the column given below :

1. Direction of propagation is	(a) 3.1
2. Amplitude of electric field part (Σ_0)	(d) 5.4×10^6
3. Angular frequency (ω) is	(c) 1.8
4. Wave propagation constant (K)	(d) - y axis

Answers 1 (d), 2 (a) , 3 (b), 4 (c) 287 Page 287

- Q. 15 1. Electromagnetic waves have same (a) wave length
 2. Electromagnetic waves have different (b) speed
 3. Electromagnetic waves have same (c) Frequency
 4. Electromagnetic waves have different (d) phase

Answers : 1 (b) 2(a) 3 (d) 4 (c)
 or 1 (d) 2(a) 3 (b) 4 (c)
 or 1 (b) 2(c) 3 (d) 4 (a)
 or 1 (d) 2(c) 3 (b) 4 (a)

Page No. 275, 285

16. 1. Frequency (ν) (a) $\nu\lambda$
 2. Wavelength (λ) (b) $w/2\pi$
 3. Speed of em wave (c) $2\pi/k$

Answer : 1 (b), 2 (c), 3 (a) page 276

Fill in the blanks : -

17. Electromagnetic waves are _____ waves. (transverse, longitudinal)
 Ans: Transverse waves page 275
18. The speed of electromagnetic waves in vacuum is same as the speed of _____.
 (light/ sound)
 Ans : light page 277
19. Inside a charging capacitor, there is no _____.
 (Conduction Current / Displacement Current)
 Ans : Conduction current Page 272
20. The electric field vector and magnetic field vector in an electromagnetic waves
 are always (Parallel/ perpendicular)
 Ans : Perpendicular
 Page 275
21. If electric field amplitude of an em wave is $E_0 = 120 \frac{N}{C}$ then magnetic field
 amplitude B_0 will be _____. $\left(\frac{120T}{4 \times 10^{-7} T} \right)$
 Answer : $4 \times 10^{-7} T$
 Solution : $E_0 = CB_0 \Rightarrow B_0 = \frac{E_0}{C} = \frac{120}{3 \times 10^8} = 4 \times 10^{-7} T$
 Page No. 286 Q. 8.8.
22. Microwaves have frequencies in the _____ range. (KHz/ GHz)

- Answer : GHz page 281
23. Welders wear special glass goggles or face masks with glass windows to protect their eyes from _____ waves produced by welding Arcs. (Radio waves / UV waves)
 Answer : UV waves page 282
24. _____ waves are often called heat waves. (infrared/ r-rays)
 Answer : infrared page : 285
25. The introduction of displacement current led to the modification of _____ law . (Gauss law in magnetism/ Ampere circuital law)
 Answer : Ampere circuital Law
 Page 272
- True-False Questions
26. An oscillating charge is the source of em waves. (T/F)
 Answer : True
 Page : 274
27. Electric field vector and magnetic field vector in an em wave are parallel to each other and perpendicular to the direction of propagation. (T/F)
 Answer : False
 Page : 275
28. The speed of all types of electromagnetic waves in vacuum is same. (T/F)
 Answer : True
 Page : 276
29. Electromagnetic waves do not carry energy and momentum like other waves. (T/F)
 Answer : False
 Page : 277
30. In microwave ovens, the frequency of microwaves is selected to match the resonant frequency of water molecules so that energy from the waves is transferred efficiently to the KE of the Molecules. (T/F)
 Answer : True, Page 281
31. When a metal target is bombarded by high energy electrons, then infrared waves are produced (T/F) Answer : False
 Solution : X rays are page 283 produced

32. The energy of electromagnetic waves is mainly due to electric field part. The magnetic field carry a small energy. Therefore, we mostly study electric field part of em waves. (T/F)

Answer False Solution : Both carry equal energy Page 284

33. If total energy transferred to a surface in time t is U , then magnitude of total momentum delivered to this surface for complete absorption is $P = \frac{2U}{C}$.

Answer False

Solution : Momentum Transferred is $P = \frac{U}{C}$ page 277

34. Infrared radiation play an important role in maintaining the earth's warmth or average temperature through the green house effect. (T/F)

Answer : True

Page : 282

3 Marks Questions

35. Write one use each of (i) infrared waves (ii) visible rays (iii) Ultraviolet rays
Answer : page 282

36. Write 3 uses of radiowaves.

Answer page 281

37. Explain how microwaves raise the temperature of any food containing water ?
Ans : page 281

38. A plane electromagnetic wave travels in vacuum along Z direction. what can you say about the direction of its electric and magnetic field vectors? if the frequency of the wave is 30 MHz, what is its wavelength ?

Answer : page 286 Q. 8.4

39. Answer the following questions :

(a) Long distance radio broadcasts use short wave bands Why ?

(b) It is necessary to use satellites for long distance TV Transmission ? why ?

(c) Optical and radio telescopes are built on the ground but ray astronomy is possible only from satellites orbiting the earth. Why?

Answer : page 287 Q. 8.15

40. (a) The small ozone layer on top of the stratosphere is crucial for human survival why?

(b) If the earth didn't have an atmosphere, could its average surface temperature be higher or lower than what it is now?

(c) Some scientists have predicted that a global nuclear war on the earth would be followed by a severe 'nuclear winter' with a devastating effect on life on earth. What might be the basis of this prediction.

Ans. Page 287 Q. 8.15

41. The amplitude of magnetic field part of a harmonic electromagnetic wave is 510 nT. What is the amplitude of the electric field part of the wave?

Answer : page 286 Q. 8.7

42. Discuss briefly how are electromagnetic waves produced ?

Answer : page 274

43. Write any six features of electromagnetic waves.

Answer : page 276, 277

44. What are electromagnetic waves? Make a simple diagram of electromagnetic waves.

Answer : page 275

45. (i) Can electromagnetic waves travel in a medium like glass or water?
(ii) Is the speed of light in vacuum and glass are same ? if no write the necessary formula of velocity of light in vacuum and in a medium in terms of electric susceptibility and magnetic permeability.

Answer : page 276

4 Mark Questions

46. (i) Write the following electromagnetic waves in increasing order of their wavelengths.

microwaves, visible rays, ultraviolet rays, rays

(ii) Which of the electromagnetic waves out of these is used to destroy cancer cells?

(iii) Which of the wave out of these is used for lasik eye surgery ?

Answer : page 282, 283

47. What do you mean by displacement current ? How displacement current is produced ? Write the modified ampere circuital law using the expression of displacement current.

Answer : page 270, 271, 272

48. Drive the expression of displacement current inside a capacitor in terms of electric flux.

Answer : page 271

49. Write the names of 4 Maxwell equations and their mathematical expressions.

Answer : page 273

50. Write the name of electromagnetic wave having the following wavelengths and give one use of each of them.

(i) 0.1 m — 1 mm

(ii) 700 nm — 400 nm

(iii) 400 nm — 1 nm

(iv) 1 nm — 10^{-3} nm

answer page 281-283

Physics Questionnaire for MR students class XII

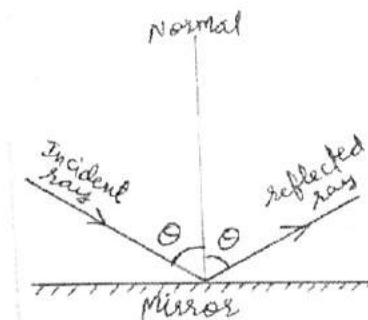
Unit -6 Optics

Multiple choice question : -

1. The highest attainable speed in nature is that of (a) speed of electron (b) speed of light in vacuum (c) speed of neutrinos (d) speed of light in glass

Answer (b) Page 309

2. The following figure indicates which law ?
(a) Law of reflection (b) Law of refraction
(c) Malus Law (d) Brewster's Law



Answer : (a) Page 311

3. Focal plane is a plane
(a) passing through pole & \perp to principal axis.
(b) passing through C and \perp to principal axis.
(c) passing through F and \perp to principal axis.
(d) passing through F and C, dividing the mirror into two parts.

Answer : (c)

page 312

4. The earth takes 24h to rotate once about its axis. How much time does the sun take to shift by 1° when viewed from the earth?
(a) 2 min (b) 3 min (c) 4 min (d) 5 min

Answer : (c)

Page 318 Exa. 9.5

5. If refractive index of water-air interface is 1.33, what will be the critical angle on air-water interface?
(a) 30.38° (b) 48.75° (c) 35.33° (d) 24.41°

Answer : (b)

$$\text{Solution : } \sin C = \frac{1}{\mu} = \frac{1}{1.33} = 0.75 \Rightarrow C = \sin^{-1}(0.75) = 48.75^\circ$$

Page 320

6. Mirage effect is based on
(a) reflection of light (b) Refraction (c) Total internal reflection
(d) Polarization of light

Answer C Page 321

7. For total internal reflection, the angle of incidence must be (a) equal to critical angle (b) less than critical angle (c) more than critical angle (d) 90°

Answer : (c)

page 320

8. In total internal reflection, If $i < i_c$, then
- (a) Total reflection inside denser medium takes place
 - (b) Total refraction in rarer medium takes place
 - (c) wave will get absorbed by surface
 - (d) some part of the waves is reflected & some refracted.

Answer : (d)

Page 320

9. A magician during a show makes a glass lens with $n=1.47$ disappears in a trough of liquid. What is the refractive index of the liquid ?
- (a) 1.47
 - (b) <1.47
 - (c) >1.47
 - (d) $\tan 45^\circ$

Answer : (a)

page 327 exa 9.7

10. 1 Diopre is equal to
- (a) 1 m
 - (b) 1cm
 - (c) 1 km
 - (d) 1 m^{-1}

Answer (d)

Page : 328

11. Suppose that the lower half of the concave mirror's reflecting surface is covered with an opaque material. What will be the effect on the image of the object placed in front of the mirror?
- (a) Mirror will produce no image
 - (b) image size will become half
 - (c) image size will be doubled
 - (d) image size will remain same but its intensity will become half.

Answer : (d)

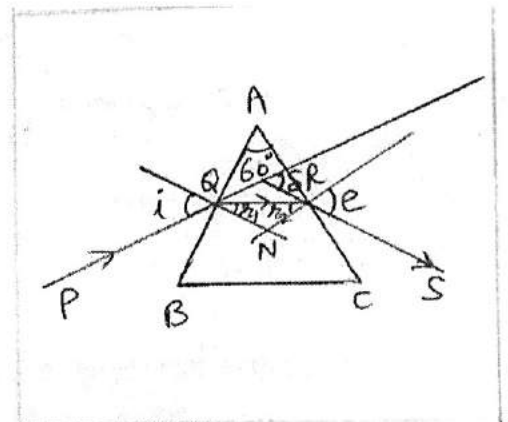
Page No. 315 Exa. 9.1

12. In the given figure
A : 60° , $i = e = 35^\circ$
What is the angle of deviation δ ?
- (a) 10°
 - (b) 130°
 - (c) 25°
 - (d) 50°

Answer (a)

page 331

13. Diffraction is
- (a) Splitting of light into seven colours



- (b) Making a rainbow in sky
- (c) bending of ray of light when an aperture or abstacle comes in its way whose size is very small.
- (d) bending of a ray of light when it moves from rarer to denser medium.

Answer (c)

Page No : 367

14. Unpolarised light is incident on a plane glass surface. What should be the angle of incidence so that the reflected and refracted rays \perp to each other ?

(μ for glass = 1.5)

- (a) 47° (b) 57° (c) 67° (d) 77°

Answer (b)

Solution :- We want to find brewster angle.

as $i + r = 90^\circ$ is possible if $\mu = \tan i_p$

$$1.5 = \tan i_p$$

$$i_p = \tan^{-1} (1.5) = 57^\circ$$

Page 381 exa 10.9

Match the column

15. Equation / formula

Name of Law

1. $\mu_2 = \frac{\sin i}{\sin r}$

(a) Law of reflection

2. $i=r$

(b) Total internal reflection

3. $\sin C = \frac{1}{\mu}$

(c) Law of refraction

Answer 1 (c) , 2 (a) , 3 (b)

Page 310, 317, 320

16. Phenomenon

Law

1. Mirage

(a) Refraction of light

2. Lengthening of the day

(b) Scattering of light

3. Blue colour of sky

(c) Total internal reflection

Answer : 1(c), 2 (a), 3 (b)

page 321, 318, 335

17. Phenomenon

Cause

1. Blue colour of sky

(a) All colour, scattered equally

2. Less scattering of red colour

(b) Blue colour scattered more than red

3. White colour of clouds

(c) Danger signals red

Answer : 1 (b) , 2 (c), . 3 (a) page 335

18. In case of concave mirror, match the column

Position of object

Position of image

- | | | |
|---------------------------|-----|-----------------------------|
| 1. Object at ∞ | (a) | virtual image on other side |
| 2. Object placed beyond C | (b) | real image between F & C |
| 3. Object between F & P | (c) | real image at F |

Answer 1 (c) , 2 (b), 3 (a)

Page 312-314

19. In case of convex lens, match the following

- | | | |
|---|-----|------------------------------|
| 1. A ray passing through optical centre | (a) | will go // to principal axis |
| 2. A ray passing through F after refraction | (b) | will go through F |
| 3. A ray coming // to principal axis after refraction | (c) | will go undeviated |

Answer : 1 (c) , 2 (a) , 3 (b) page 327

20. Lens

sign of focal length

- | | | |
|-----------------|-----|--------------------------------|
| 1. Convex Lens | (a) | focal length taken as positive |
| 2. Concave Lens | (b) | Focal length taken as negative |

Answer 1(a), 2 (b) Page 326

21. In human eye

- | | | |
|--------------------|-----|--|
| 1. Ciliary Muscles | (a) | light enters the eye through this curved front surface |
| 2. Cornea | (b) | Hold the lens at their position & change focal length |
| 3. Optic Nerves | (c) | Carry electric signal to the brain . |

Answer 1(b) 2(a) 3(c)

Page 336

22. Eye Defect

Cause

- | | | |
|------------------|-----|----------------------------------|
| 1. Myopia | (a) | Image formed behind the retina |
| 2. Hypermetropia | (b) | Cornea is not spherical in shape |
| 3. Astigmatism | (c) | Image formed in front of retina |

Answer 1 (c) , 2 (a) , 3 (b) Page 336-337

23. Eye defect

Can be treated by using

- | | | |
|------------------|-----|------------------|
| 1. Myopia | (a) | Convex lens |
| 2. Astigmatism | (b) | Concave lens |
| 3. Hypermetropia | (c) | Cylindrical lens |

Answer : 1(b), 2 (c), 3 (a) Page 336-337

24. In case of doppler effect of light

1. Source of light moving away (a) Produces blue shift
2. Source of light coming closer (b) Produces red shift

Answer 1 (b), 2 (a) Page 358

25. What is the effect on the interference fringes in a young's double slit experiment due to following operations.

1. Screen moved away from plane of slits (a) Fringe width decreases
2. Separation between two slits is increased (b) Fringe pattern becomes coloured
3. Monochromatic source replaced by source (c) Fringe width increases of white light

Answer 1 (c), 2 (a), 3 (b)

page 366 exa 10.4

26.
 1. Interference (a) Electric vector confined in single direction only
 2. Diffraction (b) Equally spaced bright and dark images
 3. Polarisation (c) Intensity falls on moving away from central fringe.

Answer : 1 (b), 2 (c), 3 (a) page 371, 377

27. In case of polarisation of light, for incident unpolarized light

1. Intensity of emergent light is maximum (a) If two polaroids are acrossed
2. Intensity of emergent light is half (b) If a single polaroid is used
3. Intensity of emergent light is zero (c) if two polaroids are parallel

Answer : 1 (c), 2 (b), 3 (a) Page 378

Fill in the blanks : -

28. If angle of incidence is equal to brewster angle, the reflected and refracted rays are always _____. (Parallel, Perpendicular)

Answer : Perpendicular Page 380

29. The distance beyond which the divergence of the beam of width a becomes significant is called _____. (Numerical aperture / Fresnel Distance)

Answer : - Fressnel Distance page 375

30. Two slits are made 1 mm apart and the screen is placed 1m away, the value of fringe separation when blue green light of wavelength 500 nm is used will be _____. (0.5 mm / 1.0 mm)

Answer : 0.5 mm solution :- $\beta = \frac{\lambda d}{d} = \frac{5 \times 10^{-7} \times 1}{10^{-3}} = 5 \times 10^{-4} m = 0.5 mm$

page 366 exa 10.3

31. If a point source of light is taken, then shapes of wave fronts produced by it will be _____ (spherical/ Plane)
Answer : spherical Page 353
32. The least distance of distinct vision for normal vision is _____. (25 cm/ 35cm/ ∞)
Answer : 25 cm Page 336
33. In old age, the flexibility of ciliary muscles decreases \therefore least distance of distinct vision shifts away from 25cm. if an elderly person tries to read a book at about 25 cm from eye, the image appears blurred.
The defect of the eye is called _____. (Hypermetropia/ presbyopia)
Answer : Presbyopia
Page 336
34. Cylindrical lenses are used to correct the defect of vision of the eye called _____. (Myopia, Astigmatism)
Answer : Astigmatism
Page 337
35. Intensity of _____ rainbow is more than _____ rainbow. (primary secondary/ secondary, primary)
(Answer : Primary, secondary) page 335
36. In Rayleigh scattering, the intensity of scattered light is inversely proportional to _____ power of wavelength. (Third/ fourth/ fifth)
Answer : Fourth page 335
37. Sky looks reddish during sunrise of sunset because red colour is scattering _____ than other colours.
Answer :less Page 335
38. The velocity of red colour inside the prism is (maximum/ minimum)
Answer : maximum pages 333
39. In optical fibres, the refractive index of core is _____ than that of cladding. (less/more)
Answer : maximum pages 322
40. Mass density of turpentine oil is less than that of water but its _____ density is higher than water. (electron/ volume / optical)
Answer: optical
Page 317

True False Type Questions

41. A concave mirror always produces real image (T/ F)

Answer : False

Sol: If object is placed between pole and focus, the image is virtual.

page 314

(T/ F)

42. For total internal reflection, the angle of incidence in denser medium must be greater than critical angle.

Answer : True Page 320

43. If focal length of a lens is +40 cm, then the power of lens will be +2D (T/F)

Answer : false

Solution : $f = +40 \text{ cm} = +0.40 \text{ m}$ | $P = \frac{1}{f} = \frac{1}{0.4} = \frac{10}{4} = 2.5 \text{ D}$ page 328
 $= +2.5 \text{ D}$

44. To obtain image at $D = 25 \text{ cm}$ is case of a simple microscope and to have a magnification of 6, one needs a convex lens of focal length $f = 10 \text{ cm}$. (T/F)

Answer : False

Solution : $M = 1 + \frac{D}{f} \Rightarrow 6 = 1 + \frac{25}{f} \Rightarrow 5 = \frac{25}{f} \Rightarrow f = 5 \text{ cm}$

page 339

45. In a compound microscope with one objective and other eye lens, the final image is inverted with respect to the object. (T/F)

Answer : True

46. The refractive index of diamond is much smaller than that of ordinary glass. (T/F)

Answer : False

Solution : μ of diamond is much greater than ordinary glass

page 347 Q. 9.18 (e)

47. A diver under water looks obliquely at a fisherman standing on the bank of a lake. the fisherman looks taller to the diver due to refraction of light (T/F)

Ans : True page 347 Q. 9.18 (c)

48. A plane and convex mirror can not produce real image under any circumstance. (T/F)

Answer : False

Solution They can produce real image if the object is virtual.

Page 347 Q. 9.18 (a)

49. Linear Magnification and angular magnification are one and the same thing. There is no difference between them. (T/F)

Answer : False

Sol: Linear magnification = $\frac{\text{Size of image}}{\text{Size of Object}}$

Angular magnification = $\frac{\text{angle subtended by image}}{\text{angle subtended by object}} = \frac{\beta}{\alpha}$

page 314, 339

50. In reflecting type telescopes, the objective is made of a concave mirror, rather than a lens. (T/F)

Answer : True Page 342

51. The spherical and chromatic aberration are absent in reflecting type telescopes. (T/F)

Answer : True Page 342

52. In a reflecting type telescope, the support to the large objective mirror is a very big problem. (T/F)

Answer : False

Solution : The support to mirror is very easy as the mirror can be supported on its entire back. The support to lens is problem as its can be supported on its rim only.

Page 342

53. The real image of an object placed between f and $2f$ from a convex lens can be seen on a screen placed at the image location. If the screen is removed, the image also disappears.

Answer : false : page 344

Solution : The image remains in air and can be seen by smoke.

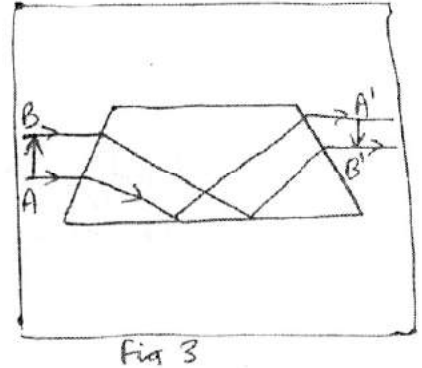
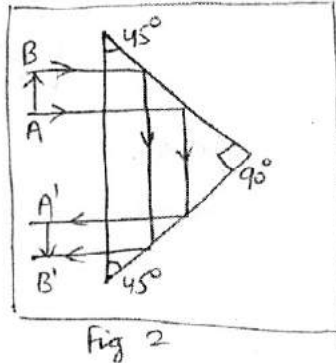
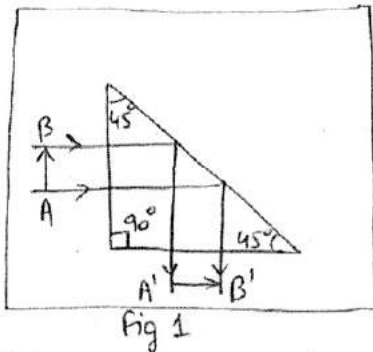
54. In diffraction at a single slit, the intensity of the bright fringes increases as we move it away from the central fringe.

Answer : False Page 369

Solution : The intensity of bright fringes goes on decreasing

3 Marks Questions

55. See the figures given below :



Which of these figures is used to

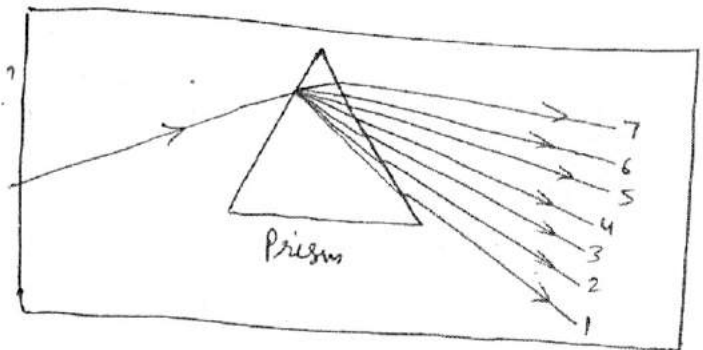
- (a) bend light by 180°
- (b) Invert images without changing their sizes
- (c) bend light by 90°

Q. 56 Write the names of seven colours numbered 1 to 7. Also tell

- (i) Which colour is deviated the least and which colour most ?
- (ii) Which colour travels fastest and which slowest inside the prism ?

57. Explain why

- (a) Sky looks blue
- (b) Clouds appear white
- (c) Danger signals are red



Answer page 335

58. The far point of a myopic person is 80 cm in front of the eye. what is the power of the lens required to enable him to see very distant objects clearly ?

Answer page 338 Exa. 9.11 (a)

59. Make ray diagram for the formation of image by a compound microscope at the least distant of distinct vision.

Ans. Page 340

60. Make ray diagram for the formation of image by an astronomical telescope when final image is obtained at infinity.

Ans page 342

61. Make a ray diagram of a reflecting cassegrain type telescope.

Ans page 342

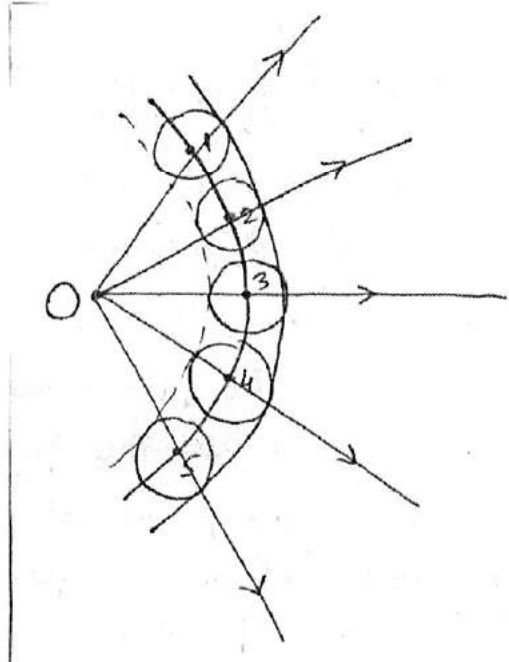
62. A tank is filled with water to a height of 12.5 cm. the apparent depth of a needle lying at the bottom of a the tank is measured by a microscope to be 9.4 cm. What is the refractive index of water?

Page 345 Q. 9.3

63. In the figure shown in front, O is a point source.

- (a) Which principle is this figure presenting ?
- (b) Show in this figure
 - (i) Primary wavefront
 - (ii) Secondary Wavefront
 - (iii) Secondary Wavelets
 - (iv) Rays of light

Answer: page 354



64. What are copherent sources ?
What are two conditions for obtaining coherent sources ?

Page 363

65. For what distance is ray optics a good approximation when the aperture is 3 mm wide and the wavelength is 500 nm?

Ans pg 376 Exa 10.7

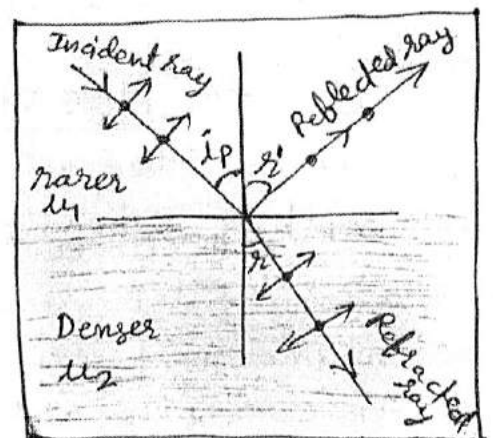
66. What is the shape of wave front in each of the following cases ?
- (a) Light diverging from a point source
 - (b) Light emerging out of convex lens when a point source is Placed at its focus.
 - (c) The portion of the wave front of light from a distant star intercepted by the earth.

Answer Page 383 Q. 10.2

67. What is the brewster angle for air to glass transition? (Refractive index of glass =1.5)

Ans : page 383 Q. 10.8

68. (i) Which law is depicted by the ray diagram as shown in the front ?
(ii) Which of the three rays is plane polarised ?



(iii) What is the angle between reflected and refracted rays ?

Ans: page 379- 381

69. Write the cartesian sign conventions used in deriving the mirror equation.

Ans: page 311

70. (i) Name the phenomenon which is observed in this figure.

(ii) Which is the point at which total internal reflection of light takes place?

(iii) Define Critical Angle (i_c).

Page 320

71. Define myopia or nearsightedness. Write its cause. How can it be corrected ?

Ans: 336

72. Define hypermetropia or farsightedness. Write its cause. How can it be corrected?

Ans. Page 337

4 marks questions

73.

(i) Write the signs of u , v , f , h_1 , R , h_2

(ii) Write the mirror formula.

(Ans: page 311, 314)

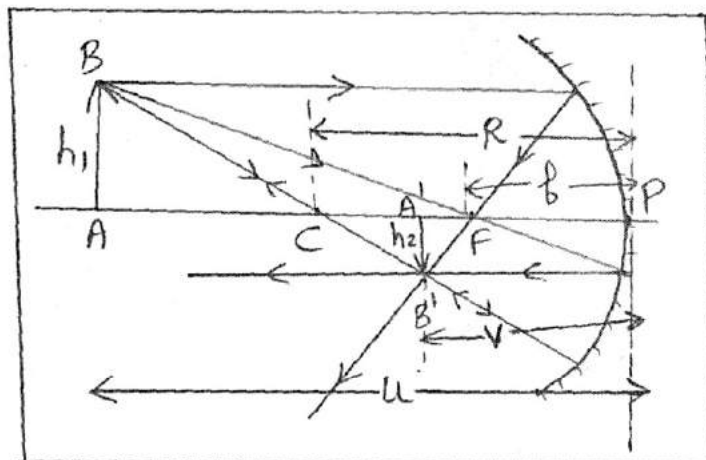
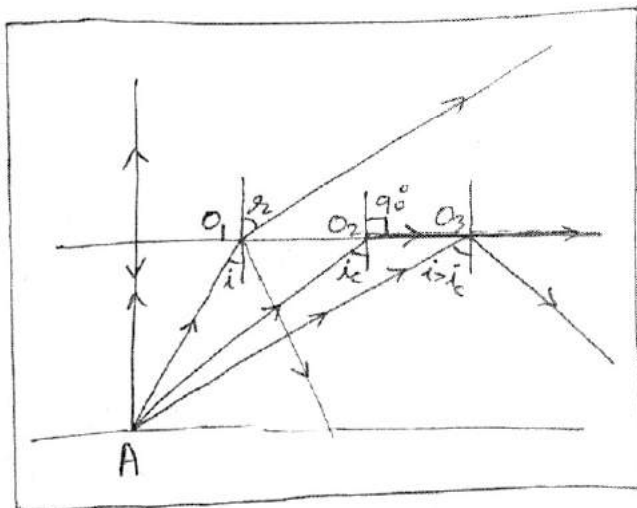
74. Write the lens maker's formula

(without derivation). Double convex lens are to be

manufactured from a glass of refractive index 1.55, with both

faces of the same radius of curvature. What is the radius of curvature required if the focal length is to be 20 cm?

Ans. page 326 , 346 Q. No. 9.7

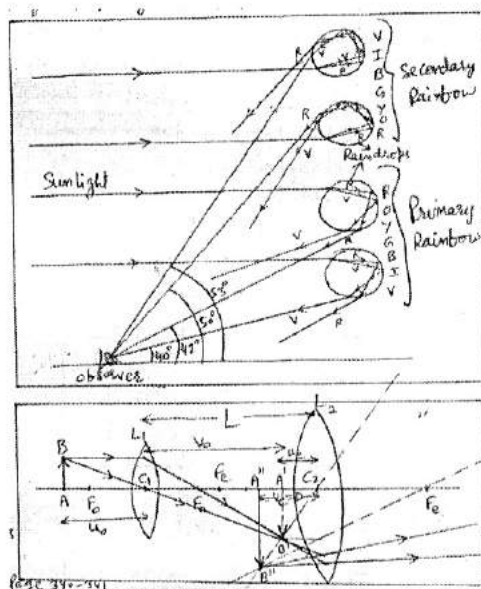


75. From the figure, write atleast 4 differences between the primary rainbow and secondary rainbow.

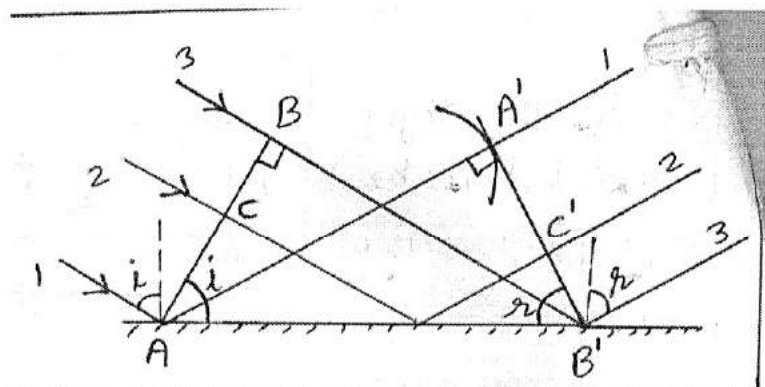
Ans : page 333-335

76. (i) Which optical instrument is the diagram showing ?
 (ii) Label objective and eye lens.
 (iii) What types of images are made by objective of eye lens ?

Ans: page 340-341



77. In the given ray diagram, AB is incident wave front and A'B' is reflected wave front. Use property of congruency of appropriate triangles to prove $\angle i = \angle r$ Which law has been proved here using wave theory of light ?



Ans : page 357

78. The fringe width in young double slit experiment is found to be $\beta = \frac{\lambda D}{d}$, What is the effect on the interference fringes in young double slit experiment due to each of the following operations.
- The screen is moved away from the plane of slits.
 - The monochromatic source is replaced by another monochromatic source of shorter wavelength.
 - The separation between two slits is increased.
 - The monochromatic source is replaced by a source of white light .

Answer : page 366 Q. No. 10.4

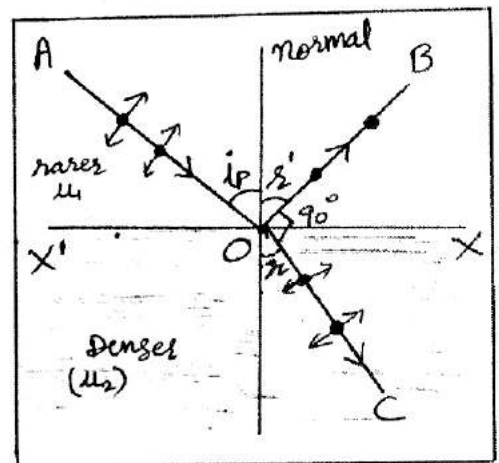
79. Make intensity vs path difference curve in interference fringes as well as diffraction pattern.

Answer page 366, 369

80. At angle of incidence equal to polarizing angle i_p , reflected & refracted rays are \perp to each other. Using snell's law at O, show that $\mu = \tan i_p$

Which law is this called ?

Answer page 380



unit -7

DUAL NATURE OF RADIATION AND MATTER

Chapter -11

Unit-7 (Short Answer type question)

1. Discuss free Electrons in metals, work function, & types of emission for the ejection of electrons?
2. Differentiate b/w photoelectric emission & thermionic emission & how will you study it experimentally?
3. Discuss Davisson & Germer experiment to verify de-broglie waves with labelled diagram?
4. What is photo electric cell? Describe a simple photocell?
5. Derive Einstein photo-electric equation & explain laws of photo electric emission?

(Very Short Answer type Question)

1. What is photo electric effect?
2. What is work function?
3. Define stopping potential?
4. State Einstein photo electric equation?
5. Write Law's of photo electric emission.
6. How photo electric cell is used as fire alarm.
7. Find the wavelength of photo of frequency 3.06×10^{15} HZ?
8. What is the frequency of a photon whose energy is 2.652 eV, $h=6.63 \times 10^{-34}$ JS?
9. Why alkali metals are most suitable for photo electric emission?
10. Do non-metals show photoelectric effect explain it?
11. Define threshold frequency & threshold energy?

Objective Type

(a) MCQ's

1. Who discovered X-rays?

- a. Roentgen b. J.J. Thomson c. Newton d. ohm

Ans (a) page 386

2. Electrons were discovered by

- a. J.J. Thomson b. Goldstein c. Rutherford d. Chadwick

Ans. (a) page 386

3. Photo-Electric effect was discovered by

- a. Hertz b. Einstein c. J.J. Thomson d. Chadwick

Ans (a) page 388

4. Which element is photo sensitive to light

- a. Caesium b. Magnesium c. Carbon d. Oxygen

Ans (a) page 389

5. Which particle is emitted from metal surface in photo electric effect

- a. Electron b. proton c. Neutron d. alpha-particle

Ans (a) pase 388

6. Value of planck's constant is

- a. 3×10^8 M/s b. $6.67 \times 10^{-11} \text{Nm}^2/\text{Kg}^2$ c. $1.6 \times 10^{-19} \text{C}$ d. $6.63 \times 10^{-34} \text{JS}$

Ans (d) 396

7. Value of 1 ev is

- a. $1.6 \times 10^{-19} \text{J}$ b. $3 \times 10^8 \text{ m/s}$ c. $6.63 \times 10^{-34} \text{JS}$ d. 9.8 m/s^2

Ans (a) page 387

(b) Match the following:

1. Match the dimensions of the following

- 1) Planck's constant (a) ML^2T^{-2}
2) Work function (b) ML^2T^{-1}

Ans : (1) --> (b) page 406

(2) --> (a)

2. Match the dimensions of the following

- 1) Threshold frequency (a) L Ans : (1) ---> (b)
2) De-broglie wavelength (b) T^{-1} (2) ---> (a) page 406

3. Match the following

- 1) X rays were discovered by (a) J.J. Thomson Ans : (1) ---> (b)
2) Electrons were discovered by (b) Roentgen (2) --->(a)
page 386

4. Match the following

- 1) Cathode rays were discovered by (a) hertz Ans : (1) ---> (b)
2) Photo electric effect discovered by (b) William crookes (2)-->(a) page 386,388

5. Match the value of the following

- 1) Planck's Constant (a) 3×10^8 m/s Ans:(1)--->(b)
2) Speed of light (b) 6.63×10^{-34} JS (2) ---> (a) page 396,387

6. Match the value of the following

- 1) 1 eV (a) 6.63×10^{-34} JS Ans:(1)--->(b)
2) Planck's constant (b) 1.6×10^{-19} J (2)--->(a) page 387,396

(c) Fill in the Blank's

1. The phenomenon of passing electric current through air is called.....

- a. Photoelectric effect b. Thermionic emission
c. electric discharge d. stopping potential

Ans (c) page 386

2. X-rays were discovered by.....

- a. Roentgen c. J.J. Thomson
b. Hertz d. Plancks

Ans (a) page 386

3. Electrons were discovered by.....

- a. Goldstein b. J.J. Thomson
c. Hertz d. Plancks

Ans (b) Page 386

4. Minimum amount of energy required to emit electrons from metal surface is called.....

- a. Binding energy
- b. Threshold energy
- c. Ionization energy
- d. work function

Ans : (b) 405

5. Formula $\lambda = h/mv$ is called..

- a. Einstien Equation
- b. Hertz Equation
- c. de Broglie equation
- d. Bohr's formula

Ans(c) 398

6. Number of Electrons emitted from metal surface depend upon. of light

- a. frequency
- b. intensity
- c. potential
- d. stopping potential

Ans : (b) page 390

7. Maximum kinetic energy with which electrons can be emitted from metal Surface depends on..... of light.

- a. Intensity
- b. potential Bus
- c. frequency
- d. momentum

Ans: (c) Page 391

(d) True / False

- 1. Photons are electrically neutral (True / false). Ans : True Page 396
- 2. Minimum energy required by an electron to escape from metal surface is called work function of the metal (True / false). Ans : True Page 387
- 3. Work function of caesium is $\phi_0 = 2.14 \text{ eV}$ (True / false) Ans.: True page 387
- 4. The minimum value of frequency at which electrons are ejected from metal surface is called threshold frequency (True/ False). Ans: True page 389
- 5. No of photo electrons emitted depends upon frequency (True/ False):

Ans : False Page 390

6. Speed of photo electrons emitted depends upon intensity of light (True/ False)

Ans: False 390

7. $\lambda = \frac{h}{mv}$ is de-broglie equation (true / false). Ans : True 398 page

Atoms & nuclei

UNIT-VIII

CHAPTER 12-13

(Short Answer Type questions)

1. Describe α (alpha) scattering experiment in detail what was the importance of this experiment?
2. Give similarities and Dissimilarities between Thomson and Rutherford's model?
3. What is the Radio activity differentiate between natural, artificial and induced radio activity?
4. State and explain law's of radioactive disintegration?
5. Prove that $N = N_0 e^{-\lambda t}$
6. Explain construction and working of nuclear reactor with labelled diagram?
7. Differentiate between nuclear fission and nuclear fusion with examples?
8. State and explain postulates of Bohr's theory?

(Very Short Answer type questions)

1. Explain failure of Rutherford model of an atom?
2. What is spectrum, classify it?
3. Discuss the limitations of Bohr's Model ?
4. Define half-life and derive relation between decay constant and half-life?
5. What are isotopes, isotones and isobars?
6. Write properties of nuclear forces?
7. What is Binding energy and mass defect?
8. In heavy nuclei, number of neutrons is more than the number of protons. Why?
9. What is chain reaction explain with diagram and example?

10. What is the function of control rods in nuclear reactor?

11. Find the Binding energy for nitrogen nucleus, $m_n=1.00783$ amu, $m_p=1.00867$ amu, $M_n=14.00307$ amu?

Objective type Question

1. Nucleus of an atom was discovered by

- a. J.J.Thomson b. ohm c. Newton d. Rutherford

Ans: (d) page 417

2. Material coated on screen in Rutherford experiment is

- a. Zns b. Nacl c. CASO₄ d. CHCL₃

Ans: (a) page 416

3. Lyman series falls in

- a. UV region b. Visible region c. Infrared region d. Cosmic rays region

Ans :(a) page 422

4. $\Sigma n = -\frac{13.6}{n^2}$ ev is given by

- a. Rutherford b. J.J. Thomson c. Chadwick d. Bohr

Ans : (d) page 425

5. Coolant used in nuclear reactor is

- a. Liquid Sodium b. Heavy water c. Charcoal d. Graphite

Ans : (a) Page 453

6. Graphite is used as

- a. Moderator b. Coolant c. Nuclear fuel d. Control rods

Ans : (a) Page 454

7. Neutrons were discovered by

- a. Chadwick b. J.J. thomson c. hertz d. Ohm

Ans. (a) page 440

8. 1 amu is equal to

- a. 20 ev b. 931.5 mev c. 100 mev d. 25 ev

Ans: (b) page 443

2. Match the following

1. Match the following

- | | |
|----------------------------|-----------------|
| 1. Nucleus was discovered | a) J.J. Thomson |
| 2. electron was discovered | b) Rutherford |

Ans : (1) ----> b page 416

(2)---->a

2. Match the following

- | | |
|--|-----------------|
| 1. Plum-pudding model proposed by | a) Rutherford |
| 2. Planetary model of atom proposed by | b) J.J. Thomson |

Ans : (1) ----> b page 414,415

(2)---->a

3. Match the following

- | | |
|------------------------------|-----------------------|
| 1. Lyman series lies in | a) Infrared region |
| 2. Paschen & Brackett lie in | b) ultraviolet region |

Ans : (1) ----> b page 422

(2)---->a

4. Match the following

- | | |
|--------------------------|--------------|
| 1. Mass of neutron m_n | a) 1.00866 u |
| 2. Mass of proton m_p | b) 1.00727 u |

Ans : (1) ----> b page page 443

(2)---->a

5. Match the following

- | | |
|--------------|-----------------------------|
| 1. Moderator | a) Liquid sodium |
| 2. Coolant | b) Heavy water and graphite |

Ans : (1) ----> b page 454

(2)---->a

6. Match the following

- | | |
|-----------------|--|
| 1. Control rods | a) uranium ${}_{92}\text{U}^{+235}$ rods |
| 2. Nuclear fuel | b) Cadmium and boron rods |

Ans : (1) ----> a page 454

(2)---->b

7. Match the following

- | | |
|---------------|-----------------------------------|
| 1. value of e | a) 931.5 mev |
| 2. 1 amu | b) $1.6 \times 10^{-19} \text{C}$ |

Ans : (1) ----> b page 462

(2)----> a

3. Fill in the Blanks

1. Neutron was discovered by

- a. Hertz b. J.J. Thomson c. Chadwick d. Rutherford

Ans (c) page 440

2. Nucleus was discovered by ..

- a. Rutherford b. Ohm c. Chadwick d. Bohr

Ans : (a) page 416

3. Balmer series lie in ...

- | | |
|-----------------------|-------------------|
| a. Ultraviolet region | b. Visible region |
| c. Infrared region | d. X-ray |

Ans: (b) page 421

4. Lyman series lie in

- | | |
|-----------------------|-------------------|
| a. Ultraviolet region | b. Visible region |
| c. Infrared region | d. X-ray |

Ans: (a) page 421

5. Value of 1 amu is

- | | |
|-----------------------------------|--------------|
| a. $1.6 \times 10^{-19} \text{C}$ | b. 931.5 mev |
|-----------------------------------|--------------|

c. 9.8 m/s^2

d. $6.67 \times 10^{-11} \text{ Nm}^2 / \text{kg}^2$

Ans: (a) page 443

6. Nuclear fusion takes place in.....

a. Sun atmosphere

b. Moon atmosphere

c. earth atmosphere

d. Mars

Ans: (b) page 455

7. Atom bomb was first time dropped on by America in August 6.1945

a. Hiroshima

b. New York

c. London

d. Paris

Ans: (a) page 457



a. $-1e^0$

b. 2He^4

c. ${}_0\text{n}^1$

d. ${}_1\text{H}^2$

Ans : (c) 452

4. True/False

1. Neutron was discovered by Chadwick (True/False). Ans : (True) page 440

2. Nucleus was discovered by Rutherford (True/False). Ans : (True) page 415

3. Formula for nth Orbit energy is $E_n = -13.6/n^2 \text{ eV}$ (True/False). Ans : (True) page 425

4. Balmer series lie in UV region (True/False). Ans : (True) page 429

5. $E = mc^2$ (True/False). Ans : (True) page 442

6. β rays have ${}_{-1}e^0$ (True/False). Ans : (True) page 450

7. Isotopes have same atomic number but different atomic mass (True/False).

Ans : (True) page 439

UNIT-9
SEMICONDUCTOR, ELECTRONICS : MATERIALS DEVICES AND SIMPLE CIRCUITS

1. Name Two types of extrinsic semiconductors
- a) npn , pnp b) n type and p type
c) diode and pn junction d) None of the above

Ans: (b) n type and p type

2. What is the forbidden energy gap for silicon and germanium
- a) 0.3 eV and 2.1 eV b) 4 eV to 5 eV
c) 0.72 eV to 1.1eV d) none of the above

Ans: (C) 0.72 eV for silicon and 1.1eV for germanium

3. When forward bias is applied to the pn junction
- a) raises the potential barrier b) reduces the majority carrier current to zero.
c) lowers the potential to zero. d) None of the above

Ans: (C)

4. For transistor amplifier, the voltage gain
- a) remains constant for all frequencies b) is high at high and low frequencies
c) is low at high and low frequencies d) None of the above

Ans: (C)

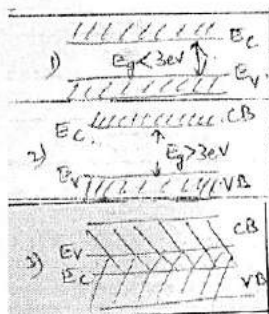
5. For transistor action, which of the following statements are correct:
- (a) Base, emitter and collector regions should have similar size and doping concentrations.
(b) The base region must be very thin and lightly doped.
(c) emitter junction is forward biased and collector junction is reverse biased.
(d) Both the emitter junction as well as the collector junction are forward biased

Ans: b and c

MATCH THE FOLLOWING

6. a) INSULATOR
 b) SEMICONDUCTOR
 c) METALS

Ans : a) -2
 b) -1
 c) -3



7. a) PENTAVALENT IMPURITY
 b) TRIVALENT IMPURITY
 c) DEPLETION LAYER
 d) INTRINSIC SEMICONDUCTOR

- 1) p type semiconductor
 2) pure semiconductor
 3) n type semiconductor
 4) pn junction diode

Ans a) - 3
 Ans b) -1
 Ans c) -4
 Ans d) -2

8. a) FORWARD BIAS PN JUNCTION



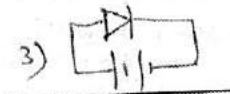
Ans a) - 3

- b) REVERSE BIAS PN JUNCTION



Ans b) - 4

- c) ZENER DIODE



Ans c) - 1

- d) NPN TRANSISTOR



Ans d) - 2

9. Match correct output of AND gate

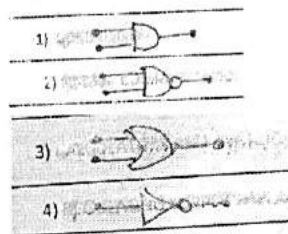
Input	
A	B
a) 0	0
b) 1	0
c) 0	1
d) 1	1

Output
Y
1) 1
2) 0
3) 1
4) 1

a) -2
 b) -1
 c) -3
 d) -4

10. a) NOT gate
 b) OR Gate
 c) AND gate
 d) NAND Gate

- 1)
 2)
 3)
 4)



a-4
 b-3
 c) -1
 d)-4

True and false question

11. LED is a heavily doped _____ which under forward bias emits spontaneous _____.
Ans : pn Junction, Radiation
12. When an external voltage V is applied across the diode such that n side is positive and p side is negative, the diode is said to be.....
Ans : forward biased
13. In the active state of junction transistor the emitter base junction acts as _____ while the base collector acts as the _____ resistor.
Ans: Low resistor, High
14. Special purpose semiconductor device which operates under reverse bias in the breakdown region is _____ and is used as _____ regulator.
Ans : Zener Diode, voltage, regulator
15. A digital circuit that follows certain logical relationship between the input and output voltages is known as the _____.
Ans : Logic gate
16. Only drift occurs during the formation of pn junction diode and there is no diffusion.
Ans : FALSE
17. In the positive half cycle of ac there is a current through the load resistance in a rectifier
Ans : True
18. NAND is formed by the combination of AND gate followed by the NOT gate.
19. For common emitter transistor amplifier current gain is the ratio of the change in collector current and the emitter current.
Ans : False
20. Emitter is the segment on one side of transistor. It is of moderate size and heavily doped.
Ans : True
21. Draw the diagram, truth table and boolean expression for the AND gate.
22. Explain with the diagram the construction and working of a solar cell and draw the characteristics of the solar cell.
23. Explain the principle construction and working of a pn Junction diode as a voltage rectifier.

24. From the output characteristic shown in Fig. calculate the values of β_{ac} and β_{dc} of the transistor when V_{ce} is 10 V and $I_c = 4.0$ mA

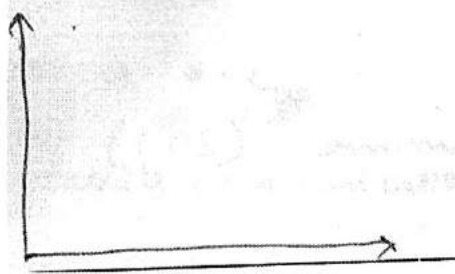
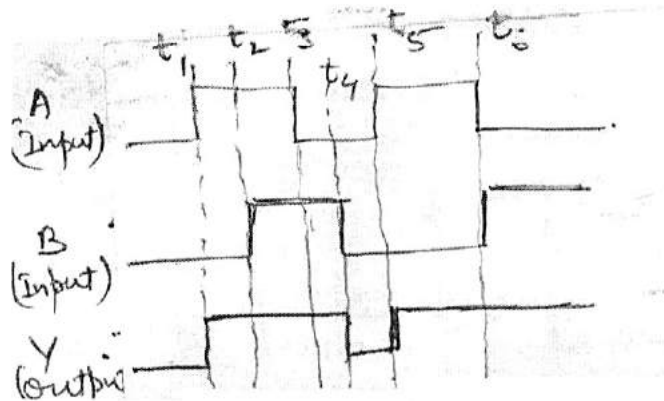


Fig 14.30 (b)

25. For a CE-transistor amplifier, the audio signal voltage across the collected resistance of 2 kW is 2 V. Suppose the current amplification factor of the transistor is 100, find the input signal voltage and base current, if the base resistance is 1 kW.
26. Justify the output waveform (y) of the OR gate for the following inputs A and B given in Fig.



27. Draw the diagram truth table and boolean expression for the OR Gate.
28. Draw the diagram of npn transistor as a common emitter amplifier and explain its construction and working.
29. Explain what is the forward and the reverse biasing of a pn junction by drawing the diagrams and draw the characteristics of pn junction.
30. Explain what are the two types of the transistors and what is emitter, base and collector with proper biasing of the two types of transistors. Draw suitable diagram where necessary.

Unit -10
Communication System

1. Which waves are used for line-of-sight (LOS) communication as well as satellite communication.
(a) Sky waves (b) Space waves (c) Grand waves (d) None of above
Ans : (b)
2. Which of the following frequencies is suitable for beyond the horizon communication using sky waves ?
(a) 10 kHz (b) 10 MHz (c) 10 Hz (d) 1000 GHz
Ans: (b)
3. Frequencies in UHF range normally propagate by means of
(a) Ground waves (b) Sky waves (c) Surface waves (d) Space waves
Ans : (d)
4. For transmitting a signal antenna should have a size
(a) One fourth of wavelength (b) Half the wavelength
(c) Twice the wavelength (d) None of the above
Ans : (a)
5. Audible frequency range lies between
(a) Less the 20 Hz (b) More than 20 kHz
(c) 20 Hz to 20kHz (d) None of the above
Ans : (c)
6. Modulation is the process of superimposing
(a) Low frequency audio signal on high frequency waves.
(b) low frequency radio signal on low frequency audio waves.
(c) high frequency audio signal on low frequency audio signal.
(d) None of these
Ans : (a)
7. When waves glides over the surface of earth the propagation is known as
(a) Sky wave propagation
(b) Space wave propagation
(c) Ground wave propagation

(d) None of these

Ans : (c)

8. (a)
(b)
(c)
(d)

Ans : ()

Match the following:

9. Match the following

- | | | | |
|-----|--|----------------|------|
| (a) | Single valued function of time having continues variation of voltage | 1) A Henuation | a- 4 |
| (b) | A device extracting desired message signal from received signal | 2) Transmitter | b-3 |
| (c) | A device which process the incoming message signal to make suitable for Transmission | 3) Receiver | c-2 |
| (d) | Loss of strength of signal | 4) signal | d-1 |

10. Service

- | | | | |
|----|-------------------------|----------------|-------|
| a) | Television | 1) 3.7—4.2 GHz | a)-4 |
| b) | Cellular Mobile | 2) 88-108 MHz | b)-3 |
| c) | Satellite Communication | 3) 896-901 MHz | c) -1 |
| d) | FM Broadcast | 4) 420-890 MHz | d) -2 |

11. a)

- | | | | |
|----|----------------------|--|-------|
| a) | Carrier wave | 1)  | a)-2 |
| b) | Modulating Signal | 2)  | b)-1 |
| c) | Amplitude Modulation | 3)  | c) -3 |
| d) | Frequency Modulation | 4)  | d) -4 |

12. a) Attenuation of waves increase with Increase in frequency. 1) $\sqrt{2Rh_r}$ a)-4
 $R \rightarrow$ Radius of earth
 b) Ionospheric reflection of radio waves towards earth 2) Space wave b)-3
 c) Sky waves 3) LOS communication c)-2
 d) Distance to horizon d_T 4) Ground wave d)-1
13. a) ITHZ to 1000 THz 1) Vidio Signals 1) b
 b) 4.2MHz 2) TV Signal 2) d
 c) 750 MHz 3) Coanial cable 3) c
 d) 6 Mz 4) Optical communication 4) a

14. Largest distance between a source and destination upto which the signal is received with sufficient strength is known as _____.

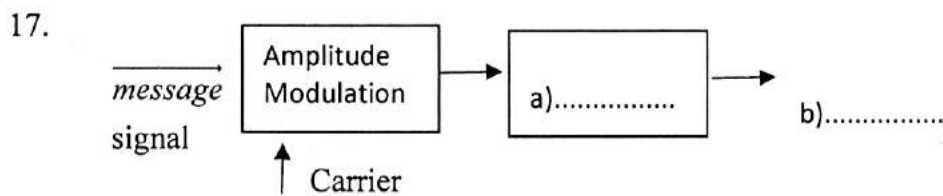
Ans : Range

15. A _____ is a combination of a receiver and a transmitter. which retransmits the signal.

Ans : Repeater

16. Electromagnetic waves of frequencies higher than _____ penetrate the ionosphere and escape.

Ans : 30 MHz

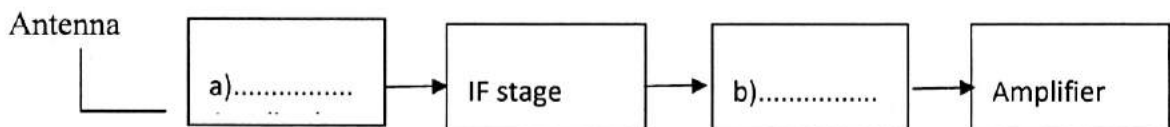


Ans : a) Power amplifier
 b) Transmitting and Tenna



18. Block diagram of receiver

Receiving



Received signal

OUTPUT

Ans : a) Amplifier

b) Detector

19. A theoretical study of radiation from linear antenna length l shows that the power radiated is proportional to _____.

Ans: wave length $\left(\frac{1}{\lambda}\right)^2$

20. The transmitted message gets _____ in propagating through the _____.

Ans : (a) Attenuated b) channel

21. Video signals for transmission of pictures required about _____ of bandwidth.

Ans: 4.2 MHz

22. The phenomenon of bending of em waves so that they are directed towards earth is similar to _____ in optics.

Ans : Total internal reflection

23. Message signals are also called _____ signals.

Ans : Base Band

24. Detection is the process of recovering the modulating signal from the _____ wave.

Ans : Modulated carrier.

25. The modulation index for a message signal of 10 kHz and peak voltage 20 volts is used to modulate a carrier frequency of 1 MHz and peak voltage of 20 volts is _____.

Ans : $\frac{10}{20} = 0.5$

Write True and false

26. There are two basic modes of communication point to point and broadcast.

Ans : True

27. Noise is an important signal that does not disturb the transmission and processing the message

Ans : False

28. Amplification is the process of increasing the amplitude of the signal using an electric circuit called the amplifier.

Ans : True

29. A coaxial fiber can offer transmission bandwidth in excess of 100 GHz.

Ans : False

30. Mixing up of signals is not a problem while transmitting a baseband signal.

Ans : False

31. Ratio of amplitude of modulating signal and carrier waves is called modulation index

Ans: True

32. Amplitude modulated signal contains frequencies $(W_c - W_m)$, W_c and $(W_c + W_m)$

Ans: True

33. Amplitude detection, which is the process of recovering the modulating signal from an AM wave form is done without using a rectifier and envelop detector.

34. In amplitude modulation the amplitude of the carrier wave is varied in accordance with the information signal.

Ans : True

35. Draw the block diagram of generalized communication system.

36. Define a) Transmitter b) Receiver c) Repeater

37. Define amplitude modulation. Draw a wave form for amplitude modulated wave from signal and carrier wave.

38. Is it necessary for a transmitting antenna to be at the same height as that of the receiving antenna for LOS communication ? A TV transmitting antenna is 81 m tall. How much service area it can cover if the receiving antenna is at the ground level.

39. A carrier wave of peak voltage 12 V is used to transmit a message signal in order to have modulation index of 75 % ?

40. For an amplitude modulated wave the maximum amplitude is found to be 10V, while the minimum amplitude is found to be 2 V. Determine the modulation index μ . What would be the value of μ if minimum amplitude is zero volt ?

41. Define demodulation. Draw block diagram for receiver.

42. What is ground wave propagation ? Why the signal attenuates during ground wave propagation ?

43. What do you mean by sky wave propagation? What frequency range is propagated through sky wave propagation

44. Obtain equation for amplitude modulated wave and draw frequency spectrum. (Amplitude Vs. ω) for such wave.

45. Discuss salient features of space wave propagation.

46. Briefly discuss the components of communication system.

47. What do you mean by modulation. Discuss the necessity of modulation.

48. Briefly explain the process of detection of amplitude modulated wave.

49. Explain how amplitude modulated wave is produced with proper diagram of modulator.

50. Draw Block diagrams of transmitter and receiver