MULTIPLE CHOICE QUESTIONS WITH ANSWERS

&

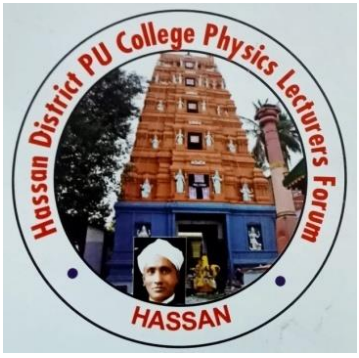
FILL IN THE BLANKS WITH ANSWERS

FOR NEW QUESTION PAPER PATTERN

II PUC PHYSICS

PREPARED BY

HASSAN DISTRICT PHYSICS PRINCIPALS AND LECTURERS FORUM HASSAN



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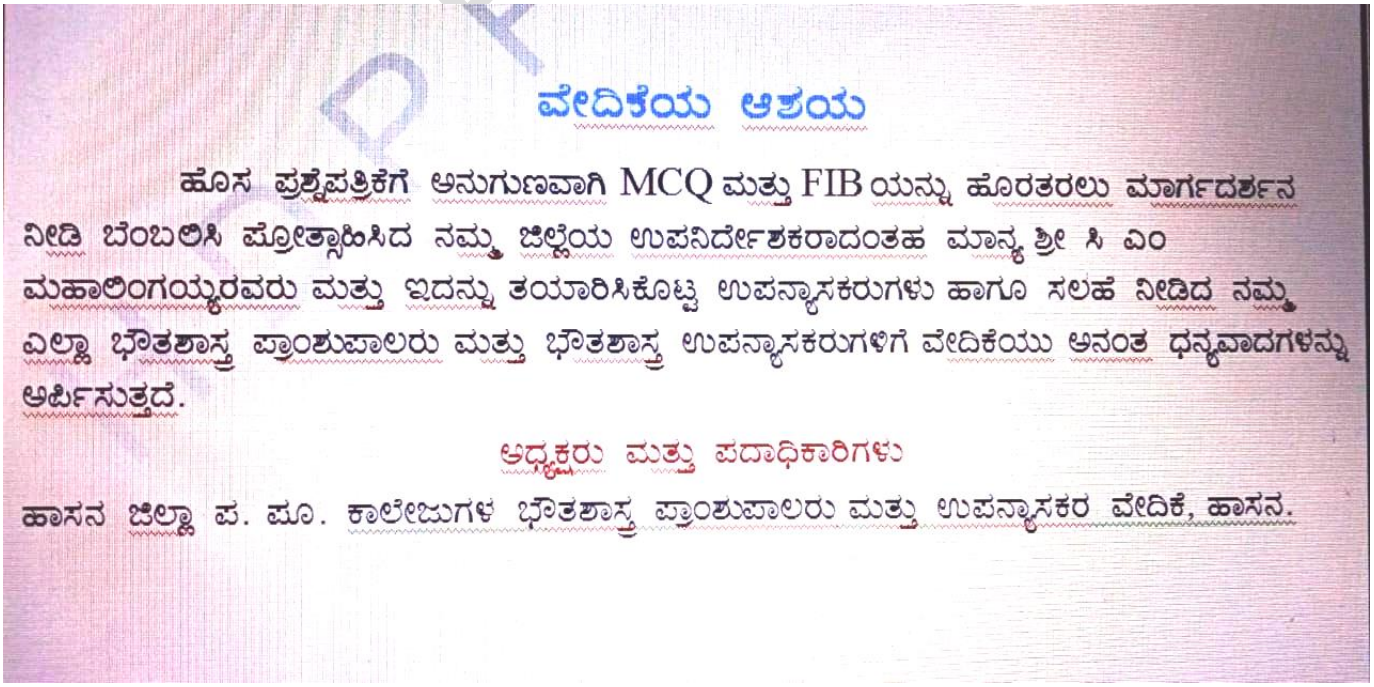

ವೇದಿಕೆಯ ಆಶಯ

ಹೊಸ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಗೆ ಅನುಗುಣವಾಗಿ MCQ ಮತ್ತು FIB ಯನ್ನು ಹೊರತರಲು ಮಾರ್ಗದರ್ಶನ ನೀಡಿ ಬೆಂಬಲಿಸಿ ಪ್ರೋತ್ಸಾಹಿಸಿದ ನಮ್ಮ ಜಿಲ್ಲೆಯ ಉಪನಿರ್ದೇಶಕರಾದಂತಹ ಮಾನ್ಯ ಶ್ರೀ ಸಿ ಎಂ ಮಹಾಲಿಂಗಯ್ಯರವರು ಮತ್ತು ಇದನ್ನು ತಯಾರಿಸಿಕೊಟ್ಟ ಉಪನ್ಯಾಸಕರುಗಳು ಹಾಗೂ ಸಲಹೆ ನೀಡಿದ ನಮ್ಮ ಎಲ್ಲಾ ಭೌತಶಾಸ್ತ್ರ ಪ್ರಾಂಶುಪಾಲರು ಮತ್ತು ಭೌತಶಾಸ್ತ್ರ ಉಪನ್ಯಾಸಕರುಗಳಿಗೆ ವೇದಿಕೆಯು ಅನಂತ ಧನ್ಯವಾದಗಳನ್ನು ಅರ್ಪಿಸುತ್ತದೆ.

ಅಧ್ಯಕ್ಷರು ಮತ್ತು ಪದಾಧಿಕಾರಿಗಳು

ಹಾಸನ ಜಿಲ್ಲಾ ಪ. ಪೂ. ಕಾಲೇಜುಗಳ ಭೌತಶಾಸ್ತ್ರ ಪ್ರಾಂಶುಪಾಲರು ಮತ್ತು ಉಪನ್ಯಾಸಕರ ವೇದಿಕೆ, ಹಾಸನ.

CHAPTER-1
ELECTRIC CHARGES AND FIELDS

1) An isolated solid metallic sphere is given $+Q$ charge. The charge will be distributed on the sphere

(A) Uniformly but only on surface

(B) Only on surface but non-uniformly

(C) Uniformly inside the volume

(D) Non-uniformly inside the volume

2) There are two metallic spheres of same radii but one is solid and the other is hollow, then

(A) Solid sphere can be given more charge

(B) Hollow sphere can be given more charge

(C) They can be charged equally

(D) None of the above

3) The value of electric permittivity of free space is

(A) $9 \times 10^9 NC^2/m^2$ (B) $8.85 \times 10^{-12} Nm^2/C^2 sec$

(C) $8.85 \times 10^{-12} C^2/Nm^2$ (D) $9 \times 10^9 C^2/Nm^2$

4) Number of electrons in one coulomb of charge will be

(A) 5.46×10^{29} (B) 6.25×10^{18}

(C) $1.6 \times 10^{+19}$ (D) 9×10^{11}

5) One metallic sphere A is given positive charge whereas another identical metallic sphere B of exactly same mass as of $A$is given equal amount of negative charge. Then

(A) Mass of A and mass of B still remain equal (B) Mass of A increases

(C) Mass of B decreases (D) Mass of B increases

6) Two charged spheres separated at a distance d exert a force Fon each other. If they are immersed in a liquid of dielectric constant 2, then what is the force (if all conditions are same)

(A) $\frac{F}{2}$ (B) F

(C) $2F$ (D) $4F$

7) When 10^{19} electrons are removed from a neutral metal plate, the electric charge on it is

(A) – 1.6 C (B) + 1.6 C

(C) $10^{+19} C$ (D) $10^{-19} C$

8) The dielectric constant of metal is

(A) 1 B) ∞

(C) 0 (D) $none\ of\ these$

9) When a glass rod is rubbed with silk then, glass rod

(A) Gains electrons from silk (B) Gives electrons to silk

(C) Gains protons from silk (D) Gives protons to silk

10) If E is the electric field intensity of an electrostatic field, then the electrostatic energy density is proportional to

(A) E (B) E^2

(C) $1/E^2$ (D) E^3

11) Conduction electrons are almost uniformly distributed within a conducting plate. When placed in an electrostatic field $\vec{E}$, the electric field within the plate

(A) is zero (B) Depends upon E

(C) Depends upon $\vec{E}$ (D) Depends upon the atomic number of the conducting element

12) The electric field near a sheet having a uniform surface charge density σ is given by

(A) $\frac{\sigma}{\varepsilon_0}$ and is parallel to the surface

(B) $\frac{2\sigma}{\varepsilon_0}$ and is parallel to the surface

(C) $\frac{\sigma}{\varepsilon_0}$ and is normal to the surface

(D) $\frac{\sigma}{2\varepsilon_0}$ and is normal to the surface

13) The unit of intensity of electric field is

(A) $Newton/Coulomb$ (B) $Joule/Coulomb$

(C) $Volt - metre$ (D) $Newton/metre$

14) Which of the following is deflected by electric field

(A) X-rays (B) γ -rays

(C) Neutrons (D) α -particles

15) An electron is moving towards *x*-axis. An electric field is along *y*-direction then path of electron is

(A) Circular (B) Elliptical

(C) Parabola (D) None of these

16) A proton enters in an electric field with its velocity in the direction of the electric lines of force. Then

(A) The path of the proton will be a circle

(B) The path of the protonwill be a parabola

(C) The path of the proton will be a straight line

(D) The path of the proton will be helix

17) An electric dipole when placed in a uniform electric field E will have minimum potential energy, if the direction of dipole moment makes the following angle with E

(A) π (B) $\pi/2$

(C) Zero (D) $3\pi/2$

18) An electric dipole is kept in uniform electric fiel(D) It experiences

(A) A force and a torque (B) A force but not a torque

(C) A torque but not a force (D) Neither a force nor a torque

19) An electric dipole is kept in non-uniform electric fiel(D) It experiences

(A) A force and a torque (B) A force but not a torque

(C) A torque but not a force (D) Neither a force nor a torque

20) The electric field due to a dipole at a distance r on its axis is

(A) Directly proportional to r^3

(B) Inversely proportional to r^3

(C) Directly proportional to r^2

(D) Inversely proportional to r^2

21) The torque acting on a dipole of moment $\vec{P}$ in an electric field $\vec{E}$ is

(A) $\vec{P} \cdot \vec{E}$ (B) $\vec{P} \times \vec{E}$

(C) Zero (D) $\vec{E} \times \vec{P}$

22) The electric field at a point on axial line of a dipole and direction of the dipole moment

(A) Will be parallel (B) Will be in opposite direction

(C) Will be perpendicular (D) Are not related

23) The electric field at a point on equatorial line of a dipole and direction of the dipole moment

(A) Will be parallel

(B) Will be in opposite direction

(C) Will be perpendicular

(D) Are not related

24) If E_a be the electric field strength of a short dipole at a point on its axial line and E_e that on the equatorial line at the same distance, then

(A) $E_e = 2E_a$ (B) $E_a = 2E_e$

(C) $E_a = E_e$ (D) None of the above

25) A region surrounding a stationary electric dipoles has

(A) Magnetic field only

(B) Electric field only

(C) Both electric and magnetic fields

(D) No electric and magnetic fields

26) Electric field at a point varies as r^0 for

(A) An electric dipole

(B) A point charge

(C) A plane infinite sheet of charge

(D) A line charge of infinite length

27) For a given surface the Gauss' law is stated as $\oint E \cdot ds = 0$. From this we can conclude that

(A) E is necessarily zero on the surface

(B) E is perpendicular to the surface at every point

(C) The total flux through the surface is zero

(D) The flux is only going out of the surface

28) According to Gauss' Theorem, electric field of an infinitely long straight wire is proportional to

(A) r (B) $\frac{1}{r^2}$

(C) $\frac{1}{r^3}$ (D) $\frac{1}{r}$

29) The S.I. unit of electric flux is

(A) *Weber*

(B) *Newton per coulomb*

(C) *Volt×metre*

(D) *Joule* per *coulomb*

30) Gauss's law in electrostatics should be invalid if

(A) There were magnetic monopoles

(B) The inverse square law were not exactly true

(C) The velocity of light were not a universal constant

(D) None of these

31) A spherical conductor has the charge on it. Then total flux emitted through the gaussian surface drawn around conductor will be

(A) $\frac{1}{\varepsilon_0} \times$ (the charge enclosed by surface)

(B) $\varepsilon_0 \times$ (charge enclosed by surface)

(C) $\frac{1}{4\pi\varepsilon_0} \times$ (charge enclosed by surface)

(D) 0

32) Gauss's law is true only if force due to a charge varies as

(A) r^{-1} (B) r^{-2}

(C) r^{-3} (D) r^{-4}

33) A metallic sphere of radius R has a uniform distribution of electric charge on its surface. At a distance x from its centre, for $x > R$, the electric field is directly proportional to

(A) $\frac{1}{x^2}$ (B) $\frac{1}{x}$

(C) x (D) x^2

KEY ANSWERS;

Question	Option	Question	Option	Question	Option	Question	Option
1	**A**	11	**A**	21	**B**	31	**A**
2	**C**	12	**D**	22	**A**	32	**B**
3	**C**	13	**A**	23	**B**	33	**A**
4	**B**	14	**D**	24	**B**		
5	**D**	15	**C**	25	**B**		
6	**A**	16	**C**	26	**C**		
7	**B**	17	**C**	27	**C**		
8	**B**	18	**C**	28	**D**		
9	**B**	19	**A**	29	**C**		
10	**B**	20	**B**	30	**B**		

FILL IN THE BLANKS

1) A body can be charged by the method of _____.
Ans: Induction

2) _____ is the simple apparatus with which the presence of electric charge on a body is detected
Ans: Electroscope

3) SI unit of linear charge density is _____.
Ans: coulomb per metre

4) The direction of electric field is _____ from the positive charge.
Ans: away

5) The direction of electric field is _____ the negative charge.
Ans: towards

6) Electric Field lines do not exist inside a _____.
Ans: conductor

7) If ($q_1q_2<0$) then nature of force between charges is _____.
Ans: attractive

8) SI unit of dipole moment is _____.
Ans: coulomb-metre

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CHAPTER-2
ELECTROSTATIC POTENTIAL AND CAPACITANCE

1. Electric potential at a point due to a point charge q depends on distance as:
   A) Distance B) Distance^2
   C) 1/distance D) 1/distance^2
2. SI unit of electric potential is:
   A) volt B) watt
   C) farad D) coulomb
3. Work done in moving a unit positive charge from infinity to a point against the electric field is said to be the electricat that point.
   A) Field B) Flux
   C) Potential D) Dipole
4. The correct formula for electric potential is:
   A) Potential = work done/ charge B) Potential = work done X charge
   C) Potential = charge/ work done D) Potential = work done – charge
5. Work done in moving a unit positive charge against the electric field from one point to another is called _____
   A) Potential B) Potential energy
   C) Potential difference D) Potential energy difference
6. The ratio of 1joule to 1coulomb is:
   A) 1volt B) 1ampere
   C) 1farad D) 1ohm
7. Identify the vector quantity among the following:
   A) Electric dipole moment B) Electric potential
   C) Electric potential difference D) Electric potential energy
8. Electric potential at a point due to a short dipole varies with distance as:
   A) Distance B) Distance^2
   C) 1/distance D) 1/distance^2
9. Electric potential at a point due to a short dipole varies with orientation as:
   A) Cos Θ B) Sin Θ
   C) Tan Θ D) Cos^{2}Θ
10. For a point on the axis of a short dipole, electric potential due to it is:
   A) $2\frac{1}{4\pi\varepsilon_0}\frac{p}{r}$ B) 0
   C) $\pm\frac{1}{4\pi\varepsilon_0}\frac{p}{r}$ D) $\pm\frac{1}{4\pi\varepsilon_0}\frac{p}{r^2}$
11. For a point on the equatorial line of a short dipole, electric potential due to it is:
   A) $2\frac{1}{4\pi\varepsilon_0}\frac{p}{r}$ B) 0
   C) $\pm\frac{1}{4\pi\varepsilon_0}\frac{p}{r}$ D) $\pm\frac{1}{4\pi\varepsilon_0}\frac{p}{r^2}$
12. Electric potential due to a uniformly charged (with total charge q) spherical shell of radius R at a point on the surface is:
   A) $\frac{1}{4\pi\varepsilon_0}\frac{q}{R}$ B) $\frac{1}{4\pi\varepsilon_0}\frac{q}{R^2}$
   C) $\frac{1}{4\pi\varepsilon_0}\frac{q^2}{R}$ D) 0
13. Electric potential due to a uniformly charged (with total charge q) spherical conducting shell of radius R at any point inside the surface is:
   A) $\frac{1}{4\pi\varepsilon_0}\frac{q}{R}$ B) $\frac{1}{4\pi\varepsilon_0}\frac{q}{R^2}$
   C) Changes at every point D) 0
14. Electric potential due to a uniformly charged (with total charge q) spherical shell of radius R at a distance r (r > R) is:

A) $\frac{1}{4\pi\varepsilon_0}\frac{q}{R}$ B) $\frac{1}{4\pi\varepsilon_0}\frac{q}{r}$

C) $\frac{1}{4\pi\varepsilon_0}\frac{q}{R^2}$ D) $\frac{1}{4\pi\varepsilon_0}\frac{q}{r^2}$

15. The angle between electric field and equipotential surface is:
    A) 90^0 B) 0^0
    C) 180^0 D) 45^0
16. If we carry a charge once around an equipotential surface, then work done by it is:
    A) Positive B) Negative
    C) zero D) Infinite
17. Equipotential surface is a surface
    A) On which each and every point has positive potential
    B) On which each and every point has negative potential
    C) On which each and every point has zero potential
    D) On which each and every point has the same potential
18. Which of the following sentences is WRONG for an equipotential surface?
    A) Work done to move a charge between two points on the surface is 0.
    B) Electric field at any point on the surface is perpendicular to the surface.
    C) Equipotential surfaces are close together in regions of strong electric field
    D) Equipotential surfaces can intersect with each other.
19. Electric field due to a point charge is in the direction in which
    A) Potential increases the steepest B) Flux increases the steepest
    C) Potential decreases the steepest D) Flux decreases the steepest
20. The correct formula connecting electric field and electric potential:
    A) $\vec{E} = \frac{\delta V}{\delta l}$ B) $V = -\frac{\delta \vec{E}}{\delta l}$
    C) $\vec{E} = -\frac{\delta V}{\delta l}$ D) $V = \frac{\delta \vec{E}}{\delta l}$
21. Potential energy due to a system of two charges is negative when:
    A) Both charges are negative
    B) Both charges have unequal magnitude
    C) One charge is positive and the other is negative
    D) Both charges are positive
22. In the relation A=BC where A is Electric Potential energy, B is Electric charge, which physical quantity does C represent?
    A) Capacitance B) Electric potential
    C) Electric force D) Electric flux
23. SI units of potential and potential energy:
    A) Volt and joule B) Joule and volt
    C) Volt and volt D) Joule and joule
24. Potential energy of a system of 2 charges varies with distance as:
    A) Distance B) 1/distance
    C) Distance^2 D) 1/distance^2
25. When dipole moment is aligned in the direction of the uniform electric field:
    A) The dipole is in stable equilibrium
    B) The dipole is in unstable equilibrium
    C) Potential energy stored by the dipole is 0
    D) The dipole stores maximum potential energy
26. When dipole moment is aligned 180^0 with respect to the uniform electric field:
    A) The dipole is in stable equilibrium
    B) The dipole is in unstable equilibrium
    C) Potential energy stored by the dipole is 0

D) The dipole stores minimum potential energy

27. At the surface of a charged conductor, electric field must be always:
    A) Parallel to the surface
    B) Perpendicular to the surface
    C) Aligned at 45^0 from the surface
    D) Zero

28. Electric potential at any point inside a conductor is:
    A) Constant and is equal to the potential on the surface
    B) Constant and is independent of the potential on the surface
    C) Constant and is less than the potential at a point outside the surface
    D) zero

29. The electric field inside a cavity present in a conductor is always:
    A) Positive
    B) Negative
    C) Zero
    D) Greater than the electric field outside the conductor

30. The electric field inside the cavity of a charged conductor is zero. This is known as:
    A) Discharging
    B) Grounding
    C) Electrostatic shielding
    D) Electrification

31. Effect of introducing a dielectric in a region of electric field is:
    A) Electric field decreases but doesn't become zero
    B) Electric field increases
    C) Electric field remains constant
    D) Electric field decreases and becomes zero

32. The maximum electric field that a dielectric medium can withstand without breakdown is called its:
    A) Permittivity
    B) Dielectric constant
    C) Electric susceptibility
    D) Dielectric strength

33. 'A' represents a molecule in which centers of positive and negative charges coincide. 'B' represents a molecule in which centers of positive and negative charges are separate. Then, which of the following is TRUE for A and B?
    A) A and B are both polar molecules
    B) A and B are both non-polar molecules
    C) A is a polar molecule, B is a non-polar molecule
    D) A is a non-polar molecule, B is a polar molecule

34. An example for polar molecule is:
    A) Oxygen (O_2) molecule
    B) Nitrogen (N_2) molecule
    C) Hydrogen (H_2) molecule
    D) Water (H_2O) molecule

35. In case of dielectric, which of the following options is true with regard to the induced dipole moment (p) and the applied external electric field (E_{ext})?
    A) E_{ext} and p can be in any direction
    B) E_{ext} and p are in the same direction but not proportional to each other
    C) E_{ext} and p are in the same direction and proportional to each other
    D) E_{ext} and p are in opposite direction and not proportional to each other.

36. Capacitors are used to
    A) Destroy electric charges
    B) Store electric charges
    C) Produce electric charges
    D) Produce high potential differences

37. Capacitance of a capacitor is defined as:
    A) Ratio of charge on the capacitor to its potential difference
    B) Ratio of potential difference of the capacitor to its charge
    C) Product of charge on the capacitor and its potential difference
    D) Ratio of electric field across the capacitor to the charge on it

38. Capacitance of a parallel plate capacitor does not depend on:
    A) Shape of the plates
    B) Size of the plates
    C) Dielectric constant between the plates
    D) Charge on the plates

39. Capacitance of a parallel plate capacitor with dielectric material of dielectric constant K is given by:
    A) $C = \varepsilon_0 K/d$
    B) $C = \varepsilon_0 KA/d$
    C) $C = \varepsilon_0 A/d$
    D) $C = \varepsilon_0 KA/d^2$
40. In a parallel plate capacitor, the capacitance increases if:
    A) Charge on the plates decreases
    B) Distance between the plates increases
    C) Area of plates increases
    D) Dielectric constant of the material between the plates decreases
41. In a parallel plate capacitor, if the area of the plates is decreased by n times, then the capacitance
    A) Increases by n times
    B) Decreases by n times
    C) Remains same
    D) Increases by n^2 times
42. Ratio of capacitance of a capacitor with a dielectric substance to the capacitance of the same capacitor without the dielectric substance is called:
    A) Permittivity of vacuum
    B) Susceptibility of the dielectric substance
    C) Permittivity of the dielectric substance
    D) Permeability of the dielectric substance
43. When a number of capacitances are connected in parallel, which quantity remains same every time for all the capacitors?
    A) Capacitances
    B) Potential differences
    C) Charges
    D) Dielectric constants
44. For three capacitors connected in series, which of the following formulae is INCORRECT?
    A) $V_s = V_1 + V_2 + V_3$
    B) $Qs = Q_1 = Q_2 = Q_3$
    C) $C_s = (C_1C_2C_3)/(C_1+C_2+C_3)$
    D) $C_s = C_1C_2C_3 /(C_1C_2+C_2C_3+C_3C_1)$
45. Electrical energy stored in a capacitor per unit volume of the space is called as:
    A) Average electrical energy
    B) Total electrical energy
    C) Energy density
    D) Energy coefficient

KEY ANSWERS;

Question	Option	Question	Option	Question	Option	Question	Option	Question	Option
1	**C**	11	**B**	21	**C**	31	**A**	41	**B**
2	**A**	12	**A**	22	**B**	32	**D**	42	**C**
3	**C**	13	**A**	23	**A**	33	**D**	43	**B**
4	**A**	14	**B**	24	**B**	34	**D**	44	**C**
5	**C**	15	**A**	25	**A**	35	**C**	45	**C**
6	**A**	16	**C**	26	**B**	36	**B**		
7	**A**	17	**D**	27	**B**	37	**A**		
8	**D**	18	**D**	28	**A**	38	**D**		
9	**A**	19	**C**	29	**C**	39	**B**		
10	**D**	20	**C**	30	**C**	40	**C**		

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CHAPTER-3
CURRENT ELECTRICITY

1. The resistance of a carbon resistor is $2.5M\Omega \pm 10\%$. The colour of the third band of the resistor is
   A) Red B) Yellow
   C) Green D) Brown
2. The resistance of a carbon resistor is (500 ± 50) Ω. The colour of the fourth band of the resistor is
   A) Gold B) Yellow
   C) Red D) Silver
3. Kirchoff's junction rule signifies the law of conservation of
   A) Energy B) Momentum
   C) Charge D) Mass
4. Kirchoff's loop rule is a consequence of the law of conservation of
   A) Charge B) Energy
   C) Mass D) Momentum
5. Drift velocity per unit electric field is called
   A) Relaxation time B) Conductivity
   C) Current density D) Mobility
6. Current per unit area is called
   A) Relaxation time B) Conductivity
   C) Current density D) Mobility
7. The resistance offered by a 1m long conductor having a cross sectional area 1sqm is called
   A) Electrical resistance of the conductor
   B) Electrical resistivity of the conductor
   C) Electrical conductance of the conductor
   D) Electrical conductivity of the conductor
8. Average time between two successive collisions is called
   A) Relaxation time B) Conductivity C) Current density D) Mobility
9. The average velocity with which free electrons move in a conductor opposite to the applied electric field is called
   A) Mobility B) Conductivity
   C) Current density D) Drift velocity
10. Constantin and Manganin wires are used in making standard resistance boxes because they have
    A) Low temperature coefficient of resistance and high resistivity
    B) High temperature coefficient of resistance and low resistivity
    C) Low temperature coefficient of resistance and low resistivity
    D) High temperature coefficient of resistance and high resistivity
11. SI unit of current density is
    A)A B)Am^2
    C)Am^{-2} D)Am^{-1}
12. SI unit of Resistivity is
    A)Ω B)Ωm
    C)Ωm^{-1} D)Ωm^{-2}
13. SI unit of Conductance
    A)$mhom$ B)mho
    C)$mhom^{-1}$ D)$mhom^{-2}$
14. SI unit of Conductivity is
    A)$mhom$ B)$mhom^2$
    C)$mhom^{-1}$ D)$mhom^{-2}$
15. SI unit of mobility is
    A)$m^2V^{-1}s^{-1}$ B)$m^{-2}Vs$
    C)$mV^{-1}s^{-2}$ D)$m^{-1}Vs^2$

16. If the third band in a colour coded resistor is silver, the value of the multiplier is
A) 10^{-1} B) 10^{-2}
C) 10^{-3} D) 10^{-4}
17. Principle of working of a meter bridge is
A) Electromagnetic Induction
B) Mechanical effect of Electric current
C) Balanced Wheatstone Bridge
D) Magnetic effect of electric current
18. Resistance of a conducting wire depends on
A) Length B) area of cross section
C) Temperature D) All of these
19. Resistivity of a conducting wire depends on
A) Length B) area of cross section
C) Temperature D) None of these
20. Resistance of a conducting wire increases when
A) Area increases
B) Temperature decreases
C) Length increases
D) None of these
21. Resistors in the higher range are mostly made from
A) Silicon B) Copper
C) Aluminium D) Carbon
22. Drift velocity v_d varies with the intensity of electric field as per the relation

A) $v_d \propto E$ C) $v_d \propto \frac{1}{E}$

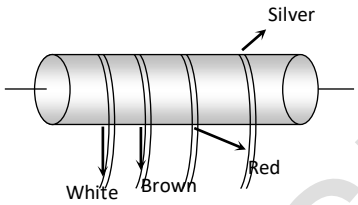
C) $v_d = \text{constant}$ D) $v_d \propto E^2$

23. When the length and area of cross-section of a wire both are doubled, then its resistance
A)will become half B) will be doubled
C)will remain the same D) will become four times
24. The resistivity of a wire
A) increases with the length of the wire
B) decreases with the area of cross-section
C) decreases with the length and increases with the cross-section of wire
D) none of the above statement is correct
25. *Ohm*'s law is true
A) For metallic conductors at low temperature
B) For metallic conductors at high temperature
C) For electrolytes when current passes through them
D) For diode when current flows
26. The example for non-*ohm*ic resistance is
A) Copper wire B) Carbon resistance
C) Diode D) Tungsten wire
27. All of the following statements are true except
A) Conductance is the reciprocal of resistance and is measured in *Siemen*
B) *Ohm*'s law is not applicable at very low and very high temperatures
C)*Ohm*'s law is applicable to semiconductors
D) *Ohm*'s law is not applicable to electron tubes, discharge tubes and electrolytes
28. The reciprocal of resistance is
A)Conductance B) Resistivity
C)Voltage D) None of the above
29. The reciprocal of Resistivity is

A) Conductance
B) Conductivity
C) Current density
D) Mobility

30. Which of the following is vector quantity
A) Current density
B) Current
C) Wattless current
D) Power

31. In the figure a carbon resistor has bands of different colours on its body as mentioned in the figure. The value of the resistance is
A) 2.2 $k\,\Omega$
B) 3.3 $k\,\Omega$
C) 5.6 $k\,\Omega$
D) 9.1 $k\,\Omega$



32. The resistance of a conductor increases with
A) Increase in length
B) Increase in temperature
C) Decrease in cross–sectional area
D) All of the above

33. When a current flows through a conductor its temperature
A) May increase or decrease
B) Remains same
C) Decreases
D) Increases

34. The alloys constantan and manganin are used to make standard resistance because they have
A) Low resistivity
B) High resistivity
C) Low temperature coefficient of resistance
D) Both B) and C)

35. The equivalent resistance of resistors connected in series is always
A)Equal to the mean of component resistors
B)Less than the lowest of component resistors
C)In between the lowest and the highest of component resistors
D)Equal to sum of component resistors

36. The correct expression for drift velocity of electrons in a conductor is
A)$v_d = -\frac{mE\tau}{e}$ B)$v_d = -\frac{eEm}{\tau}$
C)$v_d = -\frac{em\tau}{E}$ D)$v_d = -\frac{eE\tau}{m}$

37. The correct expression for conductivity of a conductor is
A)$\sigma = \frac{n^2e\tau}{m}$ B)$\sigma = \frac{ne\tau}{m^2}$
C)$\sigma = \frac{ne^2\tau}{m}$ D)$\sigma = \frac{ne\tau^2}{m}$

38. The correct expression for current density is
A) $J = nev_d$ B)$J = nAev_d$
C)$J = nAv_d$ D)$J = eAv_d$

39. The electron drift speed is small and the charge of the electron is also small but still, we obtain large current in a conductor. This is due to
A) The conducting property of the conductor
B) The resistance of the conductor is small
C) The electron number density of the conductor is small
D) The electron number density of the conductor is enormous

40. The colour code for a resistor of resistance $3.5k\Omega$ with 5% tolerance is

A) Orange, green, red and gold B) Red, yellow, black and gold

C) Orange, green, orange and silver D) Orange, green, red and silver

41. Current in a circuit containing a cell and a resistor (simple circuit) is given by

A) $I = \frac{E}{R}$ B) $I = \frac{E}{r}$

C) $I = \frac{E}{R+r}$ D) $I = \frac{E}{R+2r}$

42. On increasing the temperature of a conductor, its resistance increases because

A)Relaxation time decreases

B)Mass of the electrons increases

C)Electron density decreases

D) None of the above

43. The electric field *E*, current density *J* and conductivity σ of a conductor are related as

A) $\sigma = E / j$ B) $\sigma = j / E$

C) $\sigma = jE$ D) $\sigma = 1/ jE$

44. The accurate measurement of emf can be obtained using

A) Voltmeter B) Voltameter

C) Potentiometer D) Ammeter

45. Which among the following devices is used to measure unknown resistance?

A) Potentiometer B) Meter Bridge

C) Ammeter D) Voltameter

ANSWER KEY

Question	Option	Question	Option	Question	Option	Question	Option	Question	Option
1	**C**	11	**C**	21	**D**	31	**D**	41	**C**
2	**D**	12	**B**	22	**A**	32	**D**	42	**A**
3	**C**	13	**B**	23	**C**	33	**D**	43	**B**
4	**B**	14	**C**	24	**D**	34	**D**	44	**C**
5	**D**	15	**A**	25	**A**	35	**D**	45	**B**
6	**C**	16	**B**	26	**C**	36	**D**		
7	**B**	17	**C**	27	**C**	37	**C**		
8	**A**	18	**D**	28	**A**	38	**A**		
9	**D**	19	**C**	29	**B**	39	**D**		
10	**A**	20	**C**	30	**A**	40	**A**		

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CHAPTER-4
MOVING CHARGES AND MAGNETISM

1. A charge q is moving in a magnetic field then the magnetic force does not depend upon
(A)Charge (B)Mass
(C)Velocity (D)Magnetic field

2. If a charge q is going in the direction of magnetic field $\vec{B}$ with the velocity of $\vec{v}$ then the force on electron is
(A)Zero (B)$q(\vec{v}.\vec{B})$
(C)$q(\vec{v}\times\vec{B})$ (D)None of these

3. When a charged particle enters perpendicular to the external uniform magnetic field, it follows
(A)Linear path (B) helical path
(C) circular path (D) elliptical path

4. The magnetic force on neutral particle moving in external uniform magnetic field is
(A)Zero (B)qvB
(C)$qvB\ sin\theta$(D)qE

5. The correct expression for Lorentz force is
(A)$q[\vec{E}+(\vec{B}\times\vec{V})](B)q[\vec{E}+(\vec{V}\times\vec{B})]$
(C)$q(\vec{V}\times\vec{B})$(D) $q\vec{E}$

6. When the charged particle move in combined electric and magnetic field, the force acting on it is
(A)centripetal force (B) centrifugal force
(C)Lorentz force (D) magnetic force

7. A charged particle enters a uniform magnetic field perpendicular to it.T he magnetic field
(A)Increases the speed of the particle
(B)Decreases the kinetic energy of the particle
(C)Changes the direction of motion of the particle
(D)Both(A)&(C)

8. If the direction of the initial velocity of the charged particle is neither along nor perpendicular to that of the magnetic field, then the orbit will be
(A)a straight line (B)an ellipse
(C) a circle (D) a helix

9. A magnetic field can be produced by
(A) a moving charge (B) a static charge
(C) neutral particle (D) All of these

10. A charged particle moving in a magnetic field increases its velocity, then its radius of the circle
(A)Decreases (B)Increases
(C)Remains the same(D)Becomes half

11. A proton (or charged particle) moving with velocity *v* is acted upon by electric field *E* and magnetic field *(B)* The proton will move undeflected if
(A)*E* is perpendicular to *B*
(B)*E* is parallel to *v* and perpendicular to *B*
(C) *E* and *B* both are parallel to *v*
(D)*E*, *B* and *v* are mutually perpendicular and $v=\frac{E}{B}$

12. Magnetic field at the center of circular current loop is
(A)$\frac{\mu_0 I}{2R}$ (B)$\frac{\mu_0 \pi I}{2R}$

(C)$\frac{I}{2R}$ (D)$\frac{\mu_0 I}{2\pi R}$

13. SI unit of magnetic field is
(A)dyne (B)ohm
(C)tesla (D)volt

14. Cyclotron is a device used to
(A)slow down charged particles
(B)accelerate positively charged particle
(C) accelerate negatively charged particle
(D) accelerate neutral particle

15. In a cyclotron, the angular frequency of a charged particle is independent of
(A)Mass (B)Speed
(C)Charge (D)Magnetic field

16. An electron having mass m, charge q and kinetic energy E enters a uniform magnetic field B perpendicularly. Then its frequency of rotation will be
(A)$\frac{qB}{\pi m}$ (B)$\frac{qB}{2\pi m}$
(C)$\frac{qBE}{2\pi m}$ (D)$\frac{qB}{\pi mE}$

17. Unit of magnetic permeability is
(A)*A/metre* (B)*A*/metre^2
(C) h*enry* (D) h*enry*/*metre*

18. The magnetic force on a current carrying conductor of length l in an external magnetic field $\vec{B}$ is given by
(A)$\frac{\vec{l}\times\vec{B}}{I}$ (B) $\frac{I\times\vec{B}}{\vec{l}}$
(C)$I(\vec{l}\times\vec{B})$ (D)$I^2\vec{l}\times\vec{B}$

19. Vector form of Biot-Savart's law is
(A)$\overrightarrow{dB}=\frac{\mu_0}{4\pi}i\left(\frac{\overrightarrow{dl}\times\vec{r}}{r}\right)$ (B)$\overrightarrow{dB}=\frac{\mu_0}{4\pi}i^2\left(\frac{\overrightarrow{dl}\times\vec{r}}{r}\right)$
(C)$\overrightarrow{dB}=\frac{\mu_0}{4\pi}i^2\left(\frac{\overrightarrow{dl}\times\vec{r}}{r^2}\right)$ (D)$\overrightarrow{dB}=\frac{\mu_0}{4\pi}i\left(\frac{\overrightarrow{dl}\times\vec{r}}{r^3}\right)$

20. The magnetic induction at the centre of a current carrying circular of coil radius *r*, is
(A)Directly proportional to *r* (B)Inversely proportional *r*
(C)Directly proportional to r^2 (D)Inversely proportional to r^2

21. Ampere's circuital law is given by
(A)$\oint\vec{H}\cdot\overrightarrow{dl}=\mu_0 I_{net}(B)\oint\vec{B}\cdot\overrightarrow{dl}=\mu_0 I_{net}$
(C)$\oint\vec{B}\cdot\overrightarrow{dl}=\mu_0 J$ (D) $\oint\vec{H}\cdot\overrightarrow{dl}=\mu_0 J$

22. The magnetic induction at any point due to a long straight wire carrying a current is
(A)Proportional to the distance from the wire
(B)Inversely proportional to the distance from wire
(C)Inversely proportional to the square of the distance from the wire
(D)Does not depend on distance

23. The magnetic field *B* with in the solenoid having *n* turns per metre length and carrying a current of *I ampere* is given by
(A)$\mu_0 nI$ (B)$\mu_0 I$

(C)$\mu_0 RI$(D)μ_0/nI

24. A toroid has number of turns per unit length *n*, current *I*, then the magnetic field is

(A)$\mu_0 nI$ (B)$\mu_0 I$

(C)$\mu_0 RI$ (D)μ_0/nI

25. Which of the following statement is correct?

A) The magnetic field in the open space inside the toroid is constant

B) The magnetic field in the open space exterior to the toroid is constant

C) The magnetic field inside the core of a toroid is constant

D) The magnetic field inside the core of a toroid is zero

26. Two long parallel wires carrying currents in opposite direction

(A)Attract each other (B)Repel each other

(C)Neither attract nor repel (D)Get rotated to be perpendicular to each other

27. If *m* is magnetic moment and *B* is the magnetic field, then the torque is given by

(A)$\vec{m} \cdot \vec{B}$ (B)$\frac{\vec{m}}{\vec{B}}$

(C)$\vec{m} \times \vec{B}$ (D)$|\vec{m}| \cdot |\vec{B}|$

28. A current carrying loop is placed in a uniform magnetic fiel(D) The torque acting on it does not depend upon

(A)Shape of the loop (B)Area of the loop

(C)Value of the current (D)Magnetic field

29. An electron moves with a constant speed *v* along a circle of radius *r*. Its magnetic moment will be (*e* is the electron's charge)

(A)evr (B)$\frac{1}{2}evr$

(C)$\pi r^2 ev$ (D)πevr

30. In a moving coil galvanometer, the deflection of the coil θ is related to the electrical current *i* by the relation

(A)$i \propto tan\theta$ (B)$i \propto \theta$

(C)$i \propto \theta^2$ (D) $i \propto \sqrt{\theta}$

31. The sensitiveness of a moving coil galvanometer can be increased by decreasing

(A) The number of turns in the coil

(B)The area of the coil

(C) The magnetic field

(D)The couple per unit twist of the suspension

32. To convert a galvanometer into a voltmeter one should connect a

(A) High resistance in series with galvanometer

(B) Low resistance in series with galvanometer

(C) High resistance in parallel with galvanometer

(D) Low resistance in parallel with galvanometer

33. To convert a galvanometer into an ammeter one should connect a

(A) High resistance in series with galvanometer

(B)Low resistance in series with galvanometer

(C)High resistance in parallel with galvanometer

(D)Low resistance in parallel with galvanometer

ANSWER KEYS:

Question	Option	Question	Option	Question	Option	Question	Option
1	**B**	11	**D**	21	**B**	31	**D**
2	**A**	12	**A**	22	**B**	32	**A**
3	**C**	13	**C**	23	**A**	33	**D**
4	**A**	14	**B**	24	**A**		
5	**B**	15	**B**	25	**C**		
6	**C**	16	**B**	26	**B**		
7	**C**	17	**D**	27	**C**		
8	**D**	18	**C**	28	**A**		
9	**A**	19	**D**	29	**B**		
10	**B**	20	**B**	30	**B**		

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CHAPTER-5
MAGNETISM AND MATTER

1. The S.I unit of magnetic pole strength is
   A) ampere metre^{-1} B) ampere metre
   C) ampere metre^{2} D) ampere metre^{-2}
2. Torque acting on a magnetic dipole of magnetic moment ($\vec{M}$)placed in uniform magnetic field $(\overrightarrow{B})$ is
   (A)$\vec{\tau} = \overrightarrow{B} \times \vec{M}$ (B) .$\vec{\tau} = \vec{M} \times \overrightarrow{B}$
   (C)$\vec{\tau} = \overrightarrow{B} \cdot \vec{M}$ (D)$\vec{\tau} = \vec{M} \cdot \overrightarrow{B}$
3. Torque acting on a magnet held at angle Θ with magnet field is maximum when Θ=
   (A) 90° (B)180° (C) 360° (D)0°
4. Potential energy of a magnetic dipole is zero when Θ=
   (A) 0° (B) 90° (C) 180° (D) 360°
5. The small angle between magnetic axis and geographic axis at a place is called
   (A) Magnetic inclination (B) Magnetic declination
   (C) Magnetic dip (D) None of these.
6. Potential energy ofa magnetic dipole of magnetic moment ($\vec{M}$)placed in uniform magnetic field $(\overrightarrow{B})$ is
   (A) U = $\vec{M} \cdot \overrightarrow{B}$(B) U =$-\overrightarrow{B} \times \vec{M}$
   (C)$\vec{\tau} = \overrightarrow{B} \times \vec{M}(D)\vec{U} = -\vec{M} \times \overrightarrow{B}$
7. The angle between magnetic axis and geographic axis is
   (A) 9° $B)$ 10° $C)$11° $D)$11.3°
8. Angle of dip is 90° at
   (A) poles (B) equator
   (C) both (A) and (B) (D) none of these.
9. At magnetic poles the angle of dip is
   (A) 45° $B)$30° C)90° $D)$0°
10. Angle of dip at magnetic equator is
    (A) 0°(B)45° C)90° (D) 30°
11. S.I. unit of magnetic susceptibility is
    (A) Am (B) Am^{-1} (C) Hm^{-1} (D) No units.
12. The S.I. unit of magnetic permeability is
    (A) Wb A^{-1} m (B) Wb A $^{-1}$ m^{-1}
    (C) Hm (D) Tm^{-1}(A)
13. For paramagnetic substances.
    (A) μ_r= 1 (B)μ_r=0
    (C) μ_r> 1 (D) $\mu_r = \infty$
14. The magnetic susceptibility of a super conductor is
    (A)χ_m =1 (B)χ_m=-1
    (C)χ_m=0 (D) χ_m=∞
15. For a paramagnetic substance
    (A) χ_m=T^2(B) χ_m=T^0
    (C) $\chi_m\alpha$ T (D) $\chi_m\alpha$ T^{-1}
16. 1Curie temperature is the temperature at which
    (a) a ferromagnetic material becomes paramagnetic
    (B) a paramagnetic material becomes diamagnetic

(C) a ferromagnetic material becomes diamagnetic

(b) a paramagnetic material becomes ferromagneti(C)

17. Nickel is a

(A) diamagnetic (B) paramagnetic

(C) ferromagnetic (D) None of these

18. The weber m^{-2} equal to

(A) tesla (B) henry

(C) Watt (D) dyne.

19. Magnetic susceptibility of platinum is 0.0001 relative permeability is

(A) 1. 0000 (B) 0.9999

(C) 1.0001 (D) 0.

20. The magnetic susceptibility oI a paramagnetic material is .

(A) small and positive (B) small and negative

(C) large and positive (D) None of these.

21. For diamagnetic substances X_m is

(A) small and negative (B) small and positive

(C)large and positive (D) none of these.

22. If the magnetic moment of substance is zero, the substance is zero, the substance is

(A) diamagnetic (B) paramagnetic

(C) ferromagnetic (D) anti ferromagneti(C)

23. Earth's magnetic field always has a horizontal components except at

(A) equator (B) geographical poles

(C) magnetic poles (D) None of the above.

24. Most suitable material for making transformer Cores is

(A) Steel (B) Nickel

(C) Copper (D) Soft iron.

25. Susceptibility is positive and large for

(A) Paramagnetic (B) Ferromagnetic

(C) Diamagnetic (D)Non of these

26. Susceptibility is positive and small for

(A) Paramagnetic (B) Ferromagnetic

(C) Diamagnetic (D) Non magnetic

27. The area of B-H curve is an indication of

(A) susceptibility of substance (B) Retentivity of substance

(C)the energy dissipated per cycle (D) The permeability of medium

28. A bar magnet is kept in a uniform magnetic field It experiences.

A) A torque but not a force

B) A force but not a torque

C) Both a force and a torque

D) Neither a force nor a torque

29. The unit of magnetic dipole moment is

A) ampere metreB) ampere $metre^{-1}$

C) ampere $metre^{-2}$ D) ampere $metre^{2}$

30. In the hysteresis cycle, the of value of H needed to make the intensity of magnetization zero is called

(A) retentivity (B) coercive force

(C) Lorentz force (D) none of the above

31. The hysteresis cycle for the material of permanent magnet is
    (A) short and wide (B) tall and narrow
    (C) tall and wide (D) none of the above
32. 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
33. Choose the diamagnetic material out of the following
    (A) gold (B)aluminium
    (C) iron (D) cobalt

FILL IN THE BLANKS

1. The direction of magnetic dipole moment ($\vec{M}$) of a magnet is from …….. inside the magnet.
2. In the northern hemisphere, magnetic lines of force due to earth's field points…….
3. The net magnetic flux through a closed surface is……..
4. The vertical component of earth's magnetic field exists everywhere except at……
5. The materials which develop feeble magnetization in the direction of the magnetizing field are called……. Surface
6. The susceptibility of a …….substance is independent of magnetizing field and temperature.
7. The phenomenon of exhibiting diamagnetic property by the superconductors is called……

KEY ANSWERs :

Question	Option	Question	Option	Question	Option	Question	Option
1	**B**	11	**D**	21	**A**	31	**C**
2	**B**	12	**D**	22	**C**	32	**C**
3	**D**	13	**C**	23	**D**	33	**A**
4	**B**	14	**D**	24	**B**		
5	**B**	15	**D**	25	**A**		
6	**D**	16	**A**	26	**C**		
7	**D**	17	**C**	27	**A**		
8	**A**	18	**A**	28	**A**		
9	**C**	19	**C**	29	**D**		
10	**A**	20	**A**	30	**D**		

FILL IN THE BLANKS ANSWER

1. South and North 2. Towards earth 3. zero 4 . Magnetic equator
5. Paramagnetic 6. Diamagnetic 7. Meisner effect

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CHAPTER-6
ELECTROMAGNETIC INDUCTION

1) The correct statement of EMI is.
   A) Electric current is generated by varying electric field.
   B) Electric current is generated by varying magnetic field.
   C) Electric current is generated by varying charge.
   D) None of the above.

2) In the coil magnet experiment, the deflection in the galvanometer is larger when,
   a. A Coil moves faster towards or away from the magnet.
   b. Magnet moves faster towards or away from the coil.
      A) a only.
      B) b only.
      C) Both a and b .
      D) None of the above.

3) Identify the correct statement among the following option an experiment current induced by change in current.
   A) Galvanometer shows a momentary deflection when the taping key is pressed
   B) The key is pressed continuously, there is no deflection in the galvanometer.
   C) When the key is released, a momentary deflection is observed again in the galvanometer.
   D) All the above.

4) The S.I unit of magnetic flux is,
   A) coulomb meter
   B) tesla meter squared
   C) newton/coulomb meter squared
   D) becquerel.

5) The law which gives the polarity of induced emf in electromagnetic induction is.
   A) Gauss' law in magnetism.
   B) ampere's circuital law
   C) faraday law
   D) Lenz'slaw

6) The significance of Lenz's law is,
   A) Law of conservation of energy.
   B) Law of conservation mass
   C) Law of conservation charge.
   D) none of the above.

7) Induction furnace is the application of.
   A) Electric current
   B) Displacement current
   C) Eddy current.
   D) Photoelectric current.

8) Self-inductance plays the role of.
   A) Inertia.
   B) Impedance.
   C) Mutual inductance.
   D) None of the above.

9) The principle of AC generator is.
   A) Electromagnetic induction.
   B) Ampere's circuital law.

C) Photoelectric effect.
D) None of the above.

10) The possible maximum instantaneous value of the emf is.
A) ε=NBAω.
B) ε=NB(A)
C) E=NBAωsinωt.
D) None of the above.

11) The magnetic flux through a circuit of resistance R changes by an amount $\Delta\phi$ in time Δt, Then the total quantity of electric charge Q, which passing during this time through any point of the circuit is given by

(A) $Q = \frac{\Delta\phi}{\Delta t}$ (B) $Q = \frac{\Delta\phi}{\Delta t} \times R$

(C) $Q = -\frac{\Delta\phi}{\Delta t} + R$ (D) $Q = \frac{\Delta\phi}{R}$

12) The direction of induced e.m.f. during electromagnetic induction is given by
(A)Faraday's law (B) Lenz's law
(C)Maxwell's law (D) Ampere's law

13) To induce an e.m.f. in a coil, the linking magnetic flux
(A)Must decrease (B)Can either increase or decrease
(C)Must remain constant (D)Must increase

14) The north pole of a magnet is brought near a metallic ring. The direction of the induced current in the ring will be
(A)Clockwise (B) Anticlockwise
(C)Towards north (D)Towards south

15) Self-induction of a solenoid is
(A)Directly proportional to current flowing through the coil
(B)Directly proportional to its length
(C)Inversely proportional to area of cross-section
(D)Inversely proportional to area of cross-section

16) Mutual inductance of two coils can be increased by
(A)Decreasing the number of turns in the coils
(B)Increasing the number of turns in the coils
(C)Winding the coils on wooden core
(D)None of the above

17) Which of the following is wrong statement
(A)An emf can be induced between the ends of a straight conductor by moving it through a uniform magnetic field
(B)The self induced emf produced by changing current in a coil always tends to decrease the current
(C Inserting an iron core in a coil increases its coefficient of self induction
(D)According to Lenz's law, the direction of the induced current is such that it opposes the flux change that causes it

18) Eddy currents are produced when
(A)A metal is kept in varying magnetic field
(B)A metal is kept in the steady magnetic field
(C)A circular coil is placed in a magnetic field

(D)Through a circular coil, current is passed

19) Dynamo is a device for converting

(A)Electrical energy into mechanical energy

(B)Mechanical energy into electrical energy

(C)Chemical energy into mechanical energy

(D)Mechanical energy into chemical energy

20) Choke coil works on the principle of

(A)Transient current (B) Self induction

(C)Mutual induction (D) Wattless current

KEY ANSWERS

Question	Option	Question	Option
1	**B**	11	**D**
2	**C**	12	**B**
3	**D**	13	**B**
4	**B**	14	**B**
5	**D**	15	**B**
6	**A**	16	**B**
7	**C**	17	**C**
8	**A**	18	**A**
9	**A**	19	**B**
10	**A**	20	**B**

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CHAPTER-7
ALTERNATING CURRENT

1) When the frequency of AC is doubled, the impedance of an LCR circuited
   A) Is doubled B) increase
   C) Decreases C) is halved
2) A metal ring is held horizontally and bar magnet is dropped through the ring with its length along the axis of the ring .the acceleration of the falling magnet is.
   A) more than g B)equal to g
   C) less than g D) depends on the diameter of the ring and length of the magnet
3.) An alternating current of frequency f is flowing through a resistance R and inductance L connected in series. The impedance of the circuit is.
   A) R +2πfLB) R+L
   C)$\sqrt{R^2 + 4\,\pi^2 v^2 L^2}$D)$\sqrt{R^2 + L^2}$
4) An electric lamp is connected to 220 V, 50 Hz supply. Then the peak voltage is
   A) 211V B)320 V
   C)311 V D) 210 V
5) An AC voltage source of variable angular frequency w and fixed amplitude A is connected in series with capacitance c and an electric bulb of resistance R .When w is increased
   A) The bulb glows dimmer
   B) the bulb glows brighter
   C) total impedance of the circuit increases
   D) total impedance of the circuit is unchanged
6) What is average value of (A)c over a complete cycle?
   A) 1 B) zero
   C) 180 D)90
7) Write the relation between inductive reactance and frequency
   A) $X_L = 2\pi fL$ B)$w=2\pi f$
   C) t= 1/f D) f=1/t
8) Write the unit of inductive reactance
   A) Ohm B) mho
   C) force D) joule
9) The frequency of AC source is double. What will be the new reactance of the inductor?
   A) reactance is also doubled B) zero
   C) decreases D) increases
10) Amount of opposition offered by LCR Circuit is known as
   A) impedance B) resistor
   C) capacitor D) inductor
11) The phase difference between current and voltage in resistor
   A) 90^0 B) 0^0
   C)180^0 D) 60^0
12) The efficiency of an ideal transformer
   A) 100% B) 50%
   C) 40% D)30%
13) Frequency of DC source is
   A) infinity B) zero

C) 1 D) ½

14) The power dissipation in a pure capacitive circuit is
A) Zero B) 180^0
C)6^0 D) 90^0

15) What is the frequency of the AC mains in India?
A)60 Hz B)50hz
C) 40hz D)30hz

16) An alternating current can be produced by a
A) choke coil B) dynamo
C) electric motor D) transformer

17) Which of the following can measure an alternating current?
A) voltmeter B) ammeter
C) suspended coil galvanometer D) moving coil galvanometer

18) Which of the following circuits exhibits maximum power dissipation?
A) pure inductive circuit B) pure capacitive circuit
C) pure resistive circuit D)none of the above

19) What happens to the inductive reactance when the frequency of the AC supply is increased ?
A) increases B) decreases
C) remains the same D) decreases inversely

20)What happens to the quality factor of an LCR circuit if the resistance is increased ?
A) increases B) decreases
C) remains same D) none of the above

21)Which of the following statements is true about the LCR circuit connected to an AC source at resonance?
A)R equals the applied voltage B)R is zero
C)C is zero D)L equals the applied voltage

22) The impedance in the series LCR circuit is minimum at the resonance frequency.
A) true B) false
C) may be D) no

23) When is the current in a circuit wattless?
A) when the inductance of the circuit is zero
B) when the resistance of the circuit is zero
C)when the current is alternating
D)When both resistance and inductance is zero

24) The power factor is one for which of the following?
A) pure capacitor B) pure inductor
C)pure resistor D) all of the above

25) A device which is used to transformer alternating voltage from greater to smaller or smaller to greater value is known as
A) generator B) transformer
C) transistor D) transducer

26) Transformer works in the principle of
A) power factor B) resonance
C)self-induction D) mutual induction

27) Among the following which is not a source of energy loss in transformer
A) flux leakage B) resistance of the windings
C) Eddy current D) insulation of coil

KEY ANSWERS

Question	Option	Question	Option	Question	Option
1	**B**	11	**B**	21	**A**
2	**C**	12	**A**	22	**A**
3	**C**	13	**B**	23	**B**
4	**C**	14	**A**	24	**C**
5	**B**	15	**B**	25	**B**
6	**B**	16	**B**	26	**D**
7	**A**	17	**B**	27	**D**
8	**A**	18	**C**		
9	**A**	19	**A**		
10	**A**	20	**B**		

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CHAPTER-8
ELECTRO MAGNETIC WAVES

1. A velocity of electromagnetic waves in free space is
   A)$3x10^{-8}$ ms^{-1} B) $3x10^{8}$ ms^{-1}
   C) $3x10^{8}$ kms^{-1} D) $3x10^{-8}$ kms^{-1}
2. Maxwell in his famous equation of electromagnetism introduced the concept of
   A)AC current B) displacement current
   C) DC current D) impedance
3. One of the inconsistencies of ampere's circuital law
   A) Fails to determine magnetic field to conduction current
   B) Fails to determine magnetic field due to displacement current
   C) Fails to explain both (A) and (B)
   D) None of these
4. Which of the following rays is not an electromagnetic wave
   A) X-rays B)$\gamma - rays$
   C) β- rays D) heat rays
5. The part of the spectrum of the electromagnetic radiation used to cook food is
   A) UV- rays B) cosmic rays
   C)γ-rays D) microwaves
6. The wave used by artificial satellites for communication is
   A) Microwaves B) infrared waves
   C) radio waves D)x-rays
7. Which of the electromagnetic waves has smallest wavelength
   A) X-rays B) microwave
   C) radio waves D)γ-rays
8. The decreasing order in wavelength in this electromagnetic wave is ,
   Infrared, microwave, UV rays and gamma rays is
   A) Microwave, Infrared, Ultraviolet, Gamma rays
   B) Infrared, Microwave, Ultraviolet, Gamma rays
   C) Gamma, Infrared, Microwave, Ultraviolet rays
   D) Infrared, Gamma, Microwave, Ultraviolet rays
9. The ultra-high frequency band of radio waves in electromagnetic wave is used as in
   A) television waves B) cellular phone communication
   C) commercial FM radio D) both (A) and (C)
10. The quantity $\sqrt{\mu_0 \epsilon_0}$ represents
    A) Inverse of speed of light in vacuum B) speed of light
    C) speed of sound D) Speed of electromagnetic wave
11. Which radiation is used in the treatment of muscle pains
    A) Infrared rays B) Ultraviolet rays
    C) microwave D) X-rays
12. Which of the following electromagnetic wave used in the treatment of cancer
    A) IR –rays B) visible rays
    C) Gamma rays D) Ultraviolet rays
13. Which of the following has the maximum energy?

A) Micro waves B) IR-rays
C) Ultraviolet rays D) Gamma rays

14. Which of the following has the minimum energy?
A) Micro waves B) IR-rays
C) Ultraviolet rays D) radio waves
15. Which of the following laws was modified by Maxwell by introducing the displacement current?
A) Gauss's law B) Ampere's law
C)Biot-Savart's law D) none of these
16. What is the nature of electromagnetic waves
A) Transverse wave B) longitude wave
C) mechanical wave D) sound wave
17. What is the angle between electric field vector and magnetic field of electromagnetic waves?
A)90^o B)30^o
C)45^o D)15^o
18. Displacement current is a
A) it is the current due to time varying magnetic field
B) it is the current due to time varying electric field
C) it is the current due to time varying both magnetic field and electric field
D) it is the current due to constant magnetic field
19. Correct expression for displacement current is
A) $I_d = \epsilon_o \frac{d\varphi}{dt}$ B)$I_d = \frac{d\varphi}{dt}$
C)$I_d = \mu_o \frac{d\varphi}{dt}$ D)$I_d = \mu_o \epsilon_o \frac{d\varphi}{dt}$
20. Expression for speed of light in terms of permittivity and permeability in free space
A) $\frac{1}{\sqrt{\mu_o \epsilon_o}}$ B)$\frac{1}{\mu_o \epsilon_o}$
C)$\frac{1}{\sqrt{\mu_o + \epsilon_o}}$ D)$\mu_o \epsilon_o$
21. What is the wave length range of electromagnetic spectrum
A) 10 Hz to 10^{10}Hz B) 8Hz to 6 Hz
C) 10 Hz to 10^{22}Hz D) 10 Hz to 10^{24}Hz
22. The maximum frequency wave in the spectrum is
A) Gamma ray B) X-ray
C) UV- rays D) IR-rays
23. The minimum frequency wave in the electromagnetic spectrum is
A) Gamma ray B) Radio wave
C) UV- rays D) IR-rays
24. Which ray is used in photosynthesis
A) X-rays B) UV –rays
C) IR –rays D) visible ray
25. For dehydrated fruits the ray used
A) X-rays B) UV –rays
C) IR –rays D) visible ray
26. Fundamental source of electromagnetic wave is
A) Alternating current B) oscillating charged particles

C) changing magnetic field D) none of these

27. Among the following, which of the ray is used in photocells
    A) UV-rays B) visible rays
    C) X-rays D) micro waves

28. RADAR system use
    A) Radio wave B) micro waves
    C) IR-rays D) UV-rays

KEY ANSWER

Question	Option	Question	Option	Question	Option
1	**B**	11	**A**	21	**C**
2	**B**	12	**C**	22	**A**
3	**B**	13	**D**	23	**B**
4	**D**	14	**D**	24	**B**
5	**D**	15	**B**	25	**C**
6	**A**	16	**A**	26	**B**
7	**D**	17	**A**	27	**A**
8	**A**	18	**B**	28	**B**
9	**B**	19	**A**		
10	**A**	20	**A**		

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CHAPTER-9
RAY OPTICS AND OPTICAL INSTRUMENTS

1. The speed of light in vacuum is
   (A) 3 X 10^5 m/s (B) 3 X 10^5 km/s (C) 3 X 10^8 km/s (D) 3 X 10^6 m/s
2. The relation between focal length (f) and radius of curvature (R) of a mirror
   (A) f = R/2 (B) R = f/2 (C) R = f (D) R = f/3
3. Mirror equation is given by
   (A) f = v + u (B) f = $\frac{uv}{u+v}$ (C) $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ (D) Both B and C
4. The position of the object to get virtual image in the case of concave mirror is
   (A) Between F and P (B) Beyond C (C) At C (D) Between F and C
5. At which position of the object a concave mirror produces a magnification equal to -1
   (A) Between F and P (B) Beyond C (C) At C (D) Between F and C
6. The mirror which produces only a virtual and diminished image is
   (A) Plane mirror (B) Concave mirror (C) Convex mirror (D) None
7. The bouncing back of light after hitting any surface is called
   (A) Interference (B) Refraction (C) Diffraction (D) Reflection
8. For what angle of incidence Snell's law is not valid
   (A) 45^0 (B) 0^0 (C) 90^0 (D) 50^0
9. The colour of the light which has highest refractive index is
   (A) Violet (B) Red (C) Yellow (D) Green
10. The colour of the light which has least refractive index is
    (A) Violet (B) Red (C) Yellow (D) Green
11. Due to atmospheric refraction of sunlight, the length of the day increases by about
    (A) 2 minute (B) 1 minute (C) 4 minute (D) 3 minute
12. The colour which has least critical angle of incidence is
    (A) Violet (B) Red (C) Yellow (D) Green
13. The colour which has highest critical angle of incidence is
    (A) Violet (B) Red (C) Yellow (D) Green
14. The critical angle for diamond – water interface is nearly
    (A) 54^0 (B) 42^0 (C) 30^0 (D) 24^0
15. Convex mirrors are used as side view mirrors in cars because
    (A) they form diminished, virtual images (B) they form enlarged, virtual images
    (C) they form diminished, real images (D) they form enlarged, real images
16. Virtual images are formed
    (A) In front of the mirrors (B) Behind the mirrors
    (C) Both in front and behind the mirrors (D) Neither in front nor behind the mirrors
17. Refractive index is the
    (A) Ratio of speeds of light (B) Ratio of wavelengths of light
    (C) Ratio of frequencies of light (D) Both A and B
18. The one which has lowest refractive index is
    (A) Vacuum (B) Air (C) Water (D) Glass
19. When light travel from air to glass, frequency
    (A) increases (B) decreases (C) remains same (D) may increase or decrease
20. Twinkling effect of stars is due to
    (A) Refraction (B) Scattering (C) Diffraction (D) Reflection

21. For critical angle of incidence, Angle of refraction is
(A) 0^0 (B) 30^0 (C) 60^0 (D) 90^0
22. Principle of optical fibre is
(A) Total internal reflection (B) Reflection (C) Refraction (D) Diffraction
23. Pick the odd one out
(A) Polaroid (B) Mirage (C) Sparkling of diamond (D) Optical fiber
24. dioptre is equivalent to
(A) meter (B) $meter^2$ (C) $meter^{-1}$ (D) $meter^{-2}$
25. Deviation produced by a thin prism is
(A) (2n-1)A (B) (n-1) A (C) (n-1)A/2 (D) (2n-1) A/2
26. The nature of the image produced by concave lens is
(A) Virtual and diminished (B) Real and diminished
(C) Virtual and enlarged (D) Real and enlarged
27. At which position of the object, a convex lens produces a magnification of – 1?
(A) At F (B) At 2F (C) Beyond 2F (D) Between F and 2F
28. At which position of the object, a convex lens produces an enlarged real image?
(A) At F (B) At 2F (C) Beyond 2F (D) Between F and 2F
29. The SI unit of power of a lens is
(A) joule (B) farad (C) dioptre (D) coulomb
30. According to Rayleigh scattering law, intensity of scattering is proportional to
(A) $\frac{1}{\lambda^4}$ (B) $\frac{1}{\lambda^3}$ (C) $\frac{1}{\lambda^2}$ (D) $\frac{1}{\lambda}$
31. Blue colour of the sky is due to
(A) Reflection of light (B) Refraction of light (C) Diffraction of light (D) Scattering of light
32. In primary rainbow there are _____ total internal reflections
(A) 1 (B) 2 (C) 3 (D) 4
33. In secondary rainbow there are _____ total internal reflections
(A) 1 (B) 2 (C) 3 (D) 4
34. Magnification produced by simple microscope is given by
(A) $1 + \frac{2D}{f}$ (B) $1 + \frac{D}{2f}$ (C) $1 + \frac{D}{f}$ (D) $\frac{D}{f}$
35. Magnification produced by a compound microscope is
(A) $\left(\frac{L}{f_0}\right)\left(\frac{D}{f_e}\right)$ (B) $\left(\frac{L}{f_0}\right)$ (C) $\left(\frac{D}{f_e}\right)$ (D) $1 + \frac{D}{f_e}$
36. Magnification produced by a telescope is
(A) $\frac{f_o}{f_e}$ (B) $\frac{f_e}{f_o}$ (C) $\frac{2f_o}{f_e}$ (D) $\frac{f_o}{2f_e}$
37. The length of a telescope in normal adjustment is
(A) $f_o - f_e$ (B) $f_o + f_e$ (C) f_o/f_e (D) $f_o f_e$
38. The final image formed by compound microscope is
(A) Inverted and Diminished (B) Erect and Diminished
(C) Inverted and Enlarged (D) Erect and Enlarged
39. Deviation produced by a prism is
(A) i + e –A (B) i – e –A (C) i + e + A (D) i – e +A
40. Angle of a prism is
(A) $r_1 - r_2$ (B) $(r_1-r_2)/2$ (C) $(r_1+r_2)/2$ (D) $r_1 + r_2$

KEY ANSWERS

Question	**Option**	Question	**Option**	Question	**Option**	Question	**Option**
1	**B**	11	**C**	21	**D**	31	**D**
2	**A**	12	**A**	22	**A**	32	**A**
3	**D**	13	**B**	23	**A**	33	**B**
4	**A**	14	**D**	24	**C**	34	**C**
5	**C**	15	**A**	25	**B**	35	**A**
6	**C**	16	**B**	26	**A**	36	**A**
7	**D**	17	**D**	27	**B**	37	**B**
8	**B**	18	**A**	28	**D**	38	**C**
9	**A**	19	**C**	29	**C**	39	**A**
10	**B**	20	**A**	30	**A**	40	**D**

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CHAPTER - 10
WAVE OPTICS

1. Corpuscualr model of light was first given by

A) Newton B) Huygen C) Descartes D) Maxwell

2. According to Huygens constructions, the speed of the secondary wavelets is

A) Twice that of the wave B) Same as the wave C) Zero D) infinite

3. The source of the plane wave is

A) Point source B) Extended source C) Source at large distance D) Do not exist

4. The nature of the refracted wavefront from a prism when the incident wavefront is plane is

A) Plane wave B) Spherical wave C) Cylindrical wave D) Plane wave making angle with the incident wave

5. Coherent waves refers to wave of

A) Constant phase difference B) Constant amplitude C) Constant wavelength D) different frequency

6. Two coherent sources of light can be obtained by

A) Two different lamps B) Two different lamps of same power C) Two different lamps of same power and colour D) Two slits illuminated by a same source

7. Path difference b/w coherent waves for constructive interference must be

A) nλ B) $(2n+1)\frac{\lambda}{2}$ C) $n\frac{\lambda}{2}$ D) $(2n+2)\frac{\lambda}{2}$

8. The expression for the fringe width,(where the symbols have their usual meaning)

A) $\frac{1}{\beta}=\frac{\lambda D}{d}$ B) $\beta=\frac{\lambda D}{2d}$ C) $\beta=\frac{\lambda D}{d}$ D) $\frac{1}{\beta}=2n\frac{\lambda}{2}$

9. The distance at which an n^{th} bright fringe formed is (where the symbols have their usual meaning)

A) $X_n=\frac{n\lambda D}{d}$ B) $X_n=\frac{n\lambda D}{2d}$ C) $X_n=\frac{2\lambda D}{nd}$ D) $X_n=\frac{n\lambda d}{D}$

10. The distance at which an n^{th} dark fringe formed is (where the symbols have their usual meaning)

A) $X_n=\frac{n\lambda D}{d}$ B) $X_n=\frac{(2n+1)\lambda D}{2d}$ C) $X_n=\frac{2\lambda D}{nd}$ D) $X_n=\frac{(2n+1)\lambda d}{D}$

11. If the distance between the slit and the screen is increased, what happens to fringewidth

A) Doubles B) Remains same C) Decreases D) Increases in proportion to the distance

12. If the monochromatic source is replaced by another source of shorter wave length, the fringe width

A) Decreases B) Remains same C) Increases D) zero

13. If the monochromatic source is replaced by white light the central fringe will be

A) White B) Blue C) Red D) Yellow

14. The colours seen when CD is viewed is due to

A) Reflection B) Refraction C) Interference D) Diffraction

15. If D is the distance between slit and screen, 'a' width of the slit illuminated by a monochromatic source, the width of the central diffraction maxima is given by

A) $\frac{a}{D\lambda}$ B) $\frac{a\lambda}{D}$ C) $\frac{2D\lambda}{a}$ D) $\frac{\lambda}{a}$

16. Interference and diffraction fringes are consistent with

A) Conservation of charge B) Conservation of energy C) Conservation of momentum D) Conservation of mass

17. If the monochromatic source is replaced by white light the central fringe in diffraction will be

A) White B) Blue C) Red D) Yellow

18. Polarization is the phenomenon of light based on

A) Particle nature B) Wave nature C) Quantum phenomenon D) Transverse electromagnetic nature

19. Polaroids are used to produce

A) Monochromatic light B) Unpolarised light C) polarised light D) White light

20. The relation $I = I_o cos^2\theta$ (Where the symbols have their usual meaning) is

A) Newton's law B) Snell's law C) Malus' law D) Brewster's law

21. The intensity of the emergent beam will be zero if the pass axis of two polaroids are

A) Only when perpendicular to each other B) Parallel to each other C) At an angle of 45^0 D) At angles greater than 0 and 90

22. The angle of incidence at which the reflected wave is totally polarized and reflected and refracted rays are perpendicular to each other is called

A) Critical angle B) Snell's angle C) Fresnel angle D) Brewster angle.

23. If the intensity varies b/w maximum and minimum but not completely dark when viewed through analyser Polaroid is called

A) Completely polarized light B) Partially chromatic light C) Monochromatic light D) Partially polarized light

24. A point source of light produce

A) A. spherical wavefront B) cylindrical wavefront C) plane wavefront D) both A and C

25. Path difference for second minima in diffraction pattern a single slit

A) 0 B) λ/2 C) λ D) 2λ

ANSWERS;

QN	ANS	QN	ANS	QN	ANS	QN	ANS	QN	ANS
1	C	6	D	11	D	16	B	21	A
2	B	7	A	12	A	17	A	22	D
3	C	8	C	13	A	18	D	23	D
4	D	9	A	14	D	19	C	24	D
5	A	10	B	15	C	20	C	25	D

FILL IN THE BLANKS

1. A wavefront is the locus of all points vibrating in same phase
2. A point source at finite distance is the source of Spherical waves
3. According to Huygens construction the amplitude of the secondary wavelet is zero in backward direction
4. The physical quantity which remains same when a wave gets refracted from one medium to another of different optical density is frequency
5. The nature of the reflected plane wavefront from a concave mirror is a spherical wavefront.
6. Doppler effect produced when the light source move away from the observer is called red shift
7. Doppler effect produced when the light source move towards the observer is called blue shift.
8. The superposition of two coherent wave resulting in zero intensity is called destructive interference.
9. The path difference between two coherent waves resulting in destructive interference is odd multiple of $\frac{\lambda}{2}$
10. The alternate dark and bright bands of equal width and intensities resulting due to superposition are called interference fringes.
11. The distance between two consecutive bright or dark fringe is called fringe width.
12. Central fringe in the interference pattern is a bright fringe.
13. Fringes of unequal intensities and width are referred as diffraction pattern
14. The resolution of the telescope can be increased by increasing the diameter of the objective.
15. A telescope produces resolved image of the object.
16. A microscope produces magnified image of the object.

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CHAPTER - 11
DUAL NATURE OF RADIATION AND MATTER

1) Work function is the energyrequired __
   A) to produce x-rays B) to exhibit an atom
   C) to eject an electron just out of thesurface D) explore an atom
2) Photoelectric effect is basedupon
   A) energy B) momentum
   C) charge D) mass
3) The photoelectric effect occurs only when the incident light has more than certain minimum
   A) wavelength B) speed
   C) charge D) frequency
4) The maximum number of photo electrons released in a photocell is independent
   A) nature of the cathode surface
   B) frequency of the incident ray
   C) intensity of radiation incident oncathode surface
   D) none of the above
5) Intensity of light incident on photo sensitive surface is doubled then
   A) the number of emitted electrons tripled
   B) the number of emitted electronsis doubled
   C) kinetic energy is doubled
   D) momentum is doubled
6) If the frequency of light in photoelectric experiment is doubled, the stopping potential will
   A) be doubled B) be halved
   C) become more than doubled D) become less than doubled
7) The best metal to be used for photo emission is
   A) potassium B) sodium
   C) caesium D) lithium
8) de Brogile wavelength depends on the mass and energy accordingto the relation
   A) $(\text{mass x energy})^{-1/2}$ B) $(\text{mass x energy})^{1/2}$
   C) $(\text{mass/energy})^{1/2}$ D) mass x energy
9) The incident photon involved in the photoelectric effect experiment
   A) completely disappears B) comes out with increasedfrequency
   C) comes out with decreasedfrequency D) comes out without change in frequency
10) The kinetic energy of Photoelectron is directly proportional to
   A) intensity of incident light
   B) the difference between the frequency of the incident light and the threshold frequency
   C) the sum of frequency of incidentlight and threshold frequency
   D) the ratio of frequency of lightused and threshold frequency
11) If wavelength of an electron and a photon is same then they will have___same
   A) velocity B) momentum
   C) energy D) all of these
12) A proton and an electron move with a same velocity. The associatedwavelength for proton is
   A) shorter than that of the electron B) longer than that of the electron
   C) the same of as that of theelectron D) zero
13) Which of the following has thelargest de Brogile wavelength if they are moving with the same velocity?
   A) neutron B) proton
   C) alpha particle D) beta particle

14) For a given metal, the maximum kinetic energy of emitted electrons in a photoelectric effect does not depend upon
   A) intensity B) stopping potential

C) wavelength D) frequency

15) If an electron and a proton have the same de Broglie wavelength, then the kinetic energy of the electron is
A) more than that of the proton B) equal to that of the proton
C) zero D) less than that of the proton

16) In photoelectric effect, the number electrons ejected per second is directly
A) proportional to the wavelengthof the light
B) proportional to the intensity ofthe light
C) proportional to the workfunction of the light
D) proportional to the frequencyof the light

17) Light of certain frequency and intensity incident on photosensitive material causes photoelectric effect.If both the frequency and intensity are doubled the photoelectric current becomes
A) unchanged B) halved
C) doubled C) quadrupled

18) When green light is made incident on a metal, Photo electrons are emitted by it but no photo electrons are obtained by yellow light. If red light is made to incidenton that metal then
A) no electron will be emitted B) less electron will be emitted
C) more electron will be emitted D) none of the above

19) The value of e/m was found to be independent of
A) nature of the metal used as the cathode
B) gas introduced in the discharge tube
C) both (a) and (b)
D) none of these

20) The electromagnetic theory of light failed to explain
A) photoelectric effect B) polarisation
C) diffraction D) interference

21) G. P Thomson experimentally confirmed that existence of matterwaves by the phenomena
A) diffraction B) refraction
C) polarisation D) scattering

22) The waves associated with material particles in motion are called
A) matter waves B)light waves
C) motional waves D) particle waves

23) Photons are electrically
A) positive B) negative
C) neutral D) all of these

24) R. A Millikan performed the pioneering oil -drop experiment for the precise measurement of
A) mass of the electron B) charge of the electron
C) position of the electron D) charge of the proton

25) The minimum negative potential applied to the anode to just stop the photo emission fromcathode is called
A) stopping potential B) threshold frequency
C) work function D) threshold wavelength

26) The maximum wavelength of the incident radiation above which there is no photo emission is called as
A) threshold frequency B) work function
C) threshold wavelength D) de Brogile wavelength.

27) The wavelength of matterwaves is known as
A) threshold frequency B) threshold wavelength
C) de Brogile wavelength D) matter waves

28) The photoelectric effect is based on the law of conservation of
A) energy B) momentum
C) mass D) angular momentum

29) The phenomenon of photoelectric emission was discovered by
A) R. A Millikan B) Albert Einstein
C) Roentgen D) Heinrich hertz

30) Which of the followings is the type of electron emission?
A) Thermionic emission B) field emission
C) Photoelectric emission D) all of the above

31) The work function depends on the
A) properties of the metal B) the nature of metal surface
C) both (a) and (b) D) none of the above

32) _____metal has highest workfunction of 5.65eV
A) platinum B) caesium
C) iron D) cobalt

33) Dual nature of matter is proposed by
A) louis de Brogile B) Albert Einstein
C) Heinrich Hertz D) R. A Millikan

34) Photoelectric current is directly proportional to
A) time B) velocity
C) intensity of incident radiation D) distance

35) Photoelectric current depends on
A) Intensity B) Frequency
C) Potential of the emitter plate D) Both A and C

:Answers:

Q	AN	Q	AN	Q	AN	Q	AN	Q	AN	Q	AN	Q	AN
1	C	6	C	11	B	16	B	21	A	26	C	31	C
2	A	7	C	12	A	17	C	22	A	27	C	32	A
3	D	8	A	13	D	18	A	23	C	28	A	33	A
4	B	9	A	14	A	19	C	24	B	29	D	34	C
5	B	10	B	15	A	20	A	25	A	30	D	35	D

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CHAPTER - 13
NUCLEI

1. Nucleons are
   A) Protons and neutrons B) Neutrons and electrons
   C) Protons and electrons D) All of these
2. What is the approximate ratio of volume of a nucleus to the volume of an atom ?
   A) 10^{-34} B) 10^{-20}
   C) 10^{-12} D) 10^{-10}
3. The set which represents the isotope, isobar and isotones respectively is
   A) $({}^{2}_{1}H,\ {}^{3}_{1}H)$, $({}^{197}_{79}Au,\ {}^{198}_{80}Hg)$ and $({}^{3}_{2}He, {}^{2}_{1}H)$
   B) $({}^{3}_{2}He, {}^{1}_{1}H)$, $({}^{197}_{79}Au,\ {}^{198}_{80}Hg)$ and $({}^{1}_{1}H,\ {}^{3}_{1}H)$
   C) $({}^{3}_{2}He, {}^{3}_{1}H)$,$({}^{2}_{1}H,\ {}^{3}_{1}H)$ and $({}^{197}_{79}Au,\ {}^{198}_{80}Hg)$
   D) $({}^{2}_{1}H,\ {}^{3}_{1}H)$, $({}^{3}_{2}He, {}^{3}_{1}H)$ and $({}^{197}_{79}Au,\ {}^{198}_{80}Hg)$
4. ${}^{3}_{1}H\ and\ {}^{3}_{2}He$ atoms are example for
   A) Isobars B) Isotones
   C) Isotopes D) Isomers.
5. ${}^{37}_{17}Cl\ and\ {}^{39}_{19}K$ atoms are example for
   A) Isobars B) Isotones
   C) Isotopes D) Isomers.
6. ${}^{1}_{1}H, {}^{2}_{1}H\ and\ {}^{3}_{1}H$ atoms are example for
   A) Isobars B) Isotones
   C) Isotopes D) Isomers
7. Order of magnitude of density of uranium nucleus is
   A) 10^{20}kgm^{-3} B) 10^{17}kgm^{-3}
   C) 10^{14}kgm^{-3} D) 10^{11}kgm^{-3}
8. The force between two protons is same as the force between proton and neutron. The nature of the force is
   A) Electrical force B) Weak Nuclear force
   C) Gravitational force D) Strong nuclear force
9. The nuclear force
   A) Is purely an electrostatic force B) Obeys inverse square law of distance
   C) Is equal in strength to gravitational field D) Is a short range force.
10. All the nucleons in an atom are held by
   A) Nuclear forces B) Vander Waal's force
   C) Tensor forces D) Coulomb forces
11. Carbon dating is best suited for determining the age of fossils ., if their age in years is of the order of
   A) 10^{3} B) 10^{4}
   C) 10^{5} D) 10^{6}
12. Which of the following can be emitted by radioactive substances during their decay?
   A) Neutrinos B) Helium nuclei
   C) Electrons D) All of these.
13. Pick out the incorrect statement from the following:
   A) β^{-}emission from the nucleus is always accompanied with a neutrino.
   B) The energy of the α-particle emitted from a given nucleus is always constant.

C) ϒ- ray emission makes the nucleus more stable.
D) Nuclear force is charge independent.

14. Consider α and β particles and ϒ- rays each having an energy of 0.5MeV. In the increasing order of penetrating power, the radiation are respectively:
A) α, β, ϒ B) α, ϒ, β
C) β, ϒ, α D) ϒ, β, α

15. An electron emitted in beta radiation originates from
A) Inner orbits of atom
B) free electrons existing in the nucleus.
C) decay of neutrons in a nuclei.
D) photon escaping from the nucleus.

16. Complete the series; $_2He^6 \rightarrow {}_3Li^6 + {}_{-1}e^0 +$ _____
A) Neutrino B) Antineutrino
C) Proton D) Neutron

17. The equation $4\ {}_1^1H^+ \rightarrow {}_2^4He^{2+} + 2e^- +$ 26 MeV represents
A) β–decay B) ϒ-decay
C) fusion D) fission

18. Light energy emitted by star is due to
A) Breaking of nuclei. B) Joining of nuclei
C) Burning of nuclei. D) Reflection of solar light.

19. In nuclear reactors, the control rods are made of
A) Cadmium B) graphite
C) Krypton D) Plutonium.

20. Fast neutrons can easily be slowed down by
A) The use of lead shielding.
B) Passing them through water.
C) Elastic collision with heavy nuclei.
D) Applying a strong electric field.

21. Fission of nuclei is possible because the binding energy per nucleon in them
A) Increases with mass number at low mass numbers.
B) Decreases with mass number at low mass numbers.
C) Increases with mass number at high mass number.
D) Decreases with mass number at high mass number.

22. The graph of $\log\left[\frac{R}{R_o}\right]$ versus log A where R= radius of a nucleus and A = its mass number is
A) A straight line B) a parabola
C) an ellipse D) none of the above.

23. Which particle is emitted beta decay?
A) Protons B) Neutron
C) nuclei D) A high energy electron.

24. Which is not a characteristics of gamma radiation ?
A) Stopped by several feet of concrete or several inches of lead.
B) High energy, high penetration.
C) Stopped by thin metal.
D) Most dangerous type of radiation.

25. What is radioactive decay ?

A) The spontaneous breakdown of an atomic nucleus resulting in a release of energy and matter.
B) The spontaneous breakdown of an atomic nucleus resulting in only matter release.
C) The spontaneous breakdown of an atomic nucleus resulting in only energy release.
D) The decay of the use of radios and the increased use of televisions.

26. Which is not true of radioactive decay?
A) Radioactivity can be useful.
B) It happens only in nuclear power plants
C) It is hazardous to human health
D) It is a result of instability in atoms.

27. Isotopes of the same element have different _____
A) Number of electrons B) Number of neutrons
C) Number of protons D) Symbols

28. When does radioactive decay occur?
A) When the electrons of an isotope are shared with another isotope.
B) When the electrons of an isotope are spinning.
C) When the nucleus of an isotope is unstable.
D) When the nucleus of an isotope is stable.

29. Two smaller nuclei combines to form a larger nucleus is
A) Fission B) Fusion
C) gamma radiation D) half life

30. The splitting of a nucleus into smaller nuclei is
A) Fission B) Fusion
C) gamma radiation D) half life

31. Which atoms combine together during fusion reaction on the Sun ?
A) Helium and Hydrogen atoms B) Hydrogen and Carbon atoms
C) Hydrogen atoms D) Hydrogen and Lithium atoms

32. Very high temperature and pressure is required to:
A) Fission B) Fusion
C) gamma radiation D) half life

33. One disadvantage of nuclear energy is ___
A) It emits large amounts of pollution into the atmosphere.
B) It is a fossil fuel.
C) There are no disadvantages.
D) It leaves behind radioactive waste.

34. One advantage of nuclear energy over coal energy is _____
A) The nuclear plant emits more greenhouse gases.
B) There is very little dangerous waste with nuclear energy.
C) The nuclear plant does not emit as many greenhouse gases.
D) It is very cheap to build and maintain a nuclear power plant.

35. A radioactive nucleus emits a beta particle, then the parent and daughter nuclei are
A) Isotones B) Isotopes
C) Isomers D) Isobars

36. Which of the following are not emitted by radioactive substances?
A) Protons B) Electrons
C) Gamma Rays D) Helium Nuclei

37. A nucleus undergoes gamma decay due to
    A) Excess of neutrons B) Excess of protons
    C) Its excited state D) Large mass
38. Isotones have the same number of
    A) Protons B) Electrons
    C) Neutrons D) All of the above
39. If 'K' is a measure of the growth rate of neutrons in a reactor, then the value of 'K' is for the chain reaction gradually dies out is
    A) K =1 B) K<1
    C) K>1 D) K=0
40. In proton-proton cycle, the approximate amount of energy released is
    A) 26.7 MeV B) 20.1 MeV
    C) 28.9 MeV D) 22.5 MeV

ANSWERS;

Q N	AN	QN	AN	QN	AN	QN	AN
1	A	11	B	21	D	31	C
2	C	12	D	22	A	32	B
3	D	13	A	23	D	33	D
4	A	14	A	24	C	34	C
5	B	15	C	25	A	35	D
6	C	16	B	26	B	36	A
7	B	17	C	27	B	37	C
8	D	18	B	28	C	38	C
9	D	19	A	29	B	39	B
10	A	20	B	30	A	40	A

FILL IN THE BLANKS:

1. Protons and neutrons present in the nucleus are together called the nucleons.
2. The number of proton present in the nucleus is called the atomic number.
3. The number of nucleons in the nucleus is called the atomic mass number.
4. Nuclei of the same element having same atomic number but different mass number are called isotopes.
5. Nuclei of different elements having same mass number but different atomic number are called isobars.
6. Nuclei of different elements having same number of neutrons are called isotones.
7. Neutrons were discovered by James Chadwick.
8. Mass spectrograph is the instrument use to measure the atomic masses.
9. The order of nuclear density is $10^{17}kgm^{-3}$.
10. Energy equivalent of 1 a m u is 931.5MeV.
11. During the pair annihilation , the energy is released in the form of Υ-rays(Photons).
12. The difference between the sum of the masses of the nucleons forming the nucleus and the rest mass of the nucleus is called mass defect.
13. The minimum amount of energy required to split the nucleus into its constituents is called nuclear binding energy.

14. Binding energy per nucleon is maximum for Fe^{56}.
15. Binding energy per nucleon is minimum for U^{238}.
16. The forces that hold the nucleons together inside the nucleus are called nuclear forces.
17. Nuclear forces are strongest forces in nature.
18. Nuclear forces are short range forces.
19. The amount of energy released in per fission of $_{92}U^{235}$ is about 200MeV.
20. A nuclear reactor is a device which produces nuclear energy at a steady state.
21. The fission chain reaction will be critical and the chain reaction is just sustained when multiplication factor of a fissionable mass ,K=1.
22. The fission chain reaction gradually dies out, when K<1.
23. The fission chain reaction grows exponentially, when K>1.
24. A material used to slowdown the neutrons to thermal energies in a nuclear reactor is called moderator.
25. Control rods are used for absorption of excess neutrons in a nuclear reactor.
26. The phenomenon by which energy is produced in a star is Nuclear Fusion.
27. Nuclear fusion reactions require very high temperature of the order of 10^9K.
28. Nuclear fission is the principle of atom bombs.
29. Nuclear fusion is the principle of hydrogen atoms.
30. The phenomenon of spontaneous disintegration of heavy nuclei with emission of certain radiations is called radioactivity.
31. Henry Becquerel discovered radioactivity.
32. Alpha-particle is a helium nucleus consists of two protons and two neutrons.
33. Gamma rays are the uncharged radiation emitted by radioactive substances.
34. The SI unit of activity is becquerel (Bq).
35. The practical unit of activity is curie (Ci).
36. If mean life of a radioactive element is one year, then its half year is 0.693 year.
37. In α-decay, atomic number decreases by two units.
38. In α-decay, mass number decreases by four units.
39. In negative β-decay , the atomic number increases by one unit.
40. Antineutrino is emitted in negative β-decay.
41. In positive β-decay, the atomic number decreases by one unit.
42. Neutrino is emitted in positive β-decay.
43. In proton-proton cycle, the approximate amount of energy released is 26.7MeV.
44. The principle used in nuclear reactor is controlled fissioin chain reaction.

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CHAPTER-14

SEMICONDUCTOR ELECTRONICS: MATERIALS, DEVICES AND SIMPLE CIRCUITS

1. In semiconductors at room temperature
   (A) The valence band is partially empty and the conduction band is partially filled
   (B) The valence band is completely filled and the conduction band is partially filled
   (C) The valence band is completely filled
   (D) The conduction band is completely empty.
2. In the insulators
   (A) The valence band is partially filled with electrons.
   (B) The conduction band is partially filled with electrons.
   (C) The conduction band is partially filled with electrons and valence band is empty.
   (D) The conduction band is empty and the valence band is filled with electrons.
3. Example for elemental semiconductor is
   (A) silicon (B) gallium arsenic
   (C) anthracene (D)polypyrrole
4. The resistivity range of metals is
   (A) $10^{-2} – 10^{-8}$ Ωm (B) $10^{-5} – 10^{6}$ Ωm
   (C) $10^{11} – 10^{19}$ Ωm (D) 0
5. In n-type semiconductor the electron concentration is equal to
   (A)number of donor atoms (B)number of acceptor atoms
   (C)number of both type of atoms (D) neither number of acceptor atoms nor number of donor atoms
6. Which of the following statement is not true
   (A) the resistance of intrinsic semiconductors decreases with increase of temperature.
   (B) doping pure Si with trivalent impurities give p-type semiconductors.
   (C) the majority charge carriers in n- type semiconductors are holes
   (D) a p-n junction can act as a semiconductor diode.
7. In a n- type semiconductor, the Fermi energy level lies
   (A) In the forbidden energy gap nearer to the conduction band
   (B) In the forbidden energy gap nearer to the valence band
   (C) In the middle of forbidden gap
   (D) Outside the forbidden energy gap.
8. An n- type and p-type silicon can be obtained by doping pure silicon respectively with
   (A) Arsenic and phosphorous (B) indium and aluminium
   (C) Phosphorous and indium (D) aluminium and boron.
9. The element that can be used as acceptor impurity to dope silicon is
   (A) antimony (B) arsenic
   (C) boron (D) phosphorous
10. Among the following, the wrong statement in the case of semiconductor is
    (A) Resistivity is in between that of a conductor and insulator.
    (B) Temperature coefficient of resistance is negative.
    (C) Doping increases conductivity
    (D) At absolute zero temperature it behaves like a conductor.
11. Band gap in insulator is of the order
    (A) 6 eV (B) 0.60 eV
    (C) – 6 eV (D) 0 eV

12. In p- type semiconductor conduction is due to
(A) Greater number of holes and less number of electrons
(B) Only electrons
(C) Only holes
(D) Greater number of electrons and less number holes.

13. In n- type semiconductor conduction is due to
(A) Greater number of holes and less number of electrons
(B) Only electrons
(C) Only holes
(D) Greater number of electrons and less number holes.

14. With increase in temperature in an intrinsic semiconductor the ratio of conduction electrons and holes is
(A)1 : 1 (B) 1 : 2
(C)2 : 1 (D) 1 : 3

15. To obtain n- type extrinsic semiconductor, the impurity element to be added to germanium should be of valence
(A) 2 (B) 5
(C) 4 (D) 3

16. To obtain p- type extrinsic semiconductor, the impurity element to be added to germanium should be of valence
(A) 2 (B) 5
(C) 4 (D) 3

17. The majority carriers in a p-type semiconductor are
(A) electrons (B) holes
(C) both (D)none

18. On increasing reverse voltage in a p-n junction diode the value of reverse current will
(A) gradually increases (B) first remains constant and then suddenly increase.
(C) remains constant (D) gradually decreases

19. P-n junction in forward bias behaves like
(A) an inductor (B) a condenser
(C) amplifier (D) an on switch

20. When p-n junction is forward biased, the current across the junction is mainly due to
(A) diffusion of charges (B) drifting of charges
(C) both diffusion and drifting of charges (D) holes only

21. The thickness of depletion layer is approximately
(A) 1 μm (B) 1 mm
(C) 1 cm (D) 1 m

22. The diffusion current in a p-n junction is greater than the drift current when the junction is
(A) forward biased (B) reverse biased
(C) un biased (D) both forward and reverse biased

23. When a junction diode is reverse biased, the current called drift current is due to
(A) majority charge carriers of both n and p sides
(B) minority charge carriers of both n and p sides
(C) holes of both n and p sides
(D) conduction band electrons of n- side only

24. Among the following one statement is not correct when a junction diode is in forward bias
(A) the width of depletion region decreases

(B) free electron on n-side will move towards the junction
(C) holes on p- side move towards the junction
(D) electron on n-side and holes on p-side will move away from junction.

25. A zener diode when used as a voltage regulator is connected,
(a) in forward bias (b) in reverse bias (c) in parallel to the load (d) in series to the load
(A) (a) and (b) are correct (B) (b) and (c) are correct
(C) (a) only is correct (D) (d) only is correct

26. When p-n junction is reverse biased, as bias voltage increases, the thickness of the depletion layer
(A) increases (B) decreases
(C) becomes zero (D) remains constant

27. Among the following one gives output 1in the AND gate
(A) A= 0 , B = 0 (B) A = 1, B = 1
(C) A= 1 , B = 0 (D) A = 0, B = 1

28. NAND and NOR are called universal gates because they
(A) Are universally available (B) Can be combined to produce OR , AND and NOT gates
(C) Are widely used in the integrated circuits(D) Can be easily manufactured

29. In Boolean algebra A + B = Y implies that
(A) Sum of A and B is Y
(B) Y exist when A exist or B exists or both A and B exist
(C) Y exist only when A and B both exist
(D) Y exist when A or B exist but not when both A and B exist

30. In Boolean algebra A.B = Y implies that
(A) Product of A and B is Y
(B) Y exists when A exist or B exists
(C) Y exists when both A and B exist but not when only A or B exists
(D) Y exists when A or B exists but not both A and B exist

31. The output of a 2- input OR gate is zero only when its
(A) both inputs are 0 (B) either input is 1
(C) both inputs are 1 (D) either input is zero.

32. The main cause of Zener breakdown is
(A) the base semiconductor being germanium
(B) production of electron – hole pairs due to thermal excitation
(C) low doping (D) high doping

33. Example of optoelectronics device is
(A)Capacitor (B)Resistor
(C)Inductor (D)Photodiode

34. In optoelectronic device, the charge carriers are produced by
(A) internal electric field (B) photons
(C) temperature (D) bombarding primary electrons

35. Among the following, is not an optoelectronic device
(A) transformer (B) photodiode
(C) solar cells (D) LED

36. Photo diodes are also called as photo detectors, because
(A) It converts electrical energy into light energy (B) It detects optical signals
(C) It detects DC signals (D) It detects AC signals

37. The main function of LED is

(A) detecting optical signals (B) convert electrical energy into light
(C) convert optical radiation into electricity (D) convert AC into DC

38. The magnitude of photocurrent produced in photodiode is proportional to
(A) the barrier voltage at the junction
(B) intensity of light falling on the cell
(C) the frequency of the light falling on the cell
(D) the voltage applied at the p-n junction.

39. Light emitting diodes are operated under
(A) forward biased (B) reverse biased
(C) un biased (D) none of these

40. Photons emitted in LED's are due to
(A) recombine of excess minority charge carrier with the majority charge carrier near the junction.
(B) majority charge carrier
(C) minority charge carrier
(D) internal electric field

41. Semiconductor used for fabrication of visible LED's must at least have bandgap
(A) 1.8 eV to 3 eV (B) less than 1.8 eV
(C) greater than 3 eV (D) none of these

42. Among the following, the incorrect statement in the case of LED's over lower power incandescent lamp is
(A) low operational voltage and less power
(B) slow action and warm-up time required
(C) long life and ruggedness
(D) fast on-off switching capability

43. Solar cells are operated under
(A) forward biased (B) reverse biased
(C) un biased (D) none of these

44. Band gap of semiconductor material used for solar cell fabrication is
(A) 1.8 eV to 3 eV (B) ~ 0.1 eV to1.8 eV
(C) greater than 3 eV (D) none of these

45. The width of depletion region in Zener diode is
(A)$< 10^{-6}$ m (B)$> 10^{-6}$ m
(C) 10^{-6} m (D) none of these

Answer keys

Quest	Opt	Quest	Opt	Quest	Opt	Quest	Opt	Quest	Opt
1	**A**	11	**A**	21	**A**	31	**A**	41	**A**
2	**D**	12	**A**	22	**A**	32	**D**	42	**B**
3	**A**	13	**D**	23	**B**	33	**D**	43	**C**
4	**A**	14	**A**	24	**D**	34	**B**	44	**B**
5	**A**	15	**B**	25	**B**	35	**A**	45	**A**
6	**C**	16	**D**	26	**A**	36	**B**		
7	**A**	17	**B**	27	**B**	37	**B**		
8	**C**	18	**B**	28	**B**	38	**B**		
9	**C**	19	**D**	29	**B**	39	**A**		
10	**D**	20	**A**	30	**C**	40	**A**		

FILL IN THE BLANKS

1. The level formed due to impurity atom, in the forbidden energy gap, very near to the valence band in a p-type semiconductor is called _____ level. (Acceptor)
2. The atoms in a semiconductor are bonded by _____ bond. (Covalent)
3. Conductivity of a pure semiconductor _____ with the increase of temperature. (Increases)
4. Semiconductors at 0K behave as _____ (insulators)
5. When electric field across a semiconductor is increased, the number of charge carriers will _____ (increase)
6. In intrinsic semiconductor, at room temperature, the number of electrons and holes will be _____ (equal)
7. Majority charge carrier in n-type semiconductors is _____ (electron)
8. Rectification is a process of converting alternating current into _____ current. (Direct)
9. P-n junction under _____ bias acts as an open switch. (Reverse)
10. The region of immobile positive and negative ions in a semiconductor is called _____ region. (depletion)
11. The potential in the depletion region is due to _____ (ions)
12. _____ is used as voltage regulators. (Zener diode)
13. NOR gate is a combination of OR gate and _____ gate. (NOT)
14. Photodiodes are operated under _____ bias (reverse)
15. IV characteristics of _____ is drawn in the fourth quadrant of the coordinate system. (solar cell)

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