Chapter 12

1. The Coulomb force is:

(a) $F = K\frac{q_1 q_2}{r^2}$ **(b)** $F = K\frac{q_1\ q_2}{r}$

(c) $F = K\frac{q_1\ q_2}{r^3}$ **(d)** $F = K\frac{q_1\ r^2}{q_2}$

2. The value of K depends upon:

(a) Charges **(b)** System of units and medium

(c) The distance between charges **(d)** Nature of medium

3. The value of K in SI system of units:

(a) $9 \times 10^9\ Nm^2/c^2$ **(b)** $9 \times 10^{10}\ Nm^2/c^2$

(c) $9 \times 10^{-9}\ Nm^2/c^2$ **(d)** $9 \times 10^9\ NC/m^2$

4. The branch of physics which deals with the charges at rest:

(a) Current electricity **(b)** Electromagnetism

(c) Electrostatics **(d)** Nuclear physics

5. The value of permitivity of free space:

(a) $8.85 \times 10^{-12}\ C^2/Nm^2$ **(b)** $8.85 \times 10^{-12}\ C^2m^2/N$

(c) $8.85 \times 10^{-12}\ Nm^2/C$ **(d)** $8.85 \times 10^{-11}\ Nm^2/C^2$

6. When the medium is insulator the electrostatic force between the charges is:

(a) Decreased **(b)** Zero

(c) Increased **(d)** None of above

7. What is standard to measure the relative permitivity:

(a) Water **(b)** Vacuum

(c) Air **(d)** Atmosphere

8. Which of the following statement is correct:

(a) Similar charges attract each other **(b)** Similar charges attract and repel each other

(c) Similar charges repel each other **(d)** Similar charges neither attract nor repel

9. Metals are good conductors of electricity because they have:

(a) Large number of bounded electrons **(b)** Small number of electrons

(c) Large number of free electrons **(d)** Small number of free electrons

10. Free electrons are:

(a) Fixed **(b)** Loosely bounded

(c) Strongly fixed **(d)** Tightly bound

11. The SI unit of charge is:

(a) Coulomb **(b)** Calorie

(c) Ampere **(d)** Joule

12. The number of electrons in one coulomb charge is equal to:

(a) 6.2×10^{18} electrons **(b)** Zero electrons

(c) 1.6×10^{-22} electrons **(d)** 6.2×10^{21} electrons

13. The electrostatic force of repulsion between two electrons at 1 metre is:

(a) 9×10^{9} N **(b)** 1.44×10^{-9} N

(c) 2.30×10^{-28} N **(d)** 1 N

14. A charge of 10μC and 14.4 μC are 12 cm apart, the force between them is:

(a) 9×10^{5} N **(b)** 9×10^{7} N

(c) 90 N **(d)** 108×10^{7} N

15. A substance contains:

(a) Only positive charge **(b)** Only negative charge

(c) Both +ve and –ve charge **(d)** None of above

16. If the distance between the two charge bodies is halved, the force between them becomes:

(a) Half **(b)** Four time

(c) One fourth **(d)** Doubled

17. The SI units of permitivity are:

(a) $N.m/C^2$ **(b)** $C^2/N.m^2$

(c) $N.m^2/C^2$ **(d)** N.m/C

18. The minimum charge on any electron be less than:

(a) $1.6\times10^{-19}C$ **(b)** $3.2\times10^{-19}C$

(c) $1.8\times10^{-19}C$ **(d)** $9.1\times10^{-19}C$

19. The force in a medium of relative permitivity $\in_r$ is given by:

(a) $F' = \frac{F}{\in_r}$ **(b)** $F' = \frac{\in_r}{F}$

(c) $F' = \in_r . F$ **(d)** $F' = \frac{F}{\in_o \in_r}$

20. When current of one ampere is flowing across any cross-section of wire in one second, then the quantity of charge is said to be:

(a) One coulomb **(b)** Three coulomb

(c) One micro-coulomb **(d)** None of above

21. The electric force between two charges placed in air is 2 Newton. When placed in a medium of $\in_r = 80$, the force reduced to:

(a) 0.029 N **(b)** 0.025 N

(c) 0.03 N **(d)** 0.04 N

22. The value of $\in_r$ for various dielectrics is always:

(a) Larger than unity **(b)** Less than unity

(c) Equal to unity **(d)** None of above

23. A metallic hallow sphere of 8cm diameter is charged with 4×10^{-8}c. The potential on its surface will be:

(a) 90 volts **(b)** 9 volts

(c) 9000 volts **(d)** 900 volts

24. Origin of the gravitational and electric forces:

(a) is still unknown **(b)** was known in 1611 A.D

(c) was known in 1712 A.D **(d)** was known in 1911 A.D

25. Michael Faraday was known by his work on:

(a) Electric force **(b)** Weak nuclear force

(c) Strong nuclear force **(d)** Gravitational force

26. The SI unit of charge is:

(a) Meter **(b)** Ampere

(c) Coulomb **(d)** Volt

27. In case of two identical charges placed at certain distance, the electric lines of force are:

(a) Curved **(b)** Straight lines

(c) Both (a) and (b) **(d)** None of these

28. An example of photoconductor is:

(a) Iron **(b)** Aluminum

(c) Carbon **(d)** Selenium

29. Selenium is:

(a) Conductor

(b) Insulator in the dark are becomes conductor when exposed to light

(c) An insulator

(d) None of these

30. The inkjet printer ejects a thin stream of:

(a) Ink **(b)** Water

(c) Oil **(d)** None of these

31. An important part of inkjet printer is:

(a) Deflection plates **(b)** Toner

(c) Drum **(d)** None of these

32. An inkjet printer uses in its operation:

(a) Positrons **(b)** Neutrons

(c) An electric charge **(d)** Photons

33. The photo copying process is called:

(a) Xerography **(b)** Inkjet printer

(c) Both (a) and (b) **(d)** None of these

34. An important port of a photocopier is:

(a) Deflation plates **(b)** Toner

(c) Charging electrode **(d)** Printed head

35. Xerography means:

(a) Dry writing **(b)** Wet writing

(c) Both (a) and (b) **(d)** None of these

36. The number of electric field lines passing through a certain element of area is called:

(a) Electric lines of force **(b)** Electric intensity

(c) Electric flux **(d)** None of these

37. The concept of electric field theory was introduced by:

(a) Kepler **(b)** Newton

(c) Dalton **(d)** Michael Faraday

38. The space around the charge within which other charges are influenced by it is called:

(a) Electric field **(b)** Magnetic field

(c) Electric flux **(d)** Electric intensity

39. The force per unit charge is called:

(a) Electric field **(b)** Electric field intensity

(c) Electric potential energy **(d)** Electric potential

40. The electric field exist around:

(a) Charges **(b)** On the left side

(c) At the –ve charge **(d)** At the +ve charge

41. The practical application of electrostatic is:

(a) Photocopier **(b)** X-rays machines

(c) Laser **(d)** All of above

42. The electric field lines emerge from the charges in:

(a) Three dimensions **(b)** Two dimensions

(c) One dimension **(d)** All of above

43. The direction of electric intensity is:

(a) Normal to the field **(b)** Tangent to the field

(c) Parallel to the field **(d)** None of above

44. When the field is strong, the lines of force are:

(a) Closer **(b)** Parallel

(c) Farther **(d)** All of above

45. The electric lines of force determine the strength of an:

(a) Gravitational field **(b)** Constant field

(c) Magnetic field **(d)** Electric field

46. The electric intensity is a:

(a) Scalar quantity **(b)** Vector quantity

(c) Physical quantity **(d)** None of above

47. The unit of electric intensity is:

(a) C/m^2 **(b)** N/C

(c) Volt – meter **(d)** Both (b) and (c)

48. A charge of 2 coulomb is in a field of intensity 2 N/C. The force on charge is:

(a) 4π N **(b)** 4 N

(c) 0 N **(d)** 1 N

49. The electric intensity at a distance of 1m from the point charge is 1μC is:

(a) 9×10^9 N/C **(b)** 9×10^6 N/C

(c) 9×10^3 N/C **(d)** 9 N/C

Answers Key

1.	(a)	**2.**	(b)	**3.**	(a)	**4.**	(c)	**5.**	(a)
6.	(a)	**7.**	(b)	**8.**	(c)	**9.**	(c)	**10.**	(b)
11.	(a)	**12.**	(a)	**13.**	(c)	**14.**	(c)	**15.**	(c)
16.	(c)	**17.**	(b)	**18.**	(a)	**19.**	(a)	**20.**	(a)
21.	(b)	**22.**	(a)	**23.**	(c)	**24.**	(a)	**25.**	(a)
26.	(c)	**27.**	(a)	**28.**	(d)	**29.**	(b)	**30.**	(a)
31.	(a)	**32.**	(c)	**33.**	(a)	**34.**	(b)	**35.**	(a)
36.	(c)	**37.**	(d)	**38.**	(a)	**39.**	(b)	**40.**	(a)
41.	(a)	**42.**	(d)	**43.**	(b)	**44.**	(a)	**45.**	(d)
46.	(b)	**47.**	(b)	**48.**	(b)	**49.**	(c)		

Chapter 13

1. The current through a metallic conductor is due to the motion of

a. free electrons
b. Protons
c. Neutrons
d. still under controversy

2. Resistance of a conductor depends upon

a. nature of conductor
b. dimension of conductor
c. physical state of the conductor
d. all of above

3. A wire having very high value of conductance is said to be

a. very good conductor
b. moderately good conductor
c. an insulator
d. None

4. A wire of uniform area of cross-section A length L and resistance R is cut into two parts. Resistivity of each part

a. remains the same
b. is doubled
c. is halved
d. becomes zero

5. Production of heat due to an electric current flowing through a conductor is given by

a. Joule effect
b. Joule Thomsons effect
c. Comptons effect
d. None

6. When same current passes for same time through a th ick and thin wire

a. more heat is produced in thick wire
b. more heat is produced in thin wire
c. no heat is produced in wire
d. less heat is produced in thick wire

7. Three equal resistors connected in series with a source of e m f together dissipate 10 W of power each. What will be the power dissipated if the same resistors are connected in parallel across the same source of e m f?

a. 40 W
b. 90W
c. 100W
d. 120W

8. One kilowatt hour is the amount of energy delivered during

a. one second
b. one day
c. one minute
d. one hour

9. Thermocouples convert

a. heat energy into electrical energy
b. heat energy into light energy
c. heat energy into mechanical energy
d. mechanical energy into heat energy

10. How much heat does a 40 W bulb generates in one hour?

a. 144000J
b. 144J
c. 1.44J
d. 14J

11. An immersion heater of 400 watts kept on for 5 hours will consume electrical power of

a. 2KWh
b. 20KWh
c. 6KWh
d. 12KWh

12. Resistance of a super conductor is

a. Finite
b. Infinite
c. Zero
d. changes with every conductor

13. Resistance of an ideal insulator is

a. Infinite
b. Zero
c. Finite
d. depends upon nature

14. Which one is the best material for making connecting wires?

a. Iron
b. Tungsten
c. Silver
d. Copper

15. Reciprocal of resistivity is called

a. Resistance
b. Inductance
c. Conductivity
d. Flexibility

16. When 2,4 and 6 ohms resistor are connected in parallel their resultant equivalent resistance will be

A. 12ohm
b. 11/12ohm
C. 12/11ohm
d. None

17. Circuit which gives continuously varying potential is called

a. complex network
b. wheat stone bridge
c. potential divider
d. all of above

18. Internal resistance is the resistance offered by

a. source of e m f
b. Conductor
c. Resistor
d. Capacitor

19. There are three bulbs of 60W 100W and 200W which bulb has thickest filament.

a. 100W
b. 200W
c. 60W
d. All

20. Three bulbs are rating 40W 60W and 100W designed to work on 220V mains. Which bulb will burn most brightly if they are connected in series across 220 V mains?

a. 40 W bulb
b. 60 W blub
c. 100 W blub
d. all will burn equally brightly

21. The current in the circuit shown in figure - What will be the current in the circuit?

a. 1/45A
b. 1/10A
c. 1/5A
d. 5A

22. Resistance between points A and B in the circuit shown in figure is

a. 4 ohm
b. 6ohm

c. 10 ohm
d. 8 ohm

23. A neon flashlight cell with an emf of 1.5V gives a current of 15A when connected directly to an ammeter of resistance 0.04?. Internal resistance of the cell is

a. 0.0004?
b. 0.06?
c. 0.10?
d. 0.13?

24. Resistance of a wire on increasing its temperature will

a. increase with rise in temperature
b. decrease with rise in temperature
c. will remain same
d. depends upon altitude of experimentation

25. Specific resistance of a wire

a. will depend on its length
b. will depend on its radius
c. will depend on the type of material of the wire
d. will depend on none of the above

26. An electric iron is marked 20 volts 500W. The units consumed by it in using if for 24 hours will be

a. 12
b. 24
c. 5
d. 1100

27. In the following figure, the terminal potential is

a. zero
b. 2V
c. 12V
d. 36V

28. In liquids and gases the current is due to the motion

a. negative charges
b. positive charges
c. both negative and positive charges
d. neutral particles

29. If 1 ampere current flows through 2m long conductor the charge flow through it in 1 hour will be

a. 3600C
b. 7200C
c. 1C
d. 2C

30. The graphical representation of Ohms law is

a. hyperbola
b. Ellipse
c. parabola
d. straight line

31. SI unit of resistivity is

a. ohm
b. Ohm×m
c. $Ohm \times m^{-1}$
d. $Ohm \times m^2$

32. Which one of the following materials is useful for making bulb filaments?

a. aluminum
b. Iron
c. Copper
d. Tungsten

33. The resistance of a conductor at absolute zero (OK) is

a. zero almost
b. infinite almost

c. May increase or decrease
d. None

34. Why should a resistance be introduced in a circuit in series deliberately?
a. to increase current
b. to decrease current
c. to control current
d. just to give a good look to circuit

35. Electrical energy is measured in
a. watt
b. horse power
c. kilo watt
d. kilowatt hour

36. All electrical appliances are connected in parallel to each other between the main line and neutral wire to get
a. same current
b. same current and potential difference
c. different current but same potential difference
d. different current and potential differences

37. Electrical energy is converted to heat at the rate of
a. IRt
b. I^2R
c. I^2Rt
d. VIt

38. Which one of the following bulbs has the least resistance?
a. 100 watt
b. 200 watt
c. 300 watt
d. 60 watt

39. A fuse is placed in series with the cireuit to protect against
a. high power
b. high voltage
c. high current
d. over heating

40. Terminal potential difference of a battery is greater than its emf when
a. the internal resistance of battery is infinite
b. the internal resistance of battery is zero
c. the battery is charged
d. the battery is discharged

41. Thermistor with high negative temperature coefficient are very accurate for measuring low temperature especially near is
a. 10 K b. 70K c. 200K d. 35K

42. The resistivity of ….. decreases with the increase in temp.
a. gold b. silver c. copper d. silicon

43. Three resistors of resistance R are connected in various ways, which of the following cannot be obtained?
a. 3R ohm b. 2R/4 ohm c. R/3 ohm d. 2R/3 ohm

44. The conventional current is due to the flow of
a. atoms and molecules b. positive charges c. negative charges d. both b and c

45. Kirchhoff 1st law is is manifestation of
a. law of conservation of mass
b. law of conservation of charge
c. law of conservation of energy
d. none

46. Heat energy is converted into electrical energy
a. solar cells b. thermocouples c. electric generators d. none

47. The color code of green is
a. 8 b. 3 c. 5 d. 7

48. When the potential difference of 4 volt is applied across resistance, 10J energy is converted. Find the charge flows.
a. 0.20 C b. 2.5C c. 5C d. 10C

49. Electric power
a. V×I b. W/t c. V^2/I d. E^2/t

50. The fractional change in resistance per kelvin is known as,
a. temperature coefficient of resistance b. coefficient of Voltage of charge
c. thermal expansion d. all of above

Answers key

1	A	11	A	21	B	31	C	41	C
2	D	12	C	22	C	32	A	42	D
3	A	13	A	23	B	33	A	43	B
4	A	14	D	24	A	34	B	44	B
5	A	15	C	25	C	35	D	45	B
6	B	16	C	26	A	36	C	46	B
7	B	17	C	27	A	37	B	47	C
8	D	18	A	28	C	38	C	48	B
9	A	19	B	29	A	39	D	49	A
10	A	20	A	30	D	40	C	50	A

CHAPTER 14

1. An electron and a neutron enter a magnetic field with the same velocity. Ratio of electron to neutron's acceleration is
   a) $\frac{m_n}{m_e}$ b) $\sqrt{\frac{m_n}{m_e}}$ c) $\sqrt{\frac{m_e}{m_n}}$ d) $\frac{m_e}{m_n}$
2. Two electron beams move parallel to each other. The nature of force between them is
   a) Attractive b) Repulsive c) Dependent on magnitude of velocity d) None
3. An electron enters a magnetic field acting vertically downwards with a velocity *v* from west. The electron is deflected along
   a) North b) South c) Northeast d) Southeast
4. A proton moves in a uniform magnetic field in a circular path of radius *R*. If the energy of proton is doubled then the new radius becomes
   a) $\frac{R}{\sqrt{2}}$ b) $2R$ c) $\frac{R}{2}$ d) $\sqrt{2}\,R$
5. _____ is not affected by a magnetic field
   a) Change in magnetic flux b) a moving electron
   c) a stationary proton d) current flowing in a conductor
6. Which of the following quantities change when a proton moves at right angles to a magnetic field?
   a) Momentum b) Energy c) Speed d) All of these
7. Desirable resistance of a _____ is achieved by connecting a high resistance R_h in series with a galvanometer
   a) Ammeter b) Ohmmeter c) LED d) Voltmeter
8. Digital version of an AVO meter is known as
   a) Digital Ohmmeter b) Multimeter c) Digital Multimeter d) None of these
9. Sensitivity of a galvanometer can be increased by
   a) Increasing the number of turns of the coil b) Decreasing the magnetic field
   c) Increasing the ratio $^{C}/_{BAN}$ d) Decreasing the area of the coil
10. A galvanometer in which the coil quickly comes to rest is called a _____ galvanometer
    a) Ballistic b) Mirror c) Astatic d) Dead beat
11. Shunt resistance R_s is given as
    a) $\frac{I_g}{I-I_g}R_g$ b) $\frac{I_g}{I+I_g}R_g$ c) $\frac{I}{I-I_g}R_g$ d) None of these
12. A multipurpose instrument for measuring current, potential difference and resistance is
    a) Ohmmeter b) Astatic galvanometer c) Rheostat d) AVO Meter
13. The _____ of a CRO controls the brightness of the spot formed on the screen
    a) Filament b) Grid c) Deflection plates d) Cathode
14. A circuit which develops voltage across the horizontal deflection plates is known as
    a) Time base generator b) Electron gun c) Thermionic diode d) Zener diode
15. A Digital Multimeter is easier to use because
    a) It provides precise RMS values b) It serves as a signal synchronizer
    c) It gives reading of voltage in statvolts d) It eliminates human error during reading
16. The pole faces of U-shaped magnet in a moving coil galvanometer are made concave to
    a) decrease the strength of magnetic field b) create a non-uniform magnetic field
    c) make the magnetic field radial d) All of these
17. A galvanometer of 65 Ω resistance gives full scale deflection with 4 mA current. In order to convert it into ammeter, the range of 10 A is connected with it, the shunt resistance should be
    a) 0.1 Ω b) 0.2 Ω c) 0.06 Ω d) 0.03 Ω
18. An electron moves with a velocity of 2×10^6 ms^{-1} in the direction of a uniform magnetic field of 0.8 Tesla. The force on electron is
    a) 8 N b) 2 N c) 4 N d) Zero
19. A magnetic screw placed in a non-uniform magnetic field experiences
    a) force and torque b) only torque c) only force d) None of these
20. Work done by a uniform magnetic field in moving a charged particle in a circular path is
    a) $qvB \sin\theta$ b) $mg \sin\theta$ c) zero d) $mg \cos\theta$
21. The correct equation for Lorentz force is given as

a) $q(\vec{v} \times \vec{B})$ b) $q[\vec{E} + (\vec{v} \times \vec{B})]$ c) $q[\vec{E} + (\vec{B} \times \vec{v})]$ d) $q\vec{E}$

22. _____ remain undeflected in a magnetic field
a) β particles b) α particles c) γ rays d) Proton beams

23. A proton having mass m and charge q is projected into a region having a perpendicular magnetic field. The angle of deviation of proton when it comes out of the region with $^{mv}/_{\sqrt{2}\,qB}$ is
a) $\pi/3$ b) $\pi/4$ c) $\pi/6$ d) $2\,\pi/3$

24. A proton and a α particle enter a region having a perpendicular uniform magnetic field. The ratio of time period of proton (τ_p) to time period of α particle (τ_α) is
a) 1:4 b) 4:1 c) 2:1 d) 1:2

25. The deflection system of a TV picture tube makes use of
a) magnetic deflection b) electric deflection c) Both (a) and (b) d) None of these

26. A galvanometer has resistance of 120 Ω. In order to pass 5% of the main current in it, the value of shunt resistance R_s must be equal to
a) 6.3 Ω b) 6 Ω c) 2 Ω d) 2.3 Ω

27. One tesla equals
a) 1 $NA^{-1}m^{-1}$ b) 1 $NA^{-2}m^{-3}$ c) 1NAm^{-1} d) 1NA^{-1} m

28. Which of the following does not equal the unit of magnetic flux density?
a) 1 Wbm^{-2} b) 1 $NA^{-1}m^{-1}$ c) Both (a) and (b) d) 1 Wbm^{-1}

29. The magnetic field is _____ inside a solenoid
a) Zero b) uniform c) non-uniform d) infinite

30. A solenoid of length 1m and 10^4 turns carries a current of 0.1 A. The magnetic flux density is
a) $4\pi \times 10^{-5}$ T b) $4\pi \times 10^{-4}$ T c) $4\pi \times 10^{-3}$ T d) $4\pi \times 10^{-7}$ T

31. A current of 5.8 A flows through a 0.25 m long straight conductor which is kept perpendicular in a region of uniform magnetic field of 3.7 T . The force on conductor is
a) 5.4 N b) 2.4 N c) 3.4 N d) 6.4 N

32. A proton beam moves towards an observer. The direction of magnetic induction is
a) towards right b) anticlockwise c) towards left d) clockwise

33. A solenoid has n turns and length l. If length is reduced to $l/2$ and turns are doubled then magnetic field B produced by it becomes equal to
a) $2B$ b) $4B$ c) $1/2\,B$ d) None of these

34. An α particle moves perpendicular to a constant magnetic field of strength 1.2 T in a circular path of radius 0.7 m. The speed of α particle in ms^{-1} is _____
a) 2.7×10^7 b) 2.6×10^7 c) 3.2×10^7 d) 2.0×10^7

35. Mathematically, Ampere's circuital law is given as
a) $\sum_{r=1}^{N}(\vec{B}.\Delta\vec{L})_r = \mu_0 I$ b) $\sum_{r=1}^{N}(\vec{B} \times \Delta\vec{L})_r = \mu_0 I$
c) $\sum_{r=1}^{N}(\vec{B}^2.\Delta\vec{L})_r = \mu_0 I$ d) $\sum_{r=1}^{N}(\vec{B}.\Delta\vec{L}^2)_r = \mu_0 I$

36. The magnetic flux φ_B through a plane element of area $\vec{A}$ in a uniform magnetic field $\vec{B}$ is minimum at
a) $\theta = 90^0$ b) $\theta = 0^0$ c) $\theta = 180^0$ d) None of these

37. A proton and a deuteron have same kinetic energies while moving in a perpendicular magnetic field. The following gives the ratio of radii of their circular paths
a) $\sqrt{2} : 1$ b) $1: \sqrt{2}$ c) 1:4 d) 1:1

38. An electron moves along a circle under the action of possible electric $\vec{E}$ and magnetic $\vec{B}$ fields. Which of the following is correct?
a) $\vec{E} \neq 0, \vec{B} \neq 0$ b) $\vec{E} \neq 0, \vec{B} = 0$ c) $\vec{E} = 0, \vec{B} \neq 0$ d) All of these

39. Two charged particles A and B move in a circular motion under the action of a uniform magnetic field. The ratio of radii of particle A to particle B is given in terms of $(K.E.)$,q and m as
a) $\frac{r_A}{r_B} = \frac{q_B}{q_A}\sqrt{\frac{m_{A(K.E._A)}}{m_{B(K.E._B)}}}$ b) $\frac{r_A}{r_B} = \frac{q_A}{q_B}\sqrt{\frac{m_{A(K.E._A)}}{m_{B(K.E._B)}}}$
c) $\frac{r_A}{r_B} = \frac{q_B}{q_A}\sqrt{\frac{m_{B(K.E._A)}}{m_{A(K.E._B)}}}$ d) $\frac{r_A}{r_B} = 2\frac{q_B}{q_A}\sqrt{\frac{m_{A(K.E._A)}}{m_{B(K.E._B)}}}$

40. The momentum p of a charged particle moving in a circular path under a uniform magnetic field is given in terms of its kinetic energy and mass as

a) $p = \sqrt{2(K.E.)m}$ b) $p = \sqrt{(K.E.)m}$ c) $p = \frac{1}{2}\sqrt{(K.E.)m}$ d) None of these

41. When a uniform magnetic field *B* is applied to a current carrying coil, the coil will rotate in such a manner that its plane
a) becomes parallel to *B* b) becomes anti-parallel to *B*
c) makes an angle of 60^0 with *B* d) becomes perpendicular to *B*

42. The galvanometer used in school and college laboratories is a _____ galvanometer.
a) pivoted type b) astatic c) mirror d) none of these

43. The current *I* passing through the galvanometer coil is related to the angle of deflection θ as
a) $I \propto \theta$ b) $I\ 1/\propto \theta$ c) $I \propto \theta^2$ d) $I\ 1/\propto \theta^2$

44. The high resistance R_h connected in series with a galvanometer is given as
a) $R_h = {}^{V}/_{I_g} - R_g$ b) $R_h = {}^{V}/_{I_g} + R_g$ c) $R_h = VI_g - R_g$ d) None of these

45. The output waveform produced due to time base generator in a CRO is
a) saw tooth b) sinusoidal c) linear d) helical

46. The ratio of electric force F_E to magnetic force F_B for a moving charge is
a) ${}^{E^2}/_{vB}$ b) ${}^{E}/_{vB}$ c) ${}^{B}/_{vE}$ d) ${}^{E}/_{B}$

47. The expression $\vec{F} = q\vec{E} + q(\vec{v} \times \vec{B})$ represents _____ force
a) Maxwell b) Gravitational c) Magnetic d) Lorentz

48. The following expression gives charge to mass ratio of an electron
a) ${}^{2V}/_{B^2r^2}$ b) ${}^{\sqrt{2V}}/_{B^2r^2}$ c) ${}^{B^2r^2}/_{2V}$ d) ${}^{Br}/_{2V}$

49. The anodes in a CRO are at _____ potential with respect to the cathode
a) negative b) high negative c) high positive d) positive

50. A galvanometer having a resistance of 4.5 Ω can read up to 5 mA. If it is to read 100 V, then the high resistance to be used in series will be
a) 19998 Ω b) 19995.8 Ω c) 19995.5 Ω d) 19996.5 Ω

Answer Key:

1.A	**2.B**	**3.B**	**4.D**	**5.C**	**6.A**	**7.D**	**8.C**	**9.A**	**10.D**
11.A	**12.D**	**13.B**	**14.A**	**15.D**	**16.C**	**17.D**	**18.D**	**19.A**	**20.C**
21.B	**22.C**	**23.B**	**24.D**	**25.A**	**26.A**	**27.A**	**28.D**	**29.B**	**30.B**
31.A	**32.B**	**33.A**	**34.D**	**35.A**	**36.A**	**37.B**	**38.C**	**39.A**	**40.A**
41.D	**42.A**	**43.A**	**44.A**	**45.A**	**46.B**	**47.D**	**48.A**	**49.C**	**50.C**

Chapter 15

1. The induced emf is produced in a circuit due to:
   a. Initial magnetic flux b. final magnetic flux
   c. Change of magnetic flux d. constant magnetic flux
2. The Principle of an alternating current generator is based on:
   a. Coulomb's law b. Ampere's law c. Faraday's law d. Lenz's law
3. If velocity of a conductor moving through a magnetic field 'B' is made zero, then Motional emf will be:
   a. –VBL b. –V/BL c. – BL/V d. zero
4. The current flowing in a coil due to induced emf depends upon:
   a. shape of coil b. resistance of coil c. area of coil d. magnetic flux
5. Lenz's law is in accordance with the law of conservation of:
   a. momentum b. Angular momentum c. charge d. energy
6. A wire loop is moved parallel to a uniform magnetic field. The induced emf in the loop:
   a. depends on the shape b. depends on area c. depends on nature of loop d. zero
7. The mutual inductance of the coil depends upon:
   a. density of the coil b. stiffness of coil
   c. material of coil d. geometry of the coil
8. The phenomenon of producing emf in the coil due to change of current in the coil itself is called:
   a. mutual induction b. self-induction c. self-inductance d. mutual inductance
9. The self-inductance of a long solenoid with a turns per unit length is:
   a. $L = \mu nA/l$ b. $L = \mu n^2 A/l$ c. $L = \mu n^2 A l$ d. $L = \mu n l/A$
10. The energy density of an inductor is:
    a. $B^2 / 2\mu^2$ b. $B / 2\mu$ c. $B / 2\mu^2$ d. $B^2 / 2\mu$
11. Alternating current generator converts…… energy into electrical energy?
    a. mechanical energy b. chemical energy c. solar energy d. potential energy
12. Eddy currents produced in the core of transformer are responsible for:
    a. heat loss b. Step up process c. Step down process d. induction phenomena
13. One henry is equal to:
    a. $Vs^{-1} A$ b. NmA^{-1} c. $V^{-1} s A$ d. $V s A^{-1}$
14. To construct a step down transformer, the condition is:
    a. $N_s > N_p$ b. $N_p > N_s$ c. $N_p = N_s$ d. $N_p . N_s = 1$
15. Turn ratio of a transformer is 5. If 220 V AC is applied to its primary coil, voltage in the secondary coil will be:
    a. 44V b. 4.4 V c. 220V d. 1100V
16. "The direction of induced current is always so as to oppose the change which causes the Current" is the statement of:
    a. Faraday's law b. Lenz's Law c. Ohm's Law d. Kirchoff's rule.
17. Electric current produces magnetic field was suggested by:
    a. Faraday b. Lenz c. Ohm d. Oerested
18. If the motor is overloaded, then the magnitude of 'back emf'"
    a. Increases b. Decreases c. Constant d. Becomes zero
19. The negative sign in expression $\varepsilon = -vBL$ shows that the angle between the direction of L and (v x B) is:
    a. 90 b. 180 c. 45 d. 0
20. When a motor is just started, back emf is almost _____:
    a. Infinite b. zero c. minimum d. maximum
21. Farad is defined as:
    a. Coulomb / volt b. Ampere / volt c. Coulomb / joule d. Joule / Coulomb
22. A transformer:
    a. Works on A.C. only b. Works on D.C only
    c. Works on A.C. and D.C d. Has no hysteresis loss

23. If magnetic field is doubled then magnetic energy density becomes:
a. Four times b. Two times c. Three times d. Six times

24. A magnetic field acts on a charged particles so as to change its:
a. speed b. energy c. direction of motion d. all of these

25. An ideal transformer always obeys the law of conservation of……..:
a. energy b. momentum c. charge d. Flux

26. The unit of inductance is:
a. Volt b. Ampere c. Henry d. Ohm

27. The application of mutual induction is:
a. TV b. Radio c. Transformer d. Motor

28. The work is stored in an inductor in form of…….:
a. Elastic potential energy b. Kinetic energy
c. Potential energy d. Gravitational potential energy

29. One henry is equal to…….:
a. VA/s b. Nm/A c. As/V d. Vs/A

30. Due to self-inductance, the coil wires are known as:
a. Insulator b. Conductor c. Inductor d. Semi-conductor

31. Energy stored per unit volume inside the solenoid is called:
a. Energy density b. Charge Density
c. Mass density d. Volume charge density

32. In the plane of the A.C generator coil is perpendicular to the field, then induced emf in the coil is:
a. Maximum b. minimum c. zero d. intermediate value

33. The loss of energy over each A.C cycle magnetization and demagnetization of transformer, is called:
a. Magnetization loss b. Hysteresis loss
c. Demagnetization loss d. energy loss

34. The principle of AC generator is:
a. Mutual induction b. self induction
c. electromagnetic induction d. Induction

35. A transformer steps down 220V to 40 volts. If the secondary turns are 40 then primary turns will be:
a. 20 b. 40 c. 120 d. 220

36. The Si unit of mutual inductance and self inductance is:
a.same b. different c. no unit d. a & b

37. The most common source of AC voltage is:
a. motor b. generator c. cell d. transformer

38. In motor a permanent magnet provides:
a. Electric field b. electric flux c. magnetic field d. gravitational field

39. Which one is not present in AC generator:
a. Armature b. magnet c. slip ring d. commutator

40. The induced current in transformer which produced in the direction perpendicular to flux, is known as:
a. Conventional current b. electronic current
c. Perpendicular current d. Eddy current

41. In the plane of AC generator coil is parallel to the field, then emf induced in coil is:
a. maximum b. minimum c. zero d. intermediate

42. Which component is mainly used in a DC generator:
a.slip ring b. commutator c. magnet d. coil

43. The phenomena of induced emf was observed by Faraday and Henry in:
a. 1931 b. 1831 c. 1535 d. 1940

44. The induced current can be increased by:
a. Using strong magnetic field b. moving loop faster

c. Replacing loop by coil d. all of above

45. Which of the following will produce an induced emf:
a. Changing area of coil b. Changing magnetic flux
c. changing orientation of coil d. all of them

46. The induced emf in a coil depends upon:
a. Strength of magnetic field b. Resistance of the coil
c. area of the coil d. All of them

47. Which of the following converts electric energy into mechanical energy:
a. Transformer b. DC generator c. Motor d. AC generator

48. The only difference between construction of DC generator and Ac generator is that of:
a. carbon brush b. Bar magnet c. electromagnet d. Horseshoe magnet

49. Magnetic flux linked with a coil can be changed by using an:
a. Permanent magnet b.Bar magnet
c. Electromagnet d. Horseshoe magnet

50. The windings of the electromagnetic are usually called:
a. Magnetic coils b. Field coil c. Electric coil d. simple coil

Answers Key

1	c	11	a	21	a	31	a	41	a
2	c	12	a	22	a	32	c	42	b
3	d	13	d	23	a	33	b	43	b
4	b	14	b	24	c	34	c	44	d
5	d	15	d	25	a	35	d	45	d
6	d	16	b	26	c	36	a	46	d
7	d	17	d	27	c	37	b	47	c
8	b	18	b	28	c	38	c	48	b
9	c	19	b	29	d	39	d	49	c
10	d	20	b	30	c	40	d	50	b

Chapter 16

1: Al high frequency, the value of reactance of a capacitor in AC circuit will be
(a) Large (b) Infinite (c) Zero (d) Small

2: Al higher frequency of the alternating current, the capacitive reactance 'X_c'
(a) Decreases (b) increases
(c) Remains the same (d) sometime increases and sometimes decreases

3: In an inductive AC circuit, the current
(a) Leads the voltage by 90^o $\pi/2$) (b) Lag behind the voltage by 90^o (or $\pi/2$)
(c) Lags behind the voltage 180^o (or π) (d) Leas the voltage 180o (or π)

4: The inductive reactance 'X_L' of coil of inductance 'L' across and AC source is given by
(a) $X_L=2\pi fL$ (b) $X_L=2\pi f/L$ (c) $X_L=1/2\pi fL$ (d) $x_L = \frac{1}{\sqrt{2\pi fL}}$

5: The indicative reactance 'X_L' of inductor across an AC source is given by
(a) ωc (b) ωL (c) $1/\omega L$ (d) $\sqrt{\omega L}$

6: The inductance and capacitance behave as a function of
(a) voltage (b) current (c) power (d) Frequency

7: Inductive reactance of an inductor across an AC source is given by
(a) $2\pi fL$ (b) ωL (c) V/I (d) All of the above

8: The inductive reactance of a coil is directly proportional to
(a) resistance (b) capacitance
(c) Inductance (d) both frequency of Ac and inductance

9: The behavior of resistance in AC circuit is independent of
(a) current (b) voltage (c) power (d) Frequency

10: At low frequency of the alternate current, the inductive reactance 'X_L'
(a) Zero (b) Increases (c) Decreases (d) remains the same

11: At low frequency of the alternating current the current will be
(a) Small (b) large (c) Zero (d) infinite

12: SI unit of Inductive reactance of a coil are
(a) Henry (b) Hertz (c) Ampere (d) Ohms

13: Power dissipated in a pure inductor is
(a) Large (b) Small (c) Infinite (d) Zero

14: The reactance of a coil changes directly with
(a) The inductance (b) Frequency of AC
(c) Both inductance and frequency of AC (d) capacitance

15: The combined effect of resistance and reactance in AC circuit is called
(a) Conductance (b) Impedance (c) Resistance (d) choke

16: The ration of the rms value of the applied voltage to the rms value of resulting AC is
(a) Reactance (b) resistance (c) impedance (d) conductance's

17: SI unit of impedance is
(a) henry (b) Hertz (c) ampere (d) ohms

18: Ohms is the unit of
(a) resistance (b) reactance (c) impedance (d) all of the above

19: The power of dissipated in AC circuit is given by
(a) $P=I^2Z$ (b) $P=VI\sin\theta$ (c) $P=I^2XL$ (d) $P=VI\cos\theta$

20: In the equation $P=IV\cos\theta$, $\cos\theta$ is called
(a) phase angle (b) limiting angle (c) Critical angle (d) power angle

21: The power dissipated in a puree inductive or capacitance circuit is
(a) Zero (b) Maximum (c) Minimum (d) Moderate

22: The AC circuit in which current and voltage are in phase, the power factor is
(a) One (b) Zero (c) infinity (d) 0.5

23: In RLC series circuit, the true condition of resonance take when
(a) $X_L>X_c$ (b) $X_L<X_c$ (c) $X_L=X_c$ (d) $X_C>X_L$

24: A resonance curve for RLC series circuit is a plot of frequency versus
(a) voltage (b) resistance (c) current (d) impedance

25: At resonance frequency, the impedance of RLC series circuit is
(a) zero (b) minimum (c) maximum (d) moderate

26: The impedance of RLC series circuit resonance circuit at resonant frequency is
(a) Less than R (b) Greater than R (c) Equal to R
(d) Sometimes smaller and sometime greeter than R

27: In RLC series circuit, the current at resonance frequency is
(a) Minimum (b) Zero (c) maximum (d) infinite

28: The total reactance of a series RLC circuit at resonance is
(a) Equal to the resistance (b) Zero (c) infinity (d) 1

29: If the value of C in a series RLC circuit is increased, the resonance frequency
(a) increases (b) Decrease (c) remains the same (d) Becomes infinite

30: St resonance frequency, the impedance of L-C parallel circuit is
(a) Zero (b) Infinite (c) Minimum (d) Maximum

31: In the L—C parallel circuit, the capacitor draws a
(a) Main current (b) Lagging current (c) Leading current (d) Zero current

32: In L-C parallel circuit, the coil draws a
(a) Leading Current (b) lagging current (c) Main current (d) zero current

33: San alternating L-C parallel circuit produces resonance only when
(a) $X_L > X_C$ (b) $X_L < X_C$ (c) $X_L = X_C$ (d) $R = 0$

34: The phase angle of a series RLC at resonant frequency is
(a) 90^o (b) 0^o (c) 180^o (d) -90^o

35: In L-C parallel resonant circuit, the value of resistance can be given as
(a) LCR (b) L/CR (c) L/CR^2 (d) L/C^2R

36: For L-C Paralllel resonant circuits, the current at resonance frequency is
(a) Maximum (b) Minimum (c) infinite (d) Zero

37: The power factor in a In L-C parallel resonant circuit is
(a) 100 (b) zero (c) 1 (d) 10

38: In a resonance circuit of frequency 1000 kHZ with a inductor of 5mH, the capacitance will be required
(a) 10pF (b) 8pF (c) 3pF (d) 5.09pF

39: A three phase AC generator consists of
(a) one coil (b) Two coil (c) three coil (d) Four coil

40: In a three phase AC generator the phase difference between each pair of coils is equal to
(a) 45^o (b) 90^o (c) 120^o (d) 180^o

41: In a three phase AC generator, if the first coil has phase 0, the the other two coils will have phases
(a) 20^o and 140^o (b) 120^o and 240 (c) 120^o and 160^o (d) 20^o and 160^0

42: The total load in a AC supply can be divided into
(a) 2 parts (b) 3 parts (c) 4 parts (d) many parts

43: Metal detectors can be used to locate
(a) buried metal objects (b) ground metal object
(c)flying meta objects (d) all kinds of buried object

44: A chock coil is used as a resistance in
(a) AC circuit (b) potential divider (c) DC current (d) Wheatstone bridge

45: Chock consumes extremely small
(a) charge (b) current (c) power (d) potential

46: The waves which do not require any material medium for their propagation are called
(a) mechanical waves (b) matter waves (c) stationary waves (d) electromagnetic wavers

47: Maxwell's equation were discovered by James Clark Maxwell in
(a) 1870 (b) 1970 (c) 1864 (d) 1831

48: A changing electric flux creates a
(a) electric field (b) magnetic filed (c) electromagnetic filed (d) None

49: A changing magnetic field creates an
(a) magnetic field (b) electromagnetic filed (c) electrostatic field (d) electric filed

50: The most common source of AC voltages is
(a) motor (b) cell (c) AC generator (d) Ac transformer

Answers Key

1d	11a	21d	31c	41b
2a	12d	22a	32b	42b
3a	13d	23c	33c	43a
4a	14c	24c	34b	44d
5a	15c	25b	35b	45c
6d	16c	26c	36b	46d
7d	17c	27c	37c	47d
8d	18a	28b	38d	48b
9d	19a	29b	39c	49b
10c	20d	30d	40c	50c

Chapter 17

1. An element which has a definite volume and shape is called:
   a) Liquid b) Solid c) Gas d) Vapour
2. A solid is which atoms are in a regular order is called
   a) Crystalline solid b) Amorphous solid c) Polymeric solid d) Glassy solid
3. Which of the following is a crystalline solid?
   a) Copper b) NaCl c) Zirconia d) All of above
4. Which of the following is polymeric solid?
   a) Nylon b) Plastic c) Polythene d) All of above
5. Molecules of a solid possess
   a) Rotational motion b) Vibrational motion
   c) Translational motion d) All of above
6. A solid in which there is no regular arrangement of molecules is
   a) Amorphous b) Crystalline c) Copper d) None of above
7. Which class of material would you classify Nylon
   a) Fibres b) Polymer c) Ceramics d) Glass
8. The deformation of body is the change in its
   a) Shape b) Length c) Area d) All of above
9. A smallest three dimensional part of a crystal lattice is called.
   a) A particle b) A molecules c) A unit cell d) An atom
10. The pattern of NaCl particles have a:
    a) Triangular b) Square c) Cubic d) Rectangular
11. When stress changes the shape then it is called:
    a) Shear stress b) Tensile stress c) Compressive stress d)volumetric stress
12. The unit Nm^{-2} is also called
    a) Coulomb b) Newton c) Pascal d) Ampere
13. Stress is defined as:
    a) F/A b) F/A^2 c) A/F d) FxA
14. S.I unit of stress is:
    a) N/m b) N m c) Nm^{-2} d) Newton
15. The ability of a body to return to its original shape is called:
    a) Plasticity b) Elasticity c) Strain d) Stress
16. The strain due to tensile stress is :
    a) Compressive strain b) Shear strain c) Volumetric strain d) Tensile strain
17. S.I unit of strain is
    a) Newton b) N m^{-2} c) Pascal d) no unit
18. When stress changes the length of a body it is called
    a) Tensile stress b) Shear stress c) Compressive stress d) Yield stress
19. The deformation of a solid when stress is applied is called
    a) Strain b) Elasticity c) Rigidity d) Pressure
20. The S.I Unit of Modulus elasticity is:
    a) Pascal b) Coulomb c) Ampere d) None
21. The volumetric strain is:
    a) $\Delta V/V_o$ b) $V_o/\Delta V$ c) $\Delta V/t$ d) None
22. The ratio of stress to strain i:
    a) Modulus of conductivity b) Modules of Elasticity
    c) Modulus of electricity d) Modulus of Viscosity
23. Young's Modulus is given by
    a) (F/A) / ($\Delta V/V$) b) (F/A) / $(\frac{\Delta \ell}{\ell})$ c) (FA) / $(\frac{\Delta \ell}{\ell})$ d) (F/A) / (ΔV)
24. The ratio of shear stress to shear strain is
    a) Shear modulus b)Young's Modulus c) Bulk Modulus d)None of above

25. The ratio of stress to volumetric strain is called
a) Shear Modulus b) Young's Modulus c) Bulk Modulus d) Modulus of elasticity

26. The dimension of strain is
a) [L] b) $[ML^2T^{-2}]$ c) $[M\,L^{-1}\,T^{-2}]$ d) Dimensionless

27. The substance which break just after elastic limit:
a) Ductile b) Brittle c) Soft d) Hard

28. The substance which undergo plastic deformation until break is
a) Brittle b) Ductile c) Hard d) Soft

29. When stress is increased beyond elastic limit and material is permanently changed this property is
a) Permanent stress b) Elasticity c) Yield strength d) Plasticity

30. The maximum stress that a body can tolerate is called:
a) UTS b) Permanent stress c) Elastic strength d) Plastic stress

31. The strain energy in a deformed material is:
a) $\frac{1}{2}\left(\frac{E\ell_1}{AL}\right)$ b) $\frac{1}{2}\left(\frac{EA\ell_1}{L}\right)$ c) $\frac{1}{2}\left(\frac{EA\ell_1^2}{L}\right)$ d) $\frac{1}{2}\left(E\frac{\ell_1}{L}\right)$

32. The substances of conductivity of the order of $10^{-6} - 10^{-4}\ (\Omega m)^{-1}$ are :
a) Insulators b) Super conductors c) Semiconductors d)Good conductors

33. Substances of conductivity between 10^{-10} — $10^{-20}\ (n\ m\ )^{-1}$ are:
a) Insulators b) Semiconductors c)Super conductors d)Good conductors

34. Good conductors have conductivity of the order of
a) $10^{-10}\ (\Omega m)^{-1}$ b) $10^{-7}\ (\Omega m)^{-1}$ c) $10^{7}\ (\Omega m)^{-1}$ d) $10^{-9}\ (\Omega m)^{-1}$

35. The electrons in the outermost orbit of atom are:
a) Valance electrons b) Static electrons c) Tightly bound d) Stationary

36. The band above the valance band is called:
a) Conduction band b) Filled band c) Forbidden band d) occupied band

37. The process of addition of impurity in pure semiconductor is :
a) Doping b) Radiating c) Mixing d) Insulating

38. A semiconductor formed by addition of trivalent impurity is :
a) P–Type b) N–Type c) Q–type d) M–Type

39. Pure semiconductors silicon and germanium are
a) Extrinsic b) Intrinsic c) Insulator d) Diodes

40. A doped semiconductor is called :
a) Extrinsic b) Intrinsic c) Insulator d) Conductor

41. Conductivity of semi conductor is increased by:
a) Decrease of temperature b) By keeping temperature constant
c) Increase of temperature d) none of above

42. A combination of N-type and P-type material is called
a) Diode b) Transistor c) Resistor d) Capacitor

43. In a P-type semiconductor the charge carriers are
a) Electrons b) Holes c) Protons d) Neutrons

44. In the N-type semiconductor the charge carries are
a) Holes b) Neutrons c) Protons d) Electrons

45. The majority carriers in N-type substance are
a) Holes b) Protons c) Neutrons d) Electrons

46. Minority carriers in N-type are
a) Holes b) Electrons c) Neutrons d) Protons

47. The temperature at which material show super conductivity is
a) Super temperature temperature b) Critical temperature c)Kelvin temperature d)Absolute

48. First super conductor was discovered by
a) Kelvin b) Hertz c)Einstein d) Kamerlingh Ornes

49. The most suitable metal for making permanent magnet is

a) Iron b) Steel c) Silver d) Copper

b) The energy required to magnetize and demagnetize is called

a) Saturation b) Retentivity c) Coercivity d) Hysteresis loss

Answer Key

1	**B**	11	**A**	21	**A**	31	**C**	41	**D**
2	**A**	12	**C**	22	**B**	32	**D**	42	**A**
3	**D**	13	**A**	23	**A**	33	**A**	43	**B**
4	**D**	14	**C**	24	**B**	34	**C**	44	**D**
5	**B**	15	**B**	25	**C**	35	**A**	45	**D**
6	**A**	16	**D**	26	**D**	36	**A**	46	**A**
7	**B**	17	**D**	27	**D**	37	**A**	47	**B**
8	**D**	18	**A**	28	**D**	38	**A**	48	**D**
9	**C**	19	**A**	29	**D**	39	**B**	49	**A**
10	**C**	20	**A**	30	**A**	40	**B**	50	**D**

Chapter 18

1. The central region of transistor is called
   (a) Base (b) emitter (c) collector (d) neutral
2. The process of conversion of AC into DC is called
   (a) Amplification (b) rectification (c) purification (d)magnification
3. Which is the most important building block of electronic devices?
   (a) Diode (b) p-n junction (c) transistor (d) rectifier
4. N-type region has majority charge carriers as
   (a) Holes (b) protons (c) neutrons (d) electrons
5. Photo diode operates in the _____ condition
   (a) Forward bias (b) null (c) both a & d (d) reverse bias
6. The potential barrier for germanium is _____
   (a) 0.6 V (b) 0.2 V (c) 0.3 V (d) 0.5 V
7. In transistor, the base region is of the order of _____
   (a) 10^{-5} m (b) 10^{-2} m (c) 10^{-8} m (d) 10^{-6} m
8. In n-p-n transistor, p works as _____
   (a) Collector (b) emitter (c) base (d) any of above
9. The electronic circuits which implement the various logic operations are called _____
   (a) Logic gates (b) Boolean algebra (c) amplifier gain (d) logic functions
10. Depletion region carries _____
    (a) +ve charge (b) –ve charge (c) no charge (d) all of above
11. Process of conversion low voltage to high voltage is called _____
    (a) Rectification (b)forward bias (c) reverse bias (d) amplification
12. The open loop gain of the amplifier is _____
    (a) 10^5 (b) 10^3 (c) 10^6 (d) 10^8
13. Semiconductor germanium and silicon are
    (a) Pentavalent (b) trivalent (c) divalent (d) tetravalent
14. In p-n-p transistor, collector current is
    (a) Equal to emitter current (b) slightly less than emitter current
    (c) greater than emitter current (d) any of above
15. The operation of a transistor requires _____
    (a) Emitter is heated (b) base is heated (c) collector be heated (d) none of above
16. Non-inverting amplifier circuits have _____
    (a) Very high input impedance (b) very low input impedance
    (c) low output impedance (d) none of above
17. In forward bias, the width of potential barrier _____
    (a) Increases (b) decreases (c) remains same (d) no effect
18. An OP-AMPs can amplify _____
    (a) D.C (b) A.C (c) both A.C & D.C (d) none of above
19. For normal operation of a transistor, the collector base junction is kept
    (a) Unbiased (b) forward biased (c) reverse biased (d) none
20. The potential difference set up across the depletion region is called
    (a) Absolute potential (b) neutral potential (c) reverse potential (d) potential barrier
21. The number of diodes used in bridge rectifier circuit is
    (a) 4 (b) 3 (c) 2 (d) 5
22. SI unit of gain of amplifier is
    (a) Volt (b) ampere (c) coulomb (d) dimensionless
23. P-n junction when reversed biased acts as a
    (a) Capacitor (b) inductor (c) on switch (d) off switch
24. Forward current through a semi-conductor diode circuit is due to _____

(a) Minority carriers (b) majority carriers (c) holes (d) electrons

25. The operational amplifier is _____
(a) High gain amplifier (b) high power amplifier
(c)high resistance amplifier (d)low resistance amplifier

26. In the transistor schematic symbol, the arrow _____
(a) located on emitter (b) located on base
(c) located on collector (d) points from north to south

27. Depletion region of a junction is formed _____
(a) during the manufacturing process (b) under forward bias
(c) under reverse bias (d) when temperature varies

28. A sensor which changes light intensity into electric voltage.
(a) LDR (b) thermistor (c) photodiode (d) photovoltaic

29. Devices which convert various physical quantities into electrical voltage are known as
(a) Control system (b) sensors (c) level sensors (d) LDR

30. A light emitting diode emits light only when
(a) Reversed biased (b) forward biased (c) unbiased (d) none

31. The reverse current through semiconductor diode is due to
(a) Minority carrier (b) majority carrier (c) electrons (d) holes

32. The gain G of non-inverting amplifier is
(a) $G = -\frac{R2}{R1}$ (b) $G = 1 + \frac{R2}{R1}$ (c) $G = \frac{R2}{R1}$ (d) $G = 1 - \frac{R2}{R1}$

33. The circuit which changes input signal at output with phase shift of 1800 is called
(a) Amplifier (b) operational amplifier (c) switch (d) inverter

34. Transistors are made from
(a) Plastic (b) metals (c)insulators (d) doped semiconductors

35. The current gain β of transistor is given by
(a) $\beta = \frac{Ic}{IB}$ (b) $\beta = \frac{IE}{Ic}$ (c) $\beta = \frac{Ic}{IE}$ (d) $\beta = \frac{IB}{IE}$

36. LDR is abbreviated as
(a) Light dependent resistance (b) light depositing resistance
(c) Light doped resistance (d) all of these

37. A photodiode can switch its current ON or OFF in
(a) nano second (b) milli second (c) micro second (d) centi second

38. Current gain of a transistor which has collector current of 10 mA and a base current of 40 micro Ampere is:
(a) 25 (b) 250 (c) 2500 (d) 25000

39. A part of transistor which is heavily doped to produce large number of majority carriers is
(a) Emitter (b) Base (c) Collector (d) any of above

40. The output of two inputs OR gate is zero only when:
(a) Both are one (b) Both are zero (c) Either input is 1 (d) None

41. Silicon transistors are preferred because:
(a) High operating temperature (b) Low leakage current
(c) Suited to high frequency circuits (d) All

42. The emitter of a transistor is doped the heaviest because it:
(a) Acts as a supplier of charge carriers (b) Dissipates maximum power
c) has a large resistance (d) has a small resistance

43. In a semiconductor diode, p-side is earthed and to n-side is applied a potential of -2 volt; the diode shall
(a) Conduct (b) Not conduct (c) Conduct partially (d) Break down

44. In a transistor, the conventional current flows from base to emitter. The transistor is
(a) NPN (b) PNP (c) FET (d) None of these

45. If PN junction is forward biased its resistance is
(a) Zero (b) Infinity (c) A few ohm (d) A few kilo ohms

46. In a half wave rectifier the rms value of AC component of the waves

(a) Zero (b) Equal to DC value
(c) More than DC value (d) Less than DC value

47. On increasing the reverse bias to a large value in a p-n junction diode current
(a) Increases slowly (b) Remains fixed
(c) Suddenly increases (d) Decreases slowly

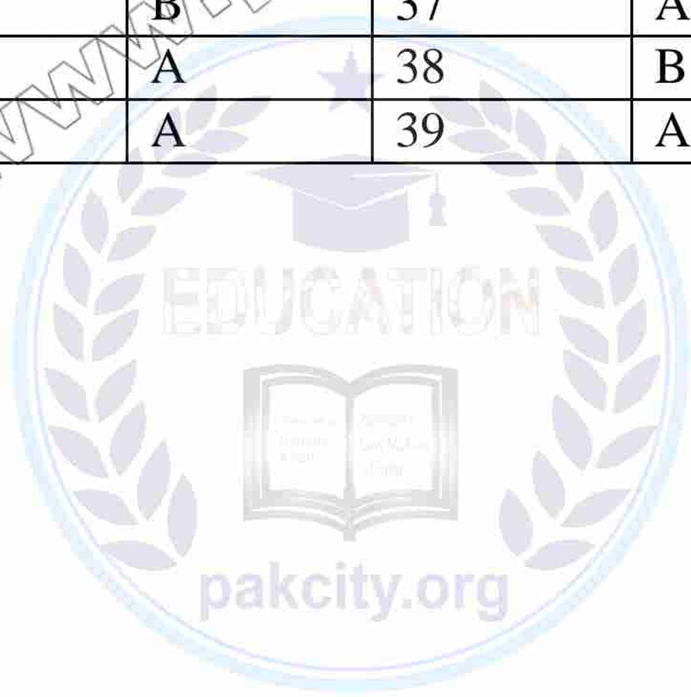
48. In the reverse biased p-n junction, the current is of the order of
(a) Ampere (b) Milliampere (c) Microampere (d) Nano-ampere

49. The output from a full wave rectifier is
(a) A pulsating uni-directional current (b) A DC voltage (c) Zero (d) An AC voltage

50. Under ideal conditions, the collector current is
(a) Equal to base current (b) Nearly equal to emitter current
(c) Less than base current (d) always zero

Answers Key

1	B	14	C	27	A	40	B
2	B	15	D	28	A	41	D
3	B	16	A	29	B	42	A
4	D	17	B	30	B	43	A
5	D	18	B	31	A	44	A
6	C	19	C	32	B	45	C
7	D	20	D	33	D	46	B
8	C	21	A	34	D	47	C
9	A	22	D	35	A	48	D
10	C	23	D	36	A	49	A
11	D	24	B	37	A	50	B
12	A	25	A	38	B		
13	D	26	A	39	A		



Chapter 19

1. Which one of the following waves requires a material medium for their propagation?
a) Light waves b) X– rays c) γ-rays d) Sound waves

2. Which one of the following scientists regarded light as electromagnetic waves?
a) Newton b) Galileo c) de Broglie d) Maxwell

3. Tick the wrong statement.
a) Velocity of light is independent of the motion of the observer.
b) Velocity of light in free space is the same in all directions.
c) Velocity of light in free space is different in different directions.
d) Absolute motion or absolute rest is meaningless to talk about

4. Which one of the following physical quantities is independent of relativistic speed?
a) Mass b) Length c) Time d) Charge

5. Relativistic velocity is of the order of,
a) $\frac{1}{15}$ of the velocity of light b) $\frac{1}{20}$ of the velocity of light
c) $\frac{1}{10}$ of the velocity of light d) All the above

6. With increase in the velocity of an object its mass will
a) Increase b) Decrease c) Remain constant d) None of the above

7. The relativistic energy 'E' is equivalent to relativistic mass given by
a) Ec^2 b) $\frac{E}{c^2}$ c) $\frac{E}{c}$ d) $\frac{c^2}{E}$

8. The length of rod at rest as measured by an observer moving parallel to it with relativistic speed is given by,
a) $\ell = \ell_o\left(1-\frac{v^2}{c^2}\right)$ b)l $l_o\sqrt{1-\frac{v^2}{c^2}}$ c) $\ell = \frac{\ell_o}{\sqrt{1-\frac{v^2}{c^2}}}$ d) $l_o = l\sqrt{1-\frac{v^2}{c^2}}$

9. A rod at rest appears to an observer just a mere point when he moves across it as speed,
a) Equal to the speed of light b) Double the speed of light
c) Three-fourth the speed of light d) None of the above

10. 0.001 Kg mass will be equivalent to
a) 2.50 Giga watt hour b) 25.00 giga watt hour c) 0.26 giga watt hour d) None of the above

11. Which one of the following radiations has the most energetic photon?
a) T.V. waves b) Micro waves c) X-rays d) γ - rays

12. The electron was discovered by
a) Burcherer b) Anderson c) Chadwick d) J. J Thomson

13. The SI unit of Planck's constant is
a) Joule – Sec^{-1} b) Joule – Sec^{-2} c) Joule – Sec d) Joule – Sec^2

14. Photoelectric effect was discovered by
a) Einstein b) G.P.Thomson c) Hallwachs d) Lenard

15. If the distance of an electric-lamp from a photo cell is continuously increased, the photo electric current (I) varies with distance (d) as,
a) $I \propto d^2$ b) $I \propto d$ ` c) $I \propto \frac{1}{d^2}$ d) $I \propto \frac{1}{d}$

16. Tick the wrong statement
a) No photoelectric emission takes place if the frequency of radiation, however intense it may be, is less than a certain critical value is called threshold frequency
b) Threshold frequency depends upon the nature of the metal surface
c) Photoelectric effect is an instantaneous phenomenon.
d) Maximum energy of a photoelectron is a function of intensity rather than frequency of radiation

17. Tick the correct statement

a) Threshold frequency is the greatest and threshold wavelength is the shortest.
b) Threshold frequency is the smallest and threshold wavelength is the greatest.
c) Both threshold frequency and wavelength are neither too large nor too small
d) None of the above

18. The linear momentum of a photon is

a) Zero b) $\frac{hf}{c^2}$ c) $\frac{hf}{c}$ d) $\frac{c^2}{hf}$

19. A device based on photo electric effect is called

a) Photo sensitive b) Photo diode c) Photo synthesis d) Photo cell

20. A Compton shift in wavelength is given by

a) $\Delta\lambda = \frac{h}{m_O c}(1+Cos\theta)$ b) $\Delta\lambda = \frac{h}{m_O c^2}(1+Cos\theta)$ c) $\Delta\lambda = \frac{hc}{m_o}(1-Cos\theta)$ d)None of the above

21. Compton wavelength is given by

a) $\frac{h}{m_O c^2}$ b) $\frac{h}{m_O c}$ c) $\frac{hc}{m}$ d) $\frac{m_O h}{c}$

22. The phenomena of pair production occurs only when the energy of incident photon is least equal

a) 10.2 MeV b) 1.02 MeV c) 1.02 eV d) 0.102 MeV

23. If energy of incident photon is greater than the rest mass energy of electron positron pair, the surplus energy is shared by the pair as,

a) Potential energy b) Thermal energy c) Electronic energy d) Kinetic energy

24. Which one of the following quantities is conserved in pair production?

a) Energy b) Charge c) Linear momentum d) All

25. The presence of anti-matter was predicted by

a) P.A.M Dirac b) Anderson c) Einstein d) Chamberlain

26. Which of the following phenomena provides a convincing proof for wave nature of radiation

a) Reflection b) Refraction c) Polarization d) Interference and diffraction

27. The concept of matter waves was introduced by

a) Davisson and Germer b) de Broglie c) Einstein d) Schrodinger

28. The wavelength of the wave associated with a moving object is given by

a) $\lambda = \frac{mv}{h}$ b) $\lambda = \frac{h}{mv^2}$ c) $\lambda = \frac{h}{mv}$ d) $\lambda = \frac{mh}{v}$

29. The wavelength of the wave associated with the moving object is

a) Directly proportional to the accelerating voltage
b) Directly proportional to the square of accelerating voltage
c) Inversely proportional to the square root of accelerating voltage
d) Inversely proportional to the accelerating voltage

30. Uncertainty principle was presented by

a) Dirac b)De Broglie c) Shrodinger d) W. Heisenberg

31. Pair production can be studied with

a) Ultraviolet rays b) X-rays c) Microwaves d) γ-rays

32. In the annihilation of matter the number of photons produced is

a) One b) Two c) Three d) None

33. In annihilation of matter the photons produced fly off at the speed of

a) Light b) Sound c) Twice the speed of light d) None

34. Tick the correct relation for uncertainty principle

a) $\Delta p\, \Delta t \approx h$ b) $\Delta x\, \Delta t \approx h$ c) $\Delta p\, \Delta x \approx h$ d) $\Delta p\, \Delta x \approx \frac{1}{h}$

35. Select the alternative from of uncertainty principle from the following

a) $\Delta\lambda = \frac{h}{m_o c}(1 - \text{Cos}\,\theta)$ b) $\Delta E.\Delta t \approx h$ c) $mc^2 = hf$ d) $mc = \frac{hf}{c}$

36. Positron was discovered by
a) J. J. Thomson b) Millikan c) Anderson d) Dirac

37. de Broglie's relation for matter waves was experimentally verified by:
a) Davisson b) Germer c) G.P. Thomson d) All the these

38. Which one of the following phenomena can be studied with γ-rays
a) Photoelectric effect b) Compton effect c) Pair production d) All of the above

39. Light waves can cause photoelectric emission in
a) Metals b) Alkali metals c) Insulators d) None of the above

40. The theory of relativity was proposed in
a) 1920 b) 1915 c) 1905 d) 1895

41. If a material object moves with the speed of light 'c' its mass becomes
a) equal to its rest mass b) Four times of its rest mass c) Double of its rest mass d) Infinite

42. A body will behave as an "ideal black body" when it acts as:
a) A perfect absorber b) A perfect radiator
c) A body to have absorption power equal to one d) All of the above

43. Black body radiations depends upon
a) The shape and nature of the body b) The velocity of radiations and colour of the body
c) The temperature of the body d) All of the above

44. The radiations emitted by human body lies in
a) Infrared region b) Ultraviolet region c) Visible region d) None of the above

45. The emission of number of photo electrons depends upon
a) The colour of the body b) The frequency of incident light
c) The intensity of light d) All of the above

46. The minimum energy required to eject an electron from a metal surface is called
a) Intensity b) Threshold frequency c) Work function d) Photo energy

47. The minimum frequency required to eject electrons from a metallic surface is called
a) Critical frequency b) Peak value of frequency c) Threshold frequency d)Photo frequency

48. The concept that particles can behave like waves was given by
a) Compton b) De-Broglie c) G.P. Thomson d) Germer

49. Noble prize was awarded to De-Broglie for his work on particle nature of light in
a) 1929 b) 1937 c) 1905 d) 1915

50. The product of uncertainties of two physical observables must be approximately equal to
a)Coulomb's constant K b) Rydberg's constant R c)Planck's constant d)All of the above

51. A three dimensional image is obtained by
a)Electron microscope b) Scanning electron microscope c) Magnetic imaging d)None of these

52. Rest mass of the photon is
a) Infinite b) Zero c) Very small d) 1.67×10^{-27} Kg

ANSWERS KEY

1	D	11	D	21	B	31	D	41	D	51	B
2	D	12	D	22	B	32	B	42	D	52	B
3	C	13	C	23	D	33	A	43	C		
4	D	14	A	24	D	34	C	44	A		
5	D	15	C	25	A	35	B	45	C		
6	A	16	D	26	D	36	A	46	C		
7	B	17	B	27	B	37	D	47	C		
8	A	18	C	28	C	38	C	48	B		
9	A	19	D	29	C	39	A	49	A		
10	B	20	A	30	D	40	C	50	C		

Chapter 20

1. The branch of physics that deals with the investigation of wavelengths of electro magnetic radiation emitted or absorbed by atoms is known as
a) spectroscopy b) astroscopy c) radioscopy d) stereoscopy
2. Black body radiation spectrum is an example of
a) band spectra b) continuous spectra c) discrete spectra d) atomic spectra
3. Molecular spectra is an example of
a) continuous spectra b) discrete spectra c) band spectra d) atomic spectra
4. Atomic Spectra is an example of
a) discrete spectra b) band spectra c) atomic spectra d) continuous spectra
5. In order to obtain spectrum from the emitted radiation, the atomic gas or vapour must be excited at
a) much less than atmospheric pressure b) much high than atmospheric pressure
c) atmospheric pressure d) high pressure and temperature
6. Line spectrum is obtained on the screen in the form of lines if the slit in front of the source is
a) narrow square b) broad square c) narrow rectangle d) broad rectangle
7. The fact that the spectrum of any element contains wavelengths that exhibit definite regularities was utilized in the second half of the _____in identifying different elements.
a) 16^{th} century b) 17^{th} century c) 18^{th} century d) 19^{th} century
8. The first Hydrogen spectral series was identified , in 1885, by
a) J.R.Rydberg b) J.J.Balmer c) Theodore Lyman d) F. S. Brackett
9. The only series which lies in the visible region of the electromagnetic spectrum is
a) Paschen series b) Lyman series c) Balmer series d) Pfund series
10. The results obtained by the Balmer were formulated, in 1896, by
a) Theodore Lyman b) F. S. Brackett c) J.R.Rydberg d) J.J.Balmer
11. The value of Rydberg's constant is
a) $1.0974 \times 10^{-7}\ m^{-1}$ b) $1.0974 \times 10^{7}\ m^{-1}$ c) $1.0974 \times 10^{7}\ m^{-2}$ d) $1.0974 \times 10^{-7}\ m^{-2}$
12. The S.I. unit of Rydberg's constant is
a) m^{-2} b) m^{-1} c) cm^{-1} d) cm^{-2}
13. The region where the Lyman series contains the wavelength $1/\lambda = R_H\ [1/1^2 - 1/n^2]$ is
a) visible region b) infrared region c) ultraviolet region d) none of these
14. Three spectral series, paschen series, Brackett series, Pfund series are found in the
a) ultraviolet region b) visible region c) infrared region d) a & b region
15. For Hydrogen atom, the allowed stationary orbits are those whose orbital angular momentum is equal to an integral multiple of *h* i.e., mvr =
a) $nh/2\pi$ b) $nh \times 2\pi$ c) $nh / 2\lambda$ d) $nh / 2\pi\lambda$
16. The gas which was identified in the Sun using spectroscopy before its discovery on earth, is
a) oxygen b) hydrogen c) helium d) nitrogen
17. The value of first quantized Bohr orbit radius of hydrogen atom is
a) 0.0053 nm b) 5.3 nm c) 0.053 nm d) 0.053 cm
18. According to Bohr's theory, the fourth stationary orbit of electrons in the hydrogen atom is
a) 4 (0.053 nm) b) 9 (0.053 nm) c) 16 (0.053 nm) d) 25(0.053 nm)
19. The speed of hydrogen electron in the nth orbit is given by $v_n =$
a) $2\lambda ke^2 / nh$ b) $2\pi ke^2 / \lambda h$ c) $2\pi ke^2 / nh$ d) $2\pi ke^2 / h$
20. The quantized Bohr orbit radius of electron in hydrogen atom is given by
a) n^2r_3 b) nr_1 c) n^2r_2 d) n^2r_1
21. The energy required to completely remove an electron from the first Bohr orbit is called
a) excited energy b) ionization energy c) accelerated energy d) orbital energy
22. By the transition of inner shell electrons in heavy atoms, high energy photons are emitted which are
a) gamma rays b) X-rays c) radio waves d) photon rays
23. For the production of X-rays, the electrons which strike with the target are
a) slow moving b) fast moving c) vibrational electrons d) free electrons
24. The amount of energy required to completely remove an electron from the first Bohr orbit is

a) 13.6 MeV b) 13.6 eV c) 1.36 MeV d) 1.36 eV

25. The continuous X-ray spectrum is obtained due to the effect called
a) Braking radiation b) Bremsstrahlung c) both a & b d) none of a & b

26. X-rays can penetrate several _____ into a solid matter.
a) millimeters b) meters c) centimeters d) kilometers

27. In human flesh, the three light elements which predominate, and allow greater amount of incident X-rays to pass through them are
a) oxygen, nitrogen , hydrogen b) oxygen, hydrogen, helium
c) oxygen, hydrogen, carbon d) carbon, nitrogen, oxygen

28. CAT is the abbreviation of
a) computerized axial topology b) computerized atomic topology
c) computerized axial tomography d) computerized atomic tomography

29. The X-rays emitted in inner shell transitions are called _____ as their energy depends upon the type of target material.
a) gamma rays b) special X-rays c) Characteristic X-rays d) continuous X-rays

30. CAT Scanners can detect density differences of the order of
a) 50 percent b) 10 percent c) 1 percent d) 40 percent

31. Three dimensional CAT Scans reveal the cyst called _____ within the skull.
a) arachnoid cyst b) epidermoid cyst c) ganglion cyst d) chalazia cyst

32. Dimension of Rydberg constant is
a) LT^{-1} b) L^{-1} c) $(LT)^{-1}$ d) $L^{-1}T$

33. Which series lies in the Ultraviolet region?
a) Lyman series b) Paschen series c) Brackett serie d) Balmer series

34. X-rays were discovered by:
a) Roentgen b) Becquerel c) Marie Curie d) Van Lave

35 . The reverse process of photo-electric effect is called:
a) Annihilation of matter b) Compton effect
c) Pair production d) X-rays

36. The total energy of electron in the Bohr orbit is given by the formula, E =
a) $-ke^2/2r$ b) $-ke^2/2r^2$ c) $-k^2e/2r$ d) $-ke^2/r$

37. The incident photon absorbed by an atom in the ground state E_1, thereby leaving the atom in the excited state E_2 , is
a) spontaneous absorption b) stimulated absorption
c) induced absorption d) both b & c

38. The emission in which the atom emits a photon of energy $hf = E_2 - E_1$, in any arbitrary direction is
a) Spontaneous emission b) stimulated emission
c) induced emission d) both a & c

39. Electron can exist in the atom but outside the nucleus because
a) speed of electron is equal to the speed of light b) speed of electron is more than speed of light
c) speed of electron is less than speed of light d) None of these

40. The radius of hydrogen atom is about
a) 5×10^{-11} m b) 5×10^{-11} cm c) 5×10^{-11} mm d) 5×10^{-11} dm

41. If electron has to be confined in the nucleus, its speed would have to be greater than
a) 10^{10} cm/s b) 10^{10} m/s c) 10^{20} m/s d) 10^{20} cm/s

42. A typical nucleus is less than _____ in diameter.
a) 10^{10} m b) 10^{-10} m c) 10^{14} m d) 10^{-14} m

43. Lasers are used to produce
a) Intense beam of visible light b) monochromatic beam of visible light
c) coherent beam of visible light d) All of them

44. An atomic energy state in which more atoms are in the lower energy state E_1 than in the excited state E_2, is known as
a) population inversion b) normal population
c) stimulated population d) atomic population

45. In the phenomenon of Laser production, atom can reside in the excited state only for
a) 10^{-6} s b) 10^{-7} s c) 10^{-8} s d) 10^{-9} s

46. In the phenomenon of Laser production, atom can reside in the meta stable state for
a) ~ 10^{-3} s b) ~ 10^{-8} s c) ~ 10^{-4} s d) ~ 10^{-10} s

47. Common type of Laser used in physics laboratories is
a) hydrogen neon Laser b) helium-neon Laser
c) carbon neon Laser d) argon neon laser

48. In Helium-neon Laser discharge tube, helium gas is
a) 15% b) 85% c) 75% d) 35%

49. In Helium-neon Laser, in meta stable state, helium is located at the energy level:
a) 20.66 eV b) 20.77 eV c) 20.61 eV d) 20.71 eV

50 In Helium-neon Laser discharge tube, neon gas is
a) 85% b) 15% c) 75% d) 45%

51. Red Laser light has a wavelength of
a) 630.8 nm b) 630 cm c) 632.8 nm d) 639.9 nm

52. Laser beams can generate three dimensional images of objects in a process called
a) polygraphy b) telegraphy c) holography d) autography

53. Laser technology has been widely used in the field of
a) neurology b) astrology c) ophthalmology d) psychology

54. Laser is the acronym for
a) Light Amplification by Stimulated Emission of Radiation
b) Light Amplification by Spontaneous Emission of Radiation
c) Light Amplified by Stimulated Emission of Radiation
d) Light Amplification by Standard Emission of Radiation

55. X-rays that are emitted in all directions and with a continuous range of frequencies are known as
a) characteristic X-rays b) continuous X-rays
c) scattered X-rays d) stimulated X-rays.

Answers Key

1	A	11	B	21	B	31	A	41	B	51	C
2	B	12	B	22	B	32	B	42	D	52	C
3	C	13	C	23	B	33	A	43	D	53	C
4	A	14	C	24	B	34	A	44	B	54	A
5	A	15	A	25	B	35	D	45	C	55	B
6	C	16	C	26	C	36	A	46	A		
7	D	17	C	27	C	37	D	47	B		
8	B	18	C	28	C	38	D	48	B		
9	B	19	C	29	C	39	C	49	C		
10	C	20	D	30	C	40	A	50	B		

Chapter 21

1: The noble Prize was conferred on Glashow, Vineberg and Abdus Salam in:
(a) 1975 (b) 1977 (c) 1979 (d) 1978

2: If a nucleus emits an β-particle along with a neutrons its mass number remains constant but charge decrease by:
(a) 4 (b) 3 (c) ± 2 (d) ± 1

3: The charge on electron was determined by Milliken in
(a) 1905 (b) 1895 (c) 1909 (d) 1918

4: The ϒ-rays radiographs are used in:
(a) Agricultural industry (b) Medical industry (c) Support industry (d) all of above

5: PWR Stands for
(a) Pressurize wind rector (b) Pressurize water reactor
(c) Power wind reactor (d) none of above

6: According to Rutherford model of atom, the positive charge in an atom
(a) is uniformly spread throughout its volume (b) Is concentrated at its centre
(c) is at certain distance from its centre (d) is scattered by an *a*-particles

7: Rutherford bombarded nitrogen with alpha particles to discover
(a) Electron (b) neutron (c) proton (d) X-rays

8: Chadwick discovered neutron by the study of scattering of alpha particles from
(a) Gold foil (b) Nitrogen (c) Beryllium d) oxygen

9: Neutron was discovered by
(a) curie (b) roentgen (c) Rutherford (d) Chadwick

10: Neutrons and protons in the nucleus are together called
(a) photon (b) nucleons (c) mesons (d) phonons

11: The Nuclei having the same mass number but different atomic number are called
(a) isotopes (b) isobars (c) isotone (d) isomers

12: The apparatus to find the massed of positive ions or protons and to detect the isotopes is called
(a) Geiger country (b) solid state detector (c) Wilson could chamber (d) Aston mass spectrometer

13: The nucleus (or nuclide) of tritium is called
(a) proton (b) Triton (c) Deuterons (d) positron

14: Nuclear force exists between
(a) neutron-neutron (b) proton-proton (c) proton-neutron (d) All of the above

15: W^+, W^- and Z^+ boons are carriers of
(a) Electroweak interaction at low energy (b) Electroweak interaction at high energy
(c) Nuclear forces (d) Gravitational force

16: The sum of the masses of constituent nucleons as compared to the mas of the resultant nucleus
(a) smaller (b) greater (c) the same (d) none of the above

17: The amount of energy required to break the nucleus is called
(a) nuclear (b) kinetic energy (c) potential energy (d) Binding energy

18: The neutron and proton are combined to form
(a) Positron (b) Triton (c) Deuterons (d) Photons

19: The binding energy of Deuterons is
(a) 22.24 MeV (b) 2.224 MeV (c) 0.224 MeV (d) 222.4 MeV

20: Radioactivity was discovered by
(a) H. Becquerel (b) J,J, Thomson (c) Bohr (d) Madame curie

21: When a nucleus emits and alpha particle, its atomic mass drops by
(a) 2 (b) 1 (c) 4 (d) 3

22: The elements showing radioactivity has atomic number 'Z'
(a) Z>50 (b) Z<82 (c) Z>82 (d) Z<70

23: Curie is unit of
(a) Conductivity (b) Binding energy (c) Resistivity (d) Radioactivity

24: β – particles are
(a) Hydrogen nuclei (b) Electrons (c) Protons (d) Photons

25: Gamma-rays consist of a stream of
(a) Electrons (b) protons (c) photons (d) positrons

26: The rate of decay (disintegration per unit time)of radioactive substance
(a) Is constant (b) Decreases exponentially with time

(c) varies inversely ad time (d) Decreases linearly with time

27: A curie represents a very strong, source of
(a) *a* – particle (b) β-particle (c) Radioactivity (d) ϒ-rays

28: The half-life of a radioactive element depends on
(a) Temperature (b) pressure (c) Nature of element (d) Amount of radio active substance

29: Capture of a neutron by a proton results in the formation of
(a) Deuteron and ϒ-rays (b) Deuteron and *a*-rays
(c) Deuteron and β-rays (d) Tritron and ϒ-rays

30: The process in which a heavy nucleus is broken into two intermediate nuclei with the release of energy is called
(a) fusion (b) fission (c) chain reaction (d) Chemical reaction

31: Fission reaction can be reduced in $_{92}U^{238}$ by
(a) Thermal neutrons (b) Slow neutrons (c) Fast neutrons (d) Neither fast nor slow neutrons

32: The process of nuclear fission was explained on the basis of liquid drop by
(a) Otto Hahn (b) Lie Meitner (c) Bohr and Wheeler
(d) Strassman and Hahn

33: during fission process, the average number of neutrons produced per fission
(a) 1 (b) 2 (c) 3 (d) 2.5

34: Fission chain reaction Is controlled by introducing
(a) Graphite rode (b) cadmium rods (c) Iron rods (d) platinum rods

35: The moderator used in a nuclear reactor is
(a) Aluminum (b) sodium (c) calcium (d) graphite

36: In liquid metal fast breeder reactor, the type of uranium used is
(a) $_{92}U^{235}$ (b) $_{92}U^{238}$ (c) $_{92}U^{234}$ (d) $_{92}U^{239}$

37: The process in which two or more light nuclei combine together to form heavier nuclei with release of energy is called
(a) Fission (b) fusion (c) chain reaction (d) chemical reaction

38: Materials can be identified by measuring their
(a) Hardness (b) Density (c) Mass (d) Half-life

39: When an alpha-particle collides with an atoms of a gas, it knocks out
(a) Neutrons (b) protons (c) electrons (d) positions

40: The range of 7.7 MeV alpha – particle in air is about
(a) 10 cm (b) 20 cm (c) 17 cm (d) 7 cm

41: Beta-particle in single encounter loses
(a) Their small mass (b) their small charges and greater speeds
(c) their smaller energy (d) Their smaller density

42: A 3MeV Beta – particle can penetrate through an aluminum foil about
(a) 655 mm (b) .65 mm (c) 6.5 mm (d) 0.065 mm

43: Gamma-rays are electromagnetic waves like
(a) X-rays (b) light waves (c) Heat waves (d) microwaves

44: Which one of the following radiation is extremely penetrating
(a) neutrons (b) Beta-rays (c) Alpha-rays (d) Gamma-rays

45: Pair production can take place only with
(a) X-rays (b) Heat radiation (c) gamma-rays (d) ultraviolet rays

46: Capture of a neutron by a nucleus results in the formation of
(a) Triton (b) Radio isotope (c) deuteron (d) helium

47: A device producing ions of high energy is called
(a) A betatron (b) A Geiger counter (c) A cyclotron (d) mass spectrograph

48: Geiger counter is a device to detect
(a) mass (b) Momentum (c) Charge (d) Nuclear radiation

49: Which one of the following detectors can count fast and operate at low voltage
(a) Geiger counter (b) Wilson cloud chamber (c) Solid state detector (d) Scintillation counter

50: The mass of an electron in unified mass scale is
(a) 0.00065 u (b) 0.00055 u (c) 1.004 u (d) 0.00075 u