+ 2 Physics **Unit : 1 Electrostatics** **Answer key – one marks**

1. The branch of science which deals with static electric charges is ……	c) electrostatics
2. If an glass rod is rubbed with silk, it becomes ……	b) positively charged
3. Bodies which do not allow the charges to pass through them are called ……..	a) insulators
4. The force between two point charges q_1 and q_2 is given by the equation ……	b) $F = q_1 q_2 / 4\pi\varepsilon_o r^2$
5. If charged bodies of charges 7q , -3q , -4q and 5q are brought in contact, the total charge =	c) 5 q
6. The value of the permittivity of free space is …….. $C^2 N^{-1} m^{-2}$	a) 8.854×10^{-12}
7. For air, ε_r = ……	b) 1
8. The force exerted by an electric field E on a charge q is ……..	b) $F = Eq_o$
9. The unit of electric dipole moment is ……..	d) C m.
10. The electric field at any point on the axial line of an electric dipole is given by ……	d) $E = 2p / 4\pi\varepsilon_o r^3$
11. The electric field at any point on the equatorial line of an electric dipole is ……	a) $E = p / 4\pi\varepsilon_o r^3$
12. The torque experienced by an electric dipole in an electric field is given by ……	b) $\tau = pE \sin\theta$
13. The direction of the electric dipole moment is from ……. to …….	b) -q , +q
14. The net force on an electric dipole in an electric field is F = ……	c) zero
15. The relation between the electric field and the electric potential is given by ……	a) $E = -dV / dr$
16. The total number of electric lines of forces passing through the given area is called electric ..	c) flux
17. The unit of electric potential difference is ……...	c) volt
18. The unit of electric field intensity is …….	b) $V m^{-1}$
19. The electric potential due to a point charge 9 μC at a distance 3 cm is ……volt.	d) 27×10^5
20. The equation of electric potential at any point due to an electric dipole is ……	a) $V = p \cos\theta / 4\pi\varepsilon_o r^2$
21. The work done in bringing each charge from infinite distance is called electric …….	d) potential energy
22. The unit of electric flux is ……	b) $N m^2 C^{-1}$
23. The total electric flux of the electric field E over any closed surface is equal to $1/\varepsilon_o$ times the net charge enclosed by the surface. This is called ……	b) Gauss law
24. The electric field due to an infinite long straight charged wire is E = ……	a) $\lambda / 2\pi\varepsilon_o r$
25. The electric field due to an infinite long charged plane sheet is E = ……	a) $\sigma / 2\varepsilon_o$
26. Electric field at any point in between two parallel sheets of equal and opposite charges is E =	b) σ / ε_o
27. The electric field at any point on the surface of a uniformly charged spherical shell is …	a) $q / 4\pi\varepsilon_o R^2$
28. Electrostatic shielding is based on the fact that the electric field inside a conductor is …	c) zero
29. The phenomenon of obtaining charges without any contact with another charge is called	a) electrostatic induction
30. A charge of 9 μC given to the conductor increases the potential by 3 volt. The capacitance is	c) 3 μF
31. The unit of capacitance is ……..	d) farad
32. A capacitor is a device to store …….	b) charges
33. The number of electric lines of force originating from 1 coulomb charge is ……..	c) 1.129×10^{11}
34. Non polar molecule is …….	d) O_2, N_2, H_2
35. Polar molecule is ……..	d) N_2O, H_2O, HCl, NH_3
36. The magnitude of the induced dipole moment p is directly proportional to ……	b) E
37. The equation for the capacitance of a parallel plate capacitor with a dielectric is……..	a) $\varepsilon_o \varepsilon_r A / \varepsilon_r (d - t) + t$
38. When three capacitors C_1 , C_2 and C_3 are connected in parallel, then C_p = …….	b) $(C_1 + C_2 + C_3)$
39. Greater the radius of a conductor, …… is the charge density.	a) smaller
40. Van de Graaff generator produces a potential in the order of ……..volt.	c) 10^7
41. Like charges …… and unlike charges ……. each other.	d) repel, attract
42. If there are 3 electrons in a body, then the total charge of the body q = …….	c) 3e
43. The permittivity of a medium is ……	b) $\varepsilon_0 . \varepsilon_r$
44. The total number of electric lines of forces from a point charge 9 C in free space is N = …	b) 10^{12}
45. The equation for the torque on an electric dipole is …….	a) $\vec{\tau} = \vec{p} \times \vec{E}$
46. Electric potential energy is of a system of 3 C and 6 C separated by 18 cm is ……J	a) 9×10^{11}
47. The capacitances of a parallel plate capacitor with and without dielectric are 90 μF and 9 μF. Then ε_r is	d) 10
48. In micro wave oven, ……. are used.	d) microwaves
49. An electric dipole contains charges – 3 C and +3 C separated by 1 nm. The dipole moment is	a) 3×10^{-9} Cm.
50. The work done in moving a charge between any two points on an equipotential surface is …	c) zero.

Best Wishes

1.	A charge of 180 C passes through a lamp in 3 minutes. The current through it is …….	d) 1 A
2.	A material through which the electric charges can flow is called ……..	c) conductor
3.	The current is proportional to the ……. velocity.	a) drift
4.	A toaster operating at 240 V has a resistance 60 ohm. The power is equal to …… watt.	b) 960
5.	When two 4 ohm resistors are in parallel, the effective resistance is equal to …….. ohm.	a) 2
6.	In the case of insulators, as the temperature increases, the resistivity ……..	c) decreases
7.	If the resistance of the coil at 0^oC is 1 ohm and $\alpha = 0.004/^oC$, the resistance at 100^oC is ……	a) 1.4 ohm
8.	The current density has the unit …….	d) A m^{-2}
9.	The drift velocity acquired per unit electric field is called …….	d) mobility
10.	mho m^{-1} is the unit of ……	c) conductivity
11.	The resistivity of insulators is in the order of …….. Ωm.	a) 10^8 to 10^{14}
12.	In superconductors, the conductivity becomes …….	d) infinity
13.	The tolerance of silver, gold, red and brown rings in a carbon resistor are ……	b) 10%. 5%, 2%. 1%
14.	Four resistances 2Ω, 2 Ω, 4 Ω, 4 Ω are connected in series. The effective resistance is equal to …	a) 12 ohm
15.	Kirchoff's first law is a consequence of conservation of …….	b) charges
16.	Wheatstone's bridge principle is used in …….	d) Kirchoff's laws
17.	Kirchoff's second law is a consequence of conservation of …….	d) energy
18.	The colours of a carbon resistor are red, green and orange. The value of resistance is …….. kΩ	a) 25
19.	The balancing lengths are l_1 =30 cm and l_2 = 70 cm when the known resistance of 14 Ω is connected in the right gap of a metre bridge. The value of unknown resistance is ……	c) 6 ohm
20.	A lamp is operated at 240 V and the current is 0.25 A. The resistance value is …… ohm.	c) 960
21.	The balancing lengths are l_1 =510 cm and l_2 = 340 cm in a potentiometer experiment. The E_1 / E_2 is …	d) 3 / 2
22.	The instrument used for measuring electrical power is called ……	a) wattmeter
23.	The unit of electro chemical equivalent is ……..	b) kg / C
24.	In voltaic cell, the electrolyte is ……..	c) dil H_2SO_4
25.	In Leclanche cell, at the cathode due to oxidation, Zn atom is converted into ……. ions.	a) Zn^{++}
26.	In lead acid accumulator, during discharge the emf falls to about …….. volt.	c) 2
27.	The cell which is rechargeable is ……..	a) secondary cell
28.	The internal resistance of the secondary cells is ……	d) very low
29.	The mass of the substance liberated at an electrode is given by the equation ……..	a) m = z I t
30.	In Daniel cell, the emf value is …… volt.	c) 1.08
31.	Three resistors each of 2 Ω are connected in series with a cell of 12 V. P. d across each resistor is …	c) 4volt
32.	A 10 Ω resistor is connected in series with a cell of emf 10 V. A voltmeter is connected in parallel to the cell and it reads 9.9 V. The internal resistance of the cell is …… ohm.	a) 0.1
33.	The work done in moving a charge of 10 μ C between two points having a p.difference 100 V is ……	c) 10^{-3} joule.
34.	If a current of 10 A flows through a resistor 10 k Ω, the power is …….. watt.	b) 10^6
35.	The colour code numbers of yellow and grey in a carbon resistor are …….	b) 4 and 8
36.	The temp at which a normal conductor is converted into a super conductor is called …….	b)superconducting transition temperature
37.	The resistivity of copper is 2×10^{-8} Ωm. The conductivity of it is ……. mho m^{-1}	a) 5×10^7
38.	A copper wire of 10^{-6} m^2 area of cross-section, carries a current density 1.6×10^6 Am-2 and n = 8×10^{28} electrons / m^3. The drift velocity is equal to …… ms^{-1}.	a) 1.25×10^{-4}
39.	Two wires of same material and same length have resistances 16 Ω and 25 Ω. The ratio of the radii……	b) 5 / 4
40.	1 kWh is equal to …….. J.	a) 36×10^5
41.	The external energy necessary to drive the free electrons in a definite direction is called as ……..	d) electromotive force
42.	The rate of flow charges is called as ……	c) current
43.	The direction of flow of positive charges in a conductor is called as the ……..	c) conventional current
44.	An electron of charge **e** in an electric field **E** experiences a force ……...	a) F = E e
45.	The unit of mobility is …….	a) $m^2 V^{-1} s^{-1}$
46.	The quantity of charge passing per unit time through unit area is called as ……..	d) current density
47.	The resistivity of semiconductors is in the order of …… Ωm.	a) 10^{-2} to 10^4
48.	…… can be used as memory or storage elements in computers.	b) superconductors
49.	The temperature coefficient of resistance of alloys is ……..	d) very small
50.	Germanium and silicon are called as …….	c) semiconductors.

Best Wishes

Unit : 3 Effects of electric current — One mark test — Answer – key

1. The electric iron works on the principle of …… effect of current. — b) Joule's heating
2. The melting point of tungsten is …… ^{o}C. — c) 3380
3. Fuse wire has high resistance and …… melting point. — b) low
4. The thermo emf is maximum at a temperature called …… temperature. — a) neutral
5. The unit of Peltier coefficient is …… — c) volt
6. Thomson effect is zero for …… — d) lead
7. The unit of Thomson coefficient is …… — b) volt / ^{0}C
8. Thermopile is a device used to detect …… — c) thermalradiations
9. The equation for the magnetic induction at the centre of the current carrying circular ring is B =…… — a) $\mu_0 nI / 2a$
10. Tangent galvanometer works on the principle of …… — d) tangent law
11. The reduction factor of T.G. is given by the equation …… — c) $2aB_h / \mu_0 n$
12. The magnitude of Lorentz force is F = …… . — d) $Bqv \sin\theta$
13. The torque on a current carrying coil is maximum when the coil is… to the magnetic field. — a) parallel
14. The deflection per unit voltage is called ……sensitivity of a galvanometer. — b) voltage
15. An ideal voltmeter is which has …… resistance. — b) infinite
16. The product of the current and the loop area is called ……. — b) magnetic dipole moment
17. The value of the gyromagnetic ratio is …… C kg^{-1}. — a) 8.8×10^{10}
18. The magnetic field in a moving coil galvanometer is the …… magnetic field. — b) radial
19. The equation for force on a current carrying conductor in a magnetic field is F = …….. — d) BIl
20. Lawrence devised …… — a) cyclotron
21. For a given thermocouple, …… temperature is a constant — a) neutral
22. Peltier effect is the converse of …… effect. — c) Seebeck
23. In transformers, dynamos …… effect is undesirable. — d) Joule's heating
24. At the temperature of inversion, the thermo emf is …… — c) zero
25. Thermal energy may be used to produce an emf. This is called …… effect. — d) thermoelectric
26. Joule's law of heating is given by the equation H = …… — c) VIt
27. The alloy of nickel and chromium is called …… . — d) nichrome
28. The relation between the thermo emf and the temperature is V = …… — b) $\alpha\theta + \frac{1}{2}\beta\theta^2$
29. The amount of heat absorbed or evolved at one junction in Peltier effect is H = …… — b) πIt
30. Sn, Au, Ag, Zn, Cd, Sb show …… effect. — b) Positive Thomson
31. Bi, Ni, Pt, Co, Fe, Hg show …… effect. — a) Negative Thomson
32. Seebeck effect is a …… process. — b) reversible
33. The thermo emf produced in Bi- Ag thermo couple is …… Bi-Sb thermo couple. — b) smaller than
34. Peltier coefficient depends on pair of metals in contact and the …… of the junction. — c) temperature
35. The unit of the magnetic induction is …… — d) tesla
36. The magnetic induction due to infinitely long straight conductor carrying current is B = … — d) $\mu_0 I / 2\pi a$
37. Around a current carrying conductor magnetic field is associated. This was observed by… — b) Oersted
38. Tangent galvanometer is most sensitive for a deflection of ……. — b) 45^0
39. Tangent law is B = …… . — a) $B_H \tan\theta$
40. …… law can be written as $\int B \cdot dl = \mu_0 I_0$. — b) Ampere's circuital
41. When a charged particle moves in a circular path in a magnetic field, the time period is T = …… — c) $2\pi m / Bq$
42. The torque on a rectangular coil of wire in a magnetic field is …… — c) $nBIA \sin\theta$
43. The deflection per unit current is called …… sensitivity of a galvanometer. — a) current
44. The current sensitivity is given by (θ / I) = ……. — d) nBA / C
45. To convert a galvanometer in to an ammeter, a …… resistance is connected in parallel with the galvanometer. — a) low
46. To convert a galvanometer in to a voltmeter, a …… resistance is connected in series with the galvanometer. — c) high
47. Bohr magneton value is …… Am^2. — b) 9.27×10^{-24}
48. A current of 0.2 A flows through a circular loop of area 10 cm^2. The magnetic dipole moment is …… Am^2 — c) 2×10^{-4}
49. In TG, a current of 1A produces a deflection of 30^0. The current that produces a deflection of 60^0 is …… A — b) 3
50. The resistance of the tungsten wire of a 100W,220V bulb is …… ohm. — d) 484

Best Wishes

Unit : 4 Electro magnetic induction and Alternating currents Marks : 50

1. Lenz law is in accordance with the law of conservation of …… **b) energy**
2. The self inductance of a straight conductor is …… **b) zero**
3. The unit henry can also be written as …… **c) $V s A^{-1}$**
4. Transformer works on …… currents only. **b) alternating**
5. The part of the AC generator that passes the current from the coil to the external circuit is …… **d) brushes.**
6. The number of magnetic lines of forces crossing unit area in a magnetic field is magnetic …… **b) induction**
7. Electromagnetic induction was discovered by ……. **c) Michael Faraday**
8. Fleming's right hand rule is also called as …… rule. **d) generator**
9. The unit of self inductance is ……... **a) H**
10. The energy stored in an inductor is given by E = ……. **d) $\frac{1}{2} L I_o^2$**
11. The equation for the mutual induction of two long solenoids is M = …….. **a) $\mu_o N_1 N_2 A / l$**
12. The induced emf by changing the area enclosed by a coil in a magnetic field is e = ……. **b) – Blv**
13. When the plane of a coil is perpendicular to a magnetic field, the induced emf is ……. **c) zero**
14. AC generator is a device used for converting the mechanical energy into …….. **c) electrical energy**
15. If a number armature coils are used in the alternator, it is called as ……. alternator. **d) poly phase**
16. Electro magnetic brakes use …….. current **c) eddy**
17. Transformer works on the …… principle. **c) electromagnetic induction**
18. The ratio of the output power to the input power of a transformer is called …… **d) efficiency**
19. Eddy current losses are minimized by using a core made of …… an alloy of steel. **b) stelloy**
20. The frequency of AC used for domestic power in India is …….. **b) 50 Hz**
21. The average value of the AC over one complete cycle is …….. **a) 0**
22. The relation between I_{rms} and I_o is …… **a) $I_{rms} = I_o / \sqrt{2}$**
23. In an AC circuit containing R only, the phase difference between current and voltage is …… **a) 0**
24. The inductive reactance X_L is given by X_L = …… **a) L ω.**
25. A capacitor offers infinite resistance to …… current. **b) direct**
26. In RLC circuit, the instantaneous current is given by I = …… **a) Io Sin (ω t ± φ)**
27. The equation for Q factor is given by Q = …….. **c) 1 /R (√ L /C)**
28. The average power consumed over a complete cycle is P_{av} = **d) $E_{rms} I_{rms} \cos \varphi$**
29. Choke coil is used to control the current in an …… circuit. **b) AC**
30. Choke coils are used in …….. tubes which work on alternating currents. **c) fluorescent**
31. The reactance of an inductor is …… proportional to the frequency. **c) directly**
32. Shell type cores are used to minimize …… losses. **d) flux**
33. The number of magnetic lines of forces crossing a closed area is called magnetic …….. **a) flux**
34. The selectivity or sharpness of a resonant circuit is measured by the …… factor. **c) quality**
35. The ratio of the voltage across a coil or capacitor to the applied voltage is called as …… **b) quality factor**
36. For normal frequencies, the Q factor lies between ……... **c) 10 and 100**
37. For radio frequencies, air chokes are used. These chokes are called as …… chokes. **c) R F or H F**
38. Whenever there is a change in the magnetic flux linked with a closed circuit, an emf is induced in it. This phenomenon is called …….. **c) electromagnetic induction**
39. In Fleming's right hand rule, the middle finger points the direction of the …… **c) induced current**
40. The property of the coil which enables to produce an opposing induced emf in it when the current in the coil changes is called …… **b) self induction**
41. If two coils are wound on a soft iron core, the mutual induction is …… **d) very large**
42. The induced emf is given by the equation e = …… **a) Eo sin ωt**
43. In fans, …….. motors are used. **d) induction**
44. In step up transformers, the transformer ratio k is …… than one. **b) greater**
45. A power of 11kW is transmitted at 5.5kV through a transmission line of resistance 1 ohm. The power loss = …… **a) 4 W**
46. In an AC circuit with C only, the phase difference between the current and the voltage is …… **b) π / 2**
47. In an LCR circuit, at resonance, the impedance is ……. and the current is maximum. **a) minimum**
48. The rms value of the AC is …….. times the peak value of the alternating current. **c) 0.707**
49. The direction of the eddy current can be noted by …… **b) Lenz's law**
50. In a three phase AC generator, the emf's of the coils differ by ……... **a) 120^0**

Best Wishes

1.	Electromagnetic waves are discovered by ----------	b) J.C.Maxwell
2.	An accelerated charge is a source of ----------	a) electromagnetic radiation
3.	Electromagnetic waves are ---------- in nature.	c) transverse
4.	The relation between the velocity of light C, μ_0 and ε_0 is given by the relation C = ----------	a) $1 / \sqrt{\mu_0 \varepsilon_0}$
5.	Hertz produced electromagnetic waves of frequency ----------	b) 5×10^7 Hz
6.	Electromagnetic waves cover a wide range of ----------	c) wavelengths or frequencies
7.	Atoms and molecules in an electric discharge tube give ---------- rays.	c) UV
8.	The wavelength range of microwaves is ----------	a) 10^{-3} m - 0.3 m
9.	The frequency range of X rays is ----------	d) 3×10^{18} to 10^{16} Hz
10.	The frequency range of FM band is from ----------	b) 88 MHz to 108 MHz
11.	In Physiotherapy, ---------- lamps are used.	a) infra-red
12.	The wavelengths of the sodium emission lines are ---------- .	d) 5896 A° and 5890 A°
13.	The ---------- spectrum is used to identify the gas.	c) line
14.	Incandescent solids, carbon arc lamp etc. give ---------- spectrum.	a) continuous
15.	Using ---------- spectra, the molecular structure of the substance can be studied.	b) band
16.	The example of line absorption spectrum is ---------- spectrum.	a) solar
17.	The sun's outer layer is called ----------	d) chromosphere.
18.	The type of delayed fluorescence is called ----------	d) phosphorescence
19.	According to corpuscular theory, light energy is the kinetic energy of the ----------	d) corpuscles
20.	Huygens assumed that light waves are ---------- in nature.	a) longitudinal
21.	The energy of each photon is given by the equation ----------	b) $E = h\gamma$
22.	The scattering of sunlight by the molecules of the earth's atmosphere is called ----------	c) Rayleigh scattering
23.	The scattering of light by the colloidal particles is called ---------- effect.	b) Tyndal
24.	In industry, ---------- spectroscopy is applied to study the properties of the materials.	a) Raman
25.	The locus of the particles having the same state of vibration is called as ----------	c) wavefront
26.	A linear source of light will give rise to ---------- wavefront.	c) cylindrical
27.	---------- principle helps us to locate the position and the shape of the wavefront.	d) Huygen
28.	In reflection of light, the angle of incidence = the angle of ----------	c) reflection
29.	For total internal ---------- to take place, light must travel from denser medium to rarer medium.	c) reflection
30.	The equation of bandwidth of interference fringes is β = ----------	a) $\lambda D / d$
31.	An important application of interference in thin films is the formation of ---------- rings.	d) Newton's
32.	The radius of the nth dark ring equation is ----------	c) $r_n = (n R \lambda)^{1/2}$
33.	The amount of bending in diffraction depends on the ----------	d) wavelength of the incident wave.
34.	In Fresnel diffraction, the incident wavefront is either ----------.	c) spherical or cylindrical
35.	Using spectrometer, ---------- diffraction can be observed.	a) Fraunhofer
36.	The combined width of a slit and a ruling is called ----------	a) grating element
37.	In a plane diffraction grating, λ = ----------	b) $\sin\theta / Nm$
38.	The phenomenon of ---------- proves that light waves are transverse.	b) polarisation
39.	The plane perpendicular to the plane of vibration is called plane of ----------	b) polarisation
40.	A device that produces a plane ---------- light is called polariser.	a) polarized
41.	The angle of incidence at which the reflected beam is completely plane polarised is angle of ----	d) polarisation
42.	The equation for Brewster's law is μ = ----------	c) $\tan i_p$
43.	The polarising angle for glass is ----------	a) 57. 5°
44.	The pile of plates uses the polarisation by ---------- phenomenon.	c) reflection
45.	The double refraction phenomenon was discovered by ----------	a) Bartholinus
46.	Crystals like mica, topaz etc. having two optic axes are called ----------	c) biaxial crystals
47.	The refractive index for Canada balsam cement is ---------- for both the rays.	c) 1.550
48.	H polaroids use a thin film of ----------	b) polyvinyl alcohol
49.	Polaroids are used as ---------- glasses	d) sun
50.	In an EM wave, the angle between the electric and the magnetic field vectors are at ----------.	b) 90^0

Best Wishes

1. At atmospheric pressure, air and other gases are poor conductors of electricity.
2. Electric current may be passed through a gas by allowing X- rays to pass through them.
3. Electrons were discovered by J.J. Thomson .
4. A discharge tube is an arrangement to study the conduction of electricity through gases.
5. In a discharge tube, the potential difference applied between the two electrodes is 50,000 V.
6. In a discharge tube, the discharge of electricity through gases starts at a pressure of about 100 mm of Hg.
7. In a discharge tube, the positive column is produced at a pressure of about 10 mm of Hg.
8. In a discharge tube, Crooke's dark space is produced at a pressure of about 0.01 mm of Hg.
9. Cathode rays travel with a velocity up to $(1/10)^{th}$ of the velocity of light.
10. Canal rays were discovered by E. Goldstein in the year 1886.
11. In 1887, J.J. Thomson measured the specific charge of the cathode ray particles.
12. If V is the potential difference between the two plates and d is the distance between them, then $E = V/d$.
13. e / m value of the electron is 1.7592×10^{11} C kg^{-1}.
14. Millikan's experiment is used for the measurement of charge of an electron.
15. In Millikan's experiment, the potential difference applied between the two electrodes is 10,000 V.
16. The net downward force acting on the oil drop = $\frac{1}{3} \times 4\pi a^3 (\rho - \sigma) g$.
17. In Millikan's experiment, the charge of the electron $q = 6\pi\eta^{3/2}(v + v_1)[9v / 2(\rho - \sigma) g]^{1/2}$.
18. In Millikan's experiment, the charge value of the electron = 1.602×10^{-19} C.
19. The concept of atoms was proposed by Dalton.
20. Prout suggested that all elements are made up of atoms of hydrogen.
21. Atom is a sphere of positive charge in which the electrons are embedded. This was suggested by Thomson.
22. In the case of hydrogen atom, Thomson's model gives only one spectral line of about 1300A°.
23. The scattering of α particles provide useful information about the structure of the atom.
24. The diameter of the atom is about 10^{-10} m.
25. The diameter of the nucleus is about 10^{-14} m.
26. According to electromagnetic theory, an accelerated electric charge must radiate energy in the form of electromagnetic waves.
27. An electron revolving in the stationary orbit does not radiate any energy.
28. According to Bohr's quantization condition, the angular momentum of the electron = $nh / 2\pi$.
29. The radius of the nth orbit of the electron is proportional to the square of the principal quantum number.
30. Bohr radius value $r_1 =$ 0.53 A°.
31. The energy of the electron $E_n = -z^2me^4 / 8\varepsilon_0^2n^2h^2$.
32. 1 electron volt = 1.602×10^{-19} J.
33. Rydberg's constant value $R = 1.094 \times 10^7 m^{-1}$.
34. The spectral lines of Lyman series of hydrogen atom lie in the ultraviolet region .
35. The spectral lines of Balmer series of hydrogen atom lie in the visible region
36. The spectral lines of Paschen series of hydrogen atom lie in the infrared region .
37. The spectral lines of Brakett series of hydrogen atom lie in the infrared region .
38. The spectral lines of Pfund series of hydrogen atom lie in the infrared region .
39. The wavelengths of D_1 and D_2 lines of sodium are 5896 A° and 5890 A°.
40. The energy required to raise an atom from its normal state into an excited state is called excitation potential energy of the atom.
41. The value of ionization potential energy for hydrogen atom is 13.6 eV.
42. The fine structure of spectral lines can not be explained by Bohr's theory.
43. It is found that when electric or magnetic field is applied to the atom, each of the spectral line is split into several lines. These effects are called Stark and Zeeman effects.
44. According to Sommerfeld's atom model, for any principal quantum number *n,* there are *n* possible sub- shells, out of which one is circular and the remaining two are elliptical in shape.
45. X-rays were discovered by Roentgen.

…….. continued in Page - 2

Best Wishes

46. X-rays are electromagnetic waves of short wavelength in the range of 0.5 A° to 10 A°.
47. Roentgen was awarded Nobel prize in 1901 for the discovery of X- rays.
48. When fast moving electrons are suddenly stopped by a metallic target, X-rays are produced.
49. In Coolidge tube, a high potential of about 20 kV is applied between filament F and the target T.
50. X-rays are of two types : (i) Soft X-rays and (ii) Hard X-rays.
51. X-rays having wavelength of 4A° or above are called Soft X-rays.
52. X-rays having low wavelength in the order of 1A° are called Hard X-rays.
53. The penetrating power of hard X-rays is high.
54. When X-rays fall on certain metals, they liberate photoelectrons.
55. To detect and measure the intensity of the X-rays an ionization chamber is used.
56. Any plane containing an arrangement of atoms is known as a lattice or cleavage plane.
57. Laue experiment is used to produce diffraction in X-rays.
58. Bragg's law is $2d \sin\theta = n\lambda$.
59. Bragg's spectrometer is used to measure the wavelength of X-rays.
60. The minimum wavelength of the radiation emitted in continuous X-ray spectra is $\lambda_{min} = 12400A^o / V$
61. When an electron jumps from M shell to the K shell, it gives K_β line in the case of characteristic X-rays.
62. The frequency of the spectral line in the characteristic X-rays is directly proportional to the square of the atomic number of the element. This is called Moseley's law.
63. Moseley's law has led to the discovery of new elements like hafnium, technetium, promethium etc.
64. In normal population, the number atoms in the ground state is greater than the excited state.
65. If the number atoms in the ground state is lesser than the excited state, this called population inversion.
66. The life time of atoms in the excited state is normally 10^{-8} second.
67. The life time of atoms in the metastable state is normally 10^{-3} second.
68. A ruby is a crystal of Al_2O_3, in which of Al^{+3} ions are replaced by Cr^{+3} ions.
69. The wavelength of green colour is 5500 A°.
70. The wavelength of red colour is 6943 A°.
71. He-Ne laser system consists of a quartz discharge containing helium and neon in the ratio of 1 : 4 at a pressure of about 1mm of Hg.
72. The energy of the emitted photon in the He-Ne laser system 6328 A°.
73. The beam that is used in endoscopy is the laser beam.
74. The beam that is used in holography is the laser beam.
75. The maser action is based on the principle of population inversion followed by stimulated emission.
76. The paramagnetic ions are used as maser materials.
77. Practical maser materials are often chromium or gadolinium ions doped as impurities in ionic crystals.
78. Maser is used in molecular spectroscopy.
79. In optical fiber, semiconductor laser is used.
80. The ratio of the radii of the first three orbits of an atom is 1 : 4 : 9
81. The cathode rays are a stream of electrons.
82. According to Bohr's postulates angular momentum quantity take discrete values.
83. For hydrogen atom, the minimum energy required to remove an electron from the first orbit to the outermost orbit is 13.6 eV.
84. According to Rutherford atom model, atoms will give only continuous spectrum.
85. The elliptical orbits of electron in the atom were proposed by Sommerfeld
86. X ray is the phenomenon of conversion of kinetic energy into radiation.
87. The chromium ions doped in the ruby rod absorbs green light.
88. Canal rays travel slower than the cathode rays.
89. The spectra of alkali metals such as K, Na etc cannot be explained by Sommerfeld atom model.
90. In laser, all the photons are in phase with each other.

Best Wishes

***** Best of luck. *****

1.The emission electrons from the metal surfaces when the electromagnetic radiations fall on them is called **photoelectric effect.**
2.Photoelectric effect phenomenon was discovered by **Hertz.**
3.Hallwachs experiment set-up is used to study **photoelectric** effect.
4.Photoelectric current is **directly** proportional to the number of photoelectrons emitted per second.
5.The minimum negative potential given to the anode for which photoelectric current becomes zero is **cut-off (stopping) potential.**
6.If **m** is the mass of the photoelectron and v_{max} is the velocity, then the kinetic energy of the electron is $\frac{1}{2} m v_{max}^2$
7.The stopping potential depends upon the **velocity** of the fastest electron.
8.For a given frequency of the incident radiation, the stopping potential is **independent** of its intensity.
9.The minimum frequency of the incident radiation below which the photoelectric effect is not possible is called **threshold frequency**.
10.Photoelectric emission is an **instantaneous** process.
11.The maximum kinetic energy of the photoelectrons is **directly** proportional to the frequency of incident radiation
12.The electromagnetic theory of light could not explain **photoelectric effect.**
13.According to the quantum theory, light is emitted in the form discrete bundles of energy called **photons.**
14.The energy of the photon is $E = h\gamma$
15.In the phenomenon interference, the photon behaves like a **wave.**
16.In the phenomenon like emission, the photon behaves like a **particle.**
17.In 1905, Einstein, successfully applied **quantum** theory to photoelectric effect.
18.The energy spent in releasing the photoelectrons from a metal surface is called **photoelectric work function.**
19.Einstein's photoelectric equation is $h\gamma - h\gamma_0 = \frac{1}{2} m v_{max}^2$
20.The photoelectric cell is a device which converts light energy into **electrical** energy.
21.Caesium oxide has **low** work function to give large number of photoelectrons.
22.The three types of the photoelectric cells are **photo emissive , photo voltaic , photo conductive cells.**
23.Photoelectric cells are used to reproduce sound in **cinematography .**
24.Photoelectric cells are used to control the temperatures of **furnaces.**
25.Photoelectric cells are used to study the spectra and the temperatures of **stars.**
26.In opening and closing of doors **photoelectric** cells are used.
27.In burglar and fire alarms **photoelectric** cells are used.
28.Matter in motion must be accompanied by waves called **de Broglie waves**.
29.The de Broglie wavelength of the de Broglie waves is $\lambda = h / mv$.
30.The de Broglie wavelength of the de Broglie waves is $\lambda = 12.27 A^0 / (V)^{1/2}$
31.The stationary orbits of electrons are those in which orbital circumference($2\pi r$) is an integral multiple of **de Broglie wavelength .**
32.The electron microscope is used for **magnifying** small objects.
33.The resolving power of the microscope is limited by the **wavelength** of the radiation.
34.In an electron microscope, electrons are accelerated by a potential difference of about **60,000** .volt.
35.The wavelength of the electron beam is about 5×10^{-12} m.
36.The wavelength of the electron beam is 10^5 times smaller than that of the visible light.
37.In medicine and biology, the electron microscope is used study **virus and bacteria.**
38.Structure of crystals can be studied using **electron** microscope.
39.In Einstein's view, there is no absolute space and all motions are **relative.**
40.The special theory of relativity was profounded by **Einstein.**
41.In classical mechanics, the mass of the body is absolute and **constant.**
42.A system of co-ordinate axes which defines the position of a particle in two or three dimensional space is called **frame of reference**.
43.When the bodies in a frame of reference obey Newton's law of inertia, the frame is called **inertial frame of reference**.
44.When the bodies in a frame of reference do not obey Newton's law of inertia, the frame is called **non - inertial frame of reference.**
45. The simplest frame of reference is the **Cartesian** co-ordinate system in which the position of a particle is specified by 3 co-ordinates.
46.The velocity of light in free space is a **constant** in all frames of references.
47.A circular object will appear as an **ellipse** for a fast moving observer.
48.The clocks in the moving space ships will appear to go **slower** than the clocks on the earth.
49.The relation between the mass at rest (m_0)and the mass of the same body moving with velocity v as $m = mo / (\sqrt{1 - v^2/c^2})$.
50.Einstein's mass – energy equivalence is given by $E = mc^2$.

Best Wishes

1.	The atomic nucleus was discovered by …… in 1911.	Earnest Rutherford
2.	Protons and neutrons inside the nucleus are called …….	nucleons.
3.	The mass of the proton is …… times greater than the mass of the electron.	1836
4.	The total number of protons and neutrons is called …… number.	mass
5.	The total number of protons or the total number of electrons is called …… number.	atomic
6.	The atoms of the same element with same atomic number but different mass number are called ……..	isotopes.
7.	The isotopes have different number of ……	neutrons.
8.	The ……. have identical chemical properties.	isotopes
9.	The atoms of different elements with same mass number but different atomic number are called ……..	isobars.
10.	$_8O^{16}$, $_7N^{16}$ are called …….	isobars.
11.	The isotones of different elements have same number of ……. Examples are $_8O^{16}$, $_6C^{14}$	neutrons
12.	The empirical formula for the nuclear radius is …….	$R = r_o A^{1/3}$.
13.	One fermi = ……..	10^{-15} m
14.	The mass of one nucleon is approximately …….. kg.	1.67×10^{-27}
15.	The nuclear density value is ……...	1.816×10^{-17} kg m^{-3}
16.	The charge value one proton is ……. C.	1.602×10^{-19}
17.	One twelfth of the mass of the carbon atom ($_6C^{12}$)is called ……	1 atomic mass unit
18.	1 amu = ……. kg .	1.66×10^{-27}
19.	The mass of one proton = …….. amu.	1.007276
20.	The mass of one neutron = ……. amu.	1.008665
21.	1 eV = …….. J.	1.6×10^{-19}
22.	The energy equivalent of 1 amu is ……..	931 MeV.
23.	The binding energy = …….. X C^2.	mass defect
24.	In BE / A curve, for A < 20, there exists peaks to those nuclei whose mass numbers are multiples of ……	four.
25.	Binding energy per nucleon of the iron nucleus is …….	8.8 MeV
26.	BE/A is about …… for nuclei having mass numbers ranging between 40 and 120.	8.5 MeV
27.	BE/A is about …… for uranium.	7.6 MeV
28.	Mass spectrometer is used to find ……..	isotopic masses
29.	In Bainbridge mass spectrometer, ……. arrangement selects ions of a particular velocity	velocity selector
30.	The force between the nucleons is called ……..	nuclear force
31.	Nuclear force is …… times stronger than the gravitational force.	10^{40}
32.	Nuclear force is strong between nucleons which are less than …… m.	10^{-15}
33.	Nuclear force is due to the continuous exchange of the particles called ……	mesons.
34.	Radioactivity was discovered by …… in the year 1896.	Henri Becquerel
35.	Radium and polonium were discovered by …….	Marie Curie and Piere Curie
36.	The phenomenon of spontaneous emission of α . β , γ rays by elements having atomic number greater than 82 is called ……	radioactivity.
37.	…….. is unaffected by any external agent like pressure, temperature and electric, magnetic fields.	Radioactivity
38.	An α particle is a ……. nucleus.	helium
39.	The ionising power of α rays is …… times greater than the β rays.	100
40.	The displacement laws were framed by …….	Soddy and Fajans
41.	Radium is converted into radon in the ……. decay.	α
42.	In β decay , the atomic number increases by ……..	one .
43.	Theoretically, an …… time is needed for the disintegration of all the radioactive atoms.	infinite
44.	The relation between half life period and the decay constant is …….	$T = 0.6931 / \lambda$.
45.	The mean life period is …… proportional to the decay constant.	inversely
46.	The rate at which the radioactive atoms decay is called ……..	activity.
47.	1 becquerel = ……...	1 disintegration / second
48.	The activity of a radioactive substance is generally expressed in ……	Curie (3.7×10^{10} disintegration / second)
49.	Neutron was discovered by ……..	Chadwick.
50.	$_4Be^9 + \ldots\ldots \rightarrow {}_6C^{12} + {}_0n^1$	$_2He^4$

…….. Continued in Page – 2

Best Wishes

51. Neutrons are the constituent particles of all nuclei, except …… **hydrogen.**
52. The half life period of an isolated neutron is ……. **13 minutes.**
53. The energy of a slow moving neutron is …… **0 to 1000 eV.**
54. The energy of a fast moving neutron is …… **0.5 MeV to 10 MeV.**
55. Induced radioactivity was discovered by ……. in the year1934. **Irene Curie and F. Joliot**
56. Positron is emitted only in …… radioactivity. **induced or artificial**
57. The half life period of $_{7}N^{13*}$ is …… minutes. **10.1**
58. The half life period of $_{15}P^{30*}$ is ……. minutes. **3**
59. Radio-isotopes can be obtained using the particle accelerator like …….. **Cyclotron.**
60. Co^{60*} is used in the treatment of …… **cancer.**
61. Na^{24*} is used in the treatment of ……. **checking blood circulation.**
62. I^{131*} is used in the treatment of …… **Thyroid glands.**
63. Fe^{59*} is used in the treatment of …… **anaemia.**
64. P^{32*} is used in the treatment of …….. **skin diseases.**
65. The ratio of C^{14} and C^{12} atoms in atmosphere is …….. **$1 : 10^{6}$.**
66. The half life period of the radio – carbon is …… **5570 years.**
67. The genetic damage is caused by …… rays. **gamma**
68. If the radiation exposure is …… it may cause diseases like leukemia. **100 R**
69. If the radiation exposure is …….. , it causes death. **600 R**
70. Safe limit of receiving the radiations is ……... **250 mR per week**
71. The intensity of the radioactive radiation is measured by the device …….. **Geiger Muller counter.**
72. The most probable mass numbers of the fission fragments lie between …… **95 and 140.**
73. When $_{92}U^{235}$ is bombarded with a neutron , the value of the energy released is …… **200 MeV.**
74. Niels Bohr and John A. Wheeler explained the nuclear fission by …….. model. **liquid drop**
75. Natural uranium consists of …….. of U^{238} and …….. of U^{235}. **99.28 %, 0.72 %**
76. Atom bombs were exploded over …….. in Japan. **Nagasaki and Hiroshima**
77. Synchrocyclotron can accelerate particles to an energy of the order of …… **10^{9} eV.**
78. In PHWR , ……. is used as fuel. **uranium oxide**
79. The energy value of the thermal neutrons is …… **0.025 eV.**
80. Cadmium or boron rods are called as …… rods. **control**
81. A mixture of beryllium with plutonium is used as a source of ……. **neutrons.**
82. The boiling point of liquid sodium is ……... **1000 ^{0}C.**
83. The name of the nuclear reactor in Kalpakkam is …… **Kamini.**
84. The total power generation by all the operating power reactors is …….. **2770 MW.**
85. The process of combining two or more number lighter nuclei to form a heavy nucleus is …….. **nuclear fusion.**
86. The principle involved in hydrogen bomb is …….. **nuclear fusion.**
87. The energy radiated per second by the sun is …….. **3.8×10^{26} J**
88. In sun , hydrogen and helium are in a state called ……. **plasma.**
89. In proton – proton cycle fusion, the energy released is in the order of …….. **26.7 MeV.**
90. The study of cosmic rays started with …… experiment. **gold leaf electroscope**
91. The intensity of cosmic rays is ……. at the equator. **minimum**
92. The intensity of cosmic rays is maximum at the height of ……. km. **20**
93. In pair production, the particles produced are …….. **electron and positron.**
94. The name cosmic rays was given by …….. **Millikan.**
95. The energy of the primary cosmic rays is in the order of ……. **10^{8} eV.**
96. The quantum of radiation with no charge and no mass is called ……. **photon .**
97. The rest mass of …… vary between 250 mp and 1000 mp. **mesons**
98. The rest mass of the hyperons vary from ……..... **2180 m_e to 3275 m_e.**
99. $_{1}H^{3} + _{1}H^{2} \rightarrow _{2}He^{4} + \ldots\ldots + \text{energy}$. **$_{0}n^{1}$**
100. In GM counter, the potential difference of about …... is applied through a high resistance of 100 mega ohm. **1000 V**

Best Wishes

Unit : 9 Semiconductor devices and their Applications Answer Key Marks : 120

1. Germanium and Silicon are most widely used as **semiconductor.**
2. The resistivity of a semiconductor lie approximately between **10^{-2} and 10^{4} Ωm** at room temperature.
3. A set of closely packed energy levels is called an **energy band**.
4. Each silicon atom has **14** electrons.
5. The subshell 3p can accommodate a total of **6** electrons.
6. The electrons in the outermost level are called **valence** electrons.
7. The energy gap between the valence band and the conduction band is called **forbidden energy gap**.
8. In insulators, the forbidden energy gap is more than **3 eV**.
9. In glass, the forbidden energy gap is in the order of **10 eV** at 0 K.
10. The resistivity of insulator approximately lies between **10^{11} and 10^{16} Ωm**.
11. The forbidden energy gap is of the order of **0.7 eV** for Germanium.
12. The forbidden energy gap is of the order of **1.1 eV** for Silicon.
13. The conductivity of a semi conductor is of the order of **10^{2} mho / m .**
14. The forbidden energy gap is of the order of **zero** eV for conductors.
15. A semiconductor in the purest form is called **intrinsic semiconductor.**
16. In a pure Germanium semiconductor, the number of valence electrons is **four.**
17. In intrinsic semiconductors, the electrons and the holes move in the **opposite** directions.
18. The process of addition of a very small amount of impurity into an intrinsic semiconductor is called **doping.**
19. When a small amount of impurity atoms are added to a pure semiconductor, semiconductor formed is **extrinsic semiconductor**
20. The valency bismuth, antimony, phosphorus etc is **five.**
21. The valency of aluminium, gallium, boron etc is **three.**
22. If arsenic is added to a pure germanium, the resulting crystal is called **P-type semiconductor**.
23. If boron is added to a pure germanium, the resulting crystal is called **N-type semiconductor**.
24. In N-type semiconductor , **electrons** are the majority charge carriers.
25. In P-type semiconductor, **holes** are the majority charge carriers.
26. The region which does not have any mobile charges very close to the PN junction is called **depletion region.**
27. In a PN junction diode, the potential barrier is approximately **0.7 V** for a silicon PN junction.
28. In a PN junction diode, the potential barrier is approximately **0.3 V** for a germanium PN junction.
29. In a PN junction diode forward bias, the potential barrier is **reduces**.
30. In a PN junction diode reverse bias, the potential barrier is **increases.**
31. In a PN junction diode forward bias, the current is of the order of **m A** .
32. In a PN junction diode reverse bias, the current is of the order of **μ A**.
33. The circuit symbol for a semiconductor diode is --------►I-------
34. In a PN junction diode forward bias, V / I is not a **constant.**
35. The conversion of AC into DC is called **rectification**.
36. A circuit which rectifies half of the a.c wave is called **half –wave** rectifier.
37. The ratio of the d.c power output to the a.c power input is known as rectifier **efficiency.**
38. The efficiency of a half wave rectifier is approximately **40.6 %**
39. The efficiency of a bridge rectifier is approximately **81.2 %**
40. There are two mechanisms which give rise to the breakdown of a PN junction under reverse bias condition. They are (i) **Avalanche** breakdown and (ii) **Zener** breakdown.

Continued……. Page - 2

Best Wishes

41. The reverse biased heavily doped semiconductor PN junction diode, which is operated in the breakdown region is called **Zener diode.**
42. In a Zener diode, at a particular reverse bias voltage called **zener or breakdown voltage**, the current increases enormously.
43. A forward biased PN junction diode which emits visible light when energized is called **LED**.
44. In instrument displays, calculators and digital watches **LEDs** are used.
45. In a junction transistor, the thickness of the base layer is about **25 microns**.
46. In a junction transistor, the **emitter** region is heavily doped.
47. In a junction transistor, the **collector** region physically larger in size.
48. In a junction transistor, the emitter – base junction is **forward** biased.
49. In a junction transistor, the collector – base junction is **reverse** biased.
50. In a CB mode transistor circuit, the current gain $\alpha = I_C / I_E$.
51. In CE mode transistor circuit, the current gain is given by $\beta = I_C / I_B$.
52. The value of α lies between **0.95** and **0.99**.
53. Usually β lies between **50** and **300**.
54. The relation between α and β is $\beta = \alpha / (1 - \alpha)$.
55. In a transistor, the ratio between emitter-base potential and base current is called **input impedance**..
56. In the output characteristics, the region below the curve for $I_B = 0$ is called **cut-off** region.
57. In a transistor, the ratio between emitter-collector potential and collector current is called **output impedance**
58. In a transistor, the ratio between collector current and the base current is called **the current gain**.
59. A circuit capable of magnifying the amplitude of weak signals is called **amplifier**.
60. There is always a phase reversal of **180^0** between the input and the output voltages in CE amplifier.
61. β of a transistor is very **sensitive** to temperature changes.
62. In an amplifier, the ratio of the output and the input voltages is called **voltage gain**.
63. The frequency response curve gives the relation between **frequency and the voltage.**
64. The frequency interval between lower cut off and upper cut off frequencies is called **band width** .
65. When a fraction of the output signal is combined with the input, **feed back** is said to exist in an amplifier.
66. If the magnitude of the input signal is reduced by the feedback, the feedback is called **negative feedback .**
67. If the magnitude of the input signal is increased by the feedback, it is called **positive feedback .**
68. The voltage gain of the amplifier with feedback $A_f = A/(1 - \beta A)$.
69. The term $A\beta$ is called **loop gain** and β is called **feedback ratio**.
70. The circuit which converts energy from d.c source into a periodically varying output is called **oscillator**.
71. Two types of oscillators are (i) **sinusoidal** and (ii) **non-sinusoidal**.
72. If an oscillator generates a rectangular wave, it is called **non-sinusoidal** oscillator.
73. In a tank circuit, the frequency of oscillation is given by $f = 1 / 2\pi\sqrt{LC}$.
74. In Colpitt's oscillator, the total phase shift between the input and output is **360^0**.
75. In Colpitt's oscillator, the frequency of oscillation is given by $f = 1 / 2\pi\sqrt{LC}$
76. Diodes and transistors are called **active** elements.
77. Resistors and capacitors are called **passive** elements.
78. ICs are broadly classified as **digital** ICs and **linear** ICs.
79. Circuits which are used to process digital signals are called **digital circuits**.
80. If the signal current is in the form of continuous, time varying current, the signal is called **continuous or analog signals**.

Continued…… Page - 3

Best Wishes

81. In an unipolar transistor, only **majority** carriers are involved in the operation.
82. In a bipolar transistor **majority** and **minority** carriers are involved in the operation.
83. The basic element in TTL circuit is the **bipolar** transistor.
84. The Boolean equation of a OR gate is **$y = A + B$**
85. The Boolean equation of a AND gate is **$y = A.B$**
86. The Boolean equation of a NOT gate is **$y = \bar{A}$**
87. The Boolean equation of a Ex - OR gate is ……..
88. The Boolean equation of a NOR gate is ……..
89. The Boolean equation of a NAND gate is …….
90. The NAND and NOR gates are called **universal gates**.
91. First De Morgan's theorem is ……..
92. Second De Morgan's theorem is ……..
93. OP-AMP consists of **20** transistors, **11** resistors and **1** capacitor.
94. In an inverting amplifier, the output voltage V_{out} = **$-(R_f / R_{in}) V_{in}$** .
95. In a non- inverting amplifier, the output voltage V_{out} **$= (1 + R_f / R_{in}) V_{in}$**.
96. In a summing amplifier, the output voltage V_{out} = **$-(v_1 + v_2)$**.
97. In a difference amplifier, the output voltage V_{out} = **$(v_1 - v_2)$**.
98. The property of the cathode rays being deflected by **electric and magnetic fields** used in CRO.
99. If the emitter current is 1 mA, then the collector current is approximately equal to **1 mA .**
100. The unit of current gain and out impedance are **no unit** and **ohm** respectively.
101. Multimeter is used to measure **voltage, current and resistance**.
102. Multimeter is also called as **AVO** meter.
103. To measure AC voltage and current, a **rectifier** unit is connected in series.
104. In a CRO the inner surface where the electron beam strikes is coated with **graphite**.
105. The active and passive elements in an electronic circuit can be tested using **CRO and Multimeter**.
106. The summing amplifier provides an output voltage equal to the algebraic sum of the **input voltages**.
107. OP-AMP is a solid state device capable of **sensing and amplifying** dc and ac input signals.
108. $(\bar{A} + B)(A + B) =$ **B**.
109. $A.\bar{A} =$ **0**.
110. $A+B = B+A$ & $AB = BA$ are **Commutative laws**.
111. $A + (B+C) = (A+B) + C$ & $A(BC) = (AB)C$ are called **Associative laws**.
112. Distributive law is **$A(B+C) = AB + AC$.**
113. In an LC oscillator, the feedback circuit provides **positive feedback**.
114. If $A\beta = 1$ and the net phase shift round the loop is 0^0 or integral multiples of 2π , these are called as **Barkhausen** conditions for oscillations.
115. Multivibrator is an example of **non-sinusoidal** oscillator.
116. In an amplifier, the voltage gain A = V0 / Vi. The gain A is often called as **open-loop** gain.
117. The most commonly used methods of obtaining transistor biasing are **i) base bias ii) base bias with emitter feedback iii) base bias with collector feedback and voltage divider bias**.
118. NOT gate is often called as an **inverter.**
119. In switching operations **transistors** are used.
120. The common emitter configuration has high input impedance, low output impedance and higher current gain when compared with **common base configuration**.

@@@@@ Best Wishes @@@@@

Best Wishes

Unit :10 Communication Systems **Answer Key** **Marks : 100**

1. Sending, receiving and processing of information electronically is called ***communication***.
2. In 1840's, communication started with ***telegraphy***.
3. Radio communication was made possible by the invention of the ***electronic valves***.
4. Radar, telemetry and satellite links play vital role in ***navigation, defence, scientific research*** etc.
5. For communication purposes, ***radio waves*** and ***microwaves*** are used.
6. Electromagnetic waves of Very High Frequencies (VHF) have a frequency range ***30 – 300 MHz***.
7. EM waves of Ultra High Frequencies (UHF) have a frequency range ***300 MHz – 3 GHz*** and wavelength range ***$1 – 10^{-1}$ m***.
8. The radio waves which travel along the surface of the earth are called ***ground or surface waves***.
9. Ground wave propagation is used only for ***medium and long wave signals***.
10. Radio waves propagated through the troposphere of the earth are known as ***space waves***.
11. The portion of the earth's atmosphere which extends upto 15 km from the surface of the earth is called ***troposphere***.
12. Space wave propagation is particularly suitable for the waves having frequencies above ***30 MHz***.
13. The ionised region containing free electrons, positive and negative ions in the earth's atmosphere is called ***ionosphere***.
14. Long distance radio communication is possible through the ***sky wave propagation***.
15. The refractive indices of the various layers in the ionosphere vary with respect to ***electron density*** and ***frequency*** of the incident wave.
16. In the sky wave propagation, for a fixed frequency, the shortest distance between the point of transmission and the point of reception along the surface is known as ***skip distance***.
17. The region between the point where there is no reception of ground waves and the point where the sky wave is received first is known as ***skip zone***.
18. In the skip zone, there is ***no reception*** at all.
19. The audio frequency ranges from ***20 – 20000 Hz***.
20. The process of changing amplitude or frequency or phase of the carrier wave (RF wave) in accordance with the intensity of the signal wave (AF wave) is called ***modulation***.
21. The process of changing amplitude of the carrier wave in accordance with the intensity of the signal wave is called ***amplitude modulation***.
22. The ratio of the amplitude change of the carrier wave after modulation to the amplitude of the carrier wave before modulation is called ***modulation factor***.
23. Signal amplitude / carrier amplitude is called as ***modulation factor***.
24. The strength and the quality of the transmitted signal can be determined by the ***modulation factor***.
25. When the modulation factor is ***less than one***, the transmitted signal will not be very strong.
26. When the modulation factor is greater than one, ***distortion*** is produced in the transmitted signal.
27. For effective modulation, the degree of modulation should never exceed ***100%***.
28. A carrier wave may be represented by $e_c = E_c \cos \omega_c t$.
29. The modulating signal may be represented by $e_s = E_s \cos \omega_s t$.
30. In AM, the component having a frequency greater than that of the carrier wave is called as the ***Upper Side Band***.
31. In AM, the component having a frequency lesser than that of the carrier wave is called as the ***Lower Side Band***.
32. The magnitude of both the upper and lower side bands is ***m /2*** times the carrier amplitude E_c .
33. In an AM wave, the ***bandwidth*** is from ($\omega_c - \omega_s$) to ($\omega_c + \omega_s$) i.e. twice the signal frequency.
34. The difference between maximum frequency of USB and the minimum frequency of the LSB is called the ***channel width***.
35. The channel width = ***2*** X maximum frequency of the modulating signal.

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36. In an AM wave, the reception is generally ***noisy***.
37. The efficiency of AM wave is ***low***.
38. The messages cannot be transmitted over long distances in ***AM wave***.
39. The process of changing frequency of the carrier wave in accordance with the intensity of the signal wave is called ***frequency modulation***.
40. The frequency of the FM transmitter without signal input is called ***the rest or centre frequency***.
41. The change or shift either above or below the resting frequency is called ***frequency deviation***.
42. Carrier swing = 2 X ***frequency deviation***.
43. FM receiver gives ***noiseless reception***.
44. A much wider channel is required by ***FM***.
45. The process of changing phase of the carrier wave in accordance with the intensity of the signal wave is called ***phase modulation***.
46. The phase modulation generally uses a ***smaller*** bandwidth than FM.
47. The centre frequency is extremely stable in ***phase*** modulation.
48. A modulator performs the process called ***modulation***.
49. Frequency modulated systems are operated usually at a frequency above ***40 MHz***.
50. The difference between oscillator frequency and radio frequency is called as ***intermediate*** frequency.
51. In a superheterodyne receiver, the output from the mixer will have a frequency of ***455*** kHz.
52. In television, usually sound signals are ***frequency*** modulated and picture signals are ***amplitude*** modulated.
53. A television camera converts the light energy into ***electrical energy***.
54. A blanking pulse is a high negative potential applied to the ***control grid*** of the electron gun.
55. The horizontal scanning frequency is as ***the number of lines scanned per sec***.
56. In a 625 line system, transmitting 25 frames per second, the horizontal scanning frequency is ***15,625*** Hz.
57. In a 625 line system, transmitting 25 frames per second, time taken to scan one line is ***64 μ s***.
58. Video signals upto about ***5 MHz*** are allowed in CCIR mode.
59. The system which uses radio waves to detect and to fix the position of targets at a distance is called as ***RADAR***.
60. Radar works on the principle of ***radio echoes***.
61. Air and sea navigation is made entirely safe with ***radar*** installations.
62. Radar systems are used for the safe landing of ***air crafts***.
63. An analog signal is a continuously varying ***voltage*** or ***current***.
64. The greatest technical problem with an analog communication system is ***noise***.
65. A digital system requires larger ***bandwidth***.
66. The name ***modem*** is the abbreviation of the term Modulator and Demodulator.
67. The device that is used to convert digital signals into analog signals capable of being transmitted over telephone lines is called as ***modem***.
68. The electronic system for transmitting graphical information by wire or radio is called as ***Fax or Facsimile***.
69. The types of wire and cable used in data communications are (a) ***twisted pair*** (b) ***multiconductor flat cable*** and (c) ***coaxial cable.***
70. Coherent light can be generated with ***laser*** or by ***LED***s.
71. Coherent light can be detected by ***photo – diodes***.
72. The principle of ***total internal reflection*** is used for the transmission of light signals through an optical fiber.
73. The people over world watch international events like Olympic games via ***satellite***.
74. The angular velocity of the geostationary satellite around the earth is equal to the angular velocity of ***the earth***.
75. Satellite orbiting the earth will be geostationary when it is about ***36,000*** km away from the earth.

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76. The downlink frequencies are kept different from the uplink frequencies in order to avoid ***interference***.
77. The downlink frequencies are kept different from the uplink frequencies by ***2 GHz***.
78. The frequency of the crystal controlled oscillator is kept constant by ***Buffer*** which separates RF power amplifier from the oscillator.
79. The superheterodyne receiver will have maximum stability, selectivity and ***sensitivity***.
80. Vidicon camera tube is a ***television*** camera tube.
81. For scanning a picture, the three synchronising pulses that are used are ***line, frame and blanking pulses***.
82. The propagation of EM waves depend on the properties of ***the waves*** and the ***environment***.
83. Radio waves ordinarily travel in ***straight lines***.
84. The advantages of amplitude modulation are ***i) easy transmission and reception*** ***ii) lesser bandwidth requirements*** ***iii) low cost***.
85. The efficiency of ***FM*** transmission is very high.
86. The two sections of amplitude modulated transmitter are ***i) AF section*** **and** ***ii) RF section***.
87. The ***buffer*** amplifier isolates the RF power amplifier from the oscillator. This arrangement keeps the frequency of the crystal controlled oscillator as a constant.
88. The phase modulation is essentially a **frequency** modulation.
89. In FM transmitter, ***pre-emphasis*** network makes all the frequencies in the modulating signal to have equal power.
90. Simple radio receiver circuit has ***i) poor sensitivity*** and ***ii) poor selectivity***.
91. For FM receivers, the IF is ***10.7 MHz***.
92. Television literally means ***seeing at a distance***.
93. The transmitter and receiver switch in a radar is called as ***duplexer***.
94. In a radar, the ***transmitter*** generates periodic pulses of very short duration.
95. The **bit** is a contraction of the term ***binary digit***.
96. High frequency waves follow ionospheric propagation.
97. In ***phase*** modulation, both the phase and the frequency of the carrier wave varies.
98. The printed documents to be transmitted by fax are converted into electrical signals by the process ***scanning***.
99. The purpose of dividing each frame into two fields so as to transmit 50 views of the picture per second is to avoid ***flicker in the picture***.
100. The RF channel in a radio transmitter produces high frequency ***carrier waves***.

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******* Best wishes *******