HIGHER SECONDARY – SECOND YEAR
PHYSICS
IMPORTANT QUESTIONS & PROBLEMS

UNIT : 1, ELECTROSTATICS

2 Marks Questions

1. State Coulomb's law in electrostatics.
2. Define one coulomb (1 C).
3. Give the vector form of Coulomb's law.
4. Two electric field lines never intersect each other. Why?
5. What is called electric dipole? Give an example.
6. Define electric dipole moment. Give its unit.
7. Define electrostatic potential. Give its unit.
8. Define equi-potential surface.
9. Define electrostatic potential energy.
10. Define electric flux. Give its unit.
11. State Gauss law.
12. Define electrostatic shielding.
13. During lightning, it is safer to sit inside bus than in an open ground or under tree. Why?
14. What are called non-polar molecules? Give examples.
15. What are called polar molecules? Give examples.
16. Define action of point or corona discharge.

3 Marks Questions

1. Discuss the basic properties of electric charge.
2. List the properties of electric field lines.
3. Derive an expression for torque experienced by an electric dipole placed in the uniform electric field.
4. Obtain an expression electric potential at a point due to a point charge.
5. Derive an expression for capacitance of parallel plate capacitor.
6. Derive an expression for energy stored in capacitor.
7. Give the applications and disadvantage of capacitors.
8. Write a note on microwave oven.
9. Obtain Gauss law from Coulomb's law.

5 Marks Questions

1. Calculate the electric field due to a dipole on its axial line.
2. Calculate the electric field due to a dipole on its equatorial line.
3. Derive an expression for electro static potential due to electric dipole.
4. Obtain an expression for electric field due to an infinitely long charged wire.
5. Explain in detail the effect of dielectric placed in a parallel plate capacitor when the capacitor is disconnected from the battery.
6. Derive the expression for resultant capacitance, when capacitors are connected in series and in parallel.
7. Explain in detail the construction and working of Van de Graff generator.

UNIT : 2, CURRENT ELECTRICITY

2 Marks Questions

1. Define drift velocity.
2. Define mobility.
3. Define current density. Give its unit.
4. Current is a scalar quantity. Why?
5. What are the factors that the resistances depend on?
6. Define resistivity of the material. Give its unit.
7. Distinguish electric energy and electric power.
8. Prove that the expression for power in an electrical circuit is P = VI.
9. State Kirchhoff's first law (current rule or junction rule).
10. State Kirchhoff's second law (voltage rule or loop rule).
11. State Joule's law of heating.
12. What are the properties of the substance used as heating element?
13. Define Seebeck effect.
14. What are the applications of Seebeck effect?
15. Define Peltier effect.
16. Define Thomson's effect.

3 Marks Questions

1. Derive the relation between the drift velocity and the current.
2. Write a note on electric cells in series.
3. Write a note on electric cells in Parallel.
4. Explain the principle of Potentiometer.
5. Explain Peltier effect.
6. Explain Thomson effect.

5 Marks Questions

1. Describe the microscopic model of current and obtain general form of Ohm's law.
2. Obtain the macroscopic form of ohm's law from its microscopic form and discuss its limitation.
3. Explain the equivalent resistance of a series and parallel resistance network.
4. Explain the determination of the internal resistance of a cell using voltmeter.
5. Obtain the condition for bridge balance in Wheatstone's bridge.
6. Explain the determination of unknown resistance using Meter Bridge.
7. How the emf of two cells are compared using potentiometer?

UNIT : 3, MAGNETISM AND MAGNETIC EFFECTS OF ELECTRIC CURRENT

2 Marks Questions

1. Define pole strength of the magnet.
2. Define magnetic dipole moment.
3. Define magnetic flux. Give its unit.
4. State Coulomb's inverse square law of magnetism.
5. State tangent law.
6. Define magnetic induction or total magnetic field.
7. Define magnetic susceptibility.
8. Define Curie's law.
9. What is Hysteresis?
10. State Right Hand Thumb Rule.
11. Define Bohr Magnetron.
12. State Ampere's circuital law.
13. What are the limitations of cyclotron?
14. State Fleming's Left Hand Rule (FLHR).
15. How the current sensitivity of galvanometer can be increased?
16. Why Phosphor - bronze is used as suspension wire?
17. Define current sensitivity of a galvanometer.

3 Marks Questions

1. What are the properties of bar magnet?
2. Give the properties of magnetic field lines.
3. Calculate the torque acting on a bar magnet in uniform magnetic field.
4. Using the relation $\vec{B} = \mu_0 (\vec{H} + \vec{M})$, show that $\chi_m = \mu_r - 1$
5. List the properties of Dia, Para and Ferromagnetic materials.
6. State and explain Biot - Savart law.
7. Define Lorentz force. Give the properties of Lorentz magnetic force.
8. How Galvanometer can be converted in to Ammeter.
9. How Galvanometer can be converted in to voltmeter?

5 Marks Questions

1. Calculate the magnetic induction at a point on the axial line of a bar magnet.
2. Obtain the magnetic induction at a point on the equatorial line of a bar magnet.
3. Deduce the relation for magnetic induction at a point due to an infinitely long straight conductor carrying current.
4. Obtain a relation for the magnetic induction at a point along the axis of a circular coil carrying current.
5. Obtain an expression for magnetic field due to long current carrying solenoid.
6. Describe the principle, construction and working of Cyclotron.
7. Obtain an expression for the force on a current carrying conductor placed in a magnetic field.
8. Obtain a force between two long parallel current carrying conductors. Hence define ampere.

UNIT : 4, ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT

2 Marks Questions

1. State Faraday's laws of electromagnetic induction.
2. State Lenz's law.
3. State Fleming's right hand rule.
4. Define self-inductance or coefficient of self-induction.
5. Define the unit of self-inductance (one Henry)
6. Define mutual inductance or coefficient of mutual induction.
7. What the methods of producing induced emf?
8. Define the efficiency of the transformer.
9. Define RMS value of AC.
11. A capacitor blocks DC but it allows AC. Why?
12. What are the applications of series RLC resonant circuit?
13. Define Q - factor or quality factor.
14. Define power factor.
15. Define wattles current.

3 Marks Questions

1. State and explain Faraday's laws of electromagnetic induction.
2. Obtain an expression for motional emf from Lorentz force.
3. What are the drawbacks of Eddy currents? How it is minimized?
4. How will you induce an emf by changing the area enclosed by the coil.
5. Explain various energy losses in a transformer.
6. Obtain the expression for average value of alternating current.
7. What are the advantages and disadvantages of AC over DC?

5 Marks Questions

1. Explain the applications of eddy currents (or) Foucault currents.
2. Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle.
3. Explain the working of a single - phase AC generator with necessary diagram.
4. Explain the principle, construction and working of transformer.
5. Derive an expression for phase angle between the applied voltage and current in a series RLC circuit.
6. Show that the mutual inductance between a pair of coils is same ($M_{12} = M_{21}$).

UNIT : 5, ELECTROMAGNETIC WAVES

2 Marks Questions

1. Define displacement current.
2. What is called pointing vector? Give its unit.
3. Give the modified form of Ampere's circuital law.
4. Define dispersion and spectrum.
5. Define Fraunhofer lines.
6. What are the uses of Fraunhofer lines?

3 Marks Questions

1. Explain the sources of electromagnetic waves.
2. Write a note on infra-red rays.
3. Write a note on ultra violet rays.
4. Write a note on X – rays.
5. Write a note on gamma rays.

5 Marks Questions

1. Write down Maxwell equations in integral form.
2. Explain the properties of electromagnetic waves.
3. Explain in detail the emission spectra.
4. Explain in detail the absorption spectra.

UNIT : 6, RAY OPTICS

2 Marks Questions

1. State the laws of reflection.
2. Define paraxial rays and marginal rays.
3. State the laws of refraction.
4. Define total internal reflection.
5. What are the conditions to achieve total internal reflection?
6. Obtain the reason for glittering of diamond.
7. Define power of a lens.
8. Define dispersive power.
9. What is Rayleigh's scattering?
10. Why does sky appears blue colour?

3 Marks Questions

1. Obtain the relation between focal length (f) and radius of curvature (R) of the spherical mirror.
2. What are the Cartesian sign conventions for spherical mirrors?
3. Write the characteristics of refraction.
4. Obtain the equation for apparent depth.
5. What is Snell's window (or) Radius of illumination?
6. Write a note on Optical fibres.
7. Why does sky and Sun looks reddish during sunset and sunrise?
8. Why does cloud appears as white colour?

5 Marks Questions

1. Derive the mirror equation and the equation for lateral magnification.
2. Describe the Fizeau's method to determine speed of light.
3. Derive the equation for lateral displacement of light passing through a glass slab.
4. Obtain Lens maker formula and mention its significance.
5. Derive the equation for angle of deviation produced by a prism and thus obtain the equation for refractive index of material of the prism.
6. What is dispersion? Obtain the equation for dispersive power of a medium.

UNIT : 7, WAVE OPTICS

2 Marks Questions

1. State Huygens's principle.
2. Define interference.
3. Give the methods to obtain coherent light waves.
4. What are called constructive and destructive interference?
5. What are the conditions for obtaining clear and broad interference bands?
6. Distinguish between Fresnel and Fraunhofer diffraction.
7. What is polarizer and analyzer?
8. What are the uses and drawbacks of Nicol prism?
9. What is myopia? What is its remedy?
10. What is astigmatism?

3 Marks Questions

1. Distinguish between interference and diffraction.
2. What is Fresnel's distance? Obtain an expression for it.
3. State and prove Malus' law.
4. List the uses of Polaroid's.
5. State and prove Brewster's law.
6. Write a note on pile of plates.
7. Discuss about Nicol prism.

5 Marks Questions

1. Prove laws of reflection using Huygens principle.
2. Obtain the equation for resultant intensity due to interference of light.
3. Obtain the equation for Path difference and band width in Young's double slit experiment.
4. Discuss diffraction at single slit and obtain the condition for n^{th} minimum.
5. Explain about compound microscope and obtain the equation for magnification.
6. Discuss about astronomical telescope.

UNIT : 8, DUAL NATURE OF RADIATION AND MATTER

2 Marks Questions

1. Define surface barrier.
2. Define work function of a metal. Give its unit.
3. What is photo electric effect?
4. Define stopping potential.
5. Define threshold frequency.
6. What is photo electric cell? Give its type.
7. List the properties of X - rays.

3 Marks Questions

1. State the laws of photo electric effect.
2. Derive the expression of de Broglie wavelength.
3. A proton and an electron have same kinetic energy. Which one has greater de- Broglie wavelength. Justify.
4. Write a note on continuous X - ray spectrum.
5. Write a note on characteristic X - ray spectra.
6. Explain the applications of X -rays.
7. List the characteristics of photons.
8. Give the application of photo cells.
9. Derive an expression for de Broglie wavelength of electrons.

5 Marks Questions

1. What do you mean by electron emission? Explain briefly various methods of electron emission.
2. Explain the effect of potential difference on photo electric current.
3. Obtain Einstein's photoelectric equation with necessary explanation.
4. Give the construction and working of photo emissive cell.
5. Describe briefly Davisson – Germer experiment which demonstrated the wave nature of electrons.
6. Briefly explain the principle and working of electron microscope.

UNIT : 9, ATOMIC AND NUCLEAR PHYSICS

2 Marks Questions

1. Give the results of Rutherford alpha scattering experiment.
2. Define impact parameter.
3. What is mass defect?
4. Define binding energy.
5. Calculate the energy equivalent to one atomic mass unit (1u).
6. Give the properties of nuclear forces?
7. Define radioactivity.
8. State the properties of neutrino.
9. State the law of radioactive decay.
10. Define activity. Give its unit.
11. Define one curie.

3 Marks Questions

1. Give the properties of cathode rays.
2. What are the drawbacks of Rutherford atom model?
3. State the postulates of Bohr's atom model.
4. Give the symbolic representation of alpha decay, beta decay and gamma decay.
5. List the properties of neutrons.
6. What is called chain reaction. Give its types.
7. Write a note on proton - proton cycle.
8. Explain radio carbon dating.

5 Marks Questions

1. Explain the J.J. Thomson experiment to determine the specific charge of electron.
2. Derive the expression for radius and energy of the n^{th} orbit of hydrogen atom using Bohr atom model.
3. Explain the spectral series of hydrogen atom.
4. Obtain the law of radioactivity (radioactive decay).
5. Describe the working of nuclear reactor with a block diagram.

UNIT : 10, ELECTRONICS AND COMMUNICATION

2 Marks Questions

1. What is called intrinsic semiconductor?
2. Define Doping.
3. What is an extrinsic semiconductor?
4. What is P-N junction diode? Give its symbol.
5. What is meant by rectification?
6. Give the applications of LEDs.
7. Draw the circuit diagram of common base configurations of NPN transistor.
8. Give the relation between α and β.
9. Give the Barkhausen conditions for sustained oscillations.
10. Give the applications of oscillator.
11. State De-Morgan's theorems.
12. What is called modulation? Give its types.
13. Give the advantages and limitations of amplitude modulation (AM).
14. Define skip distance.
15. Define skip zone.

3 Marks Questions

1. Write a note on bipolar junction transistor (BJT).
2. Draw the block diagram of an oscillator Block diagram of oscillator:
3. Explain the working of Zener diode as a voltage regulator.
4. Explain in detail about the photo diode.
5. Explain the function of RADAR. Give its applications.
6. Give the applications of ICT in fisheries, mining and agriculture sectors.

5 Marks Questions

1. Draw the circuit diagram of a half wave rectifier and explain its working.
2. Explain the construction and working of a full wave rectifier.
3. Transistor functions as a switch. Explain.
4. Describe the function of a transistor as an amplifier with the neat circuit diagram. Sketch the input and output wave form.
5. Explain the action transistor as an oscillator.
6. State and prove De Morgan's First and Second theorems.
7. What is called modulation? Explain the types of modulation with help of necessary diagrams.
8. Explain the three modes of propagation of electromagnetic waves through space.

UNIT : 11, RECENT DEVELOPMENTS IN PHYSICS

2 Marks Questions

1. Distinguish between Nano science and Nanotechnology.
2. What is the difference between Nano materials and Bulk materials?
3. List the applications of Nano technology.
4. What is robotics?
5. Why steels are preferred to make robots?
6. Write a note on Cosmology.

3 Marks Questions

1. Explain how nano structures are made in the laboratory?
2. What is artificial intelligence? What are its work?
3. Write a note on nano robots.
4. What are called gravitational waves?
5. Write a note on black holes.

5 Marks Questions

1. Explain Nano structure in nature with examples.
2. Discuss the applications of Nano-materials in various fields.
3. Mention the advantages and disadvantages of Robotics.

PROBLEMS:

UNIT – 1, ELECTROSTATICS

1. A sample of HCl gas is placed in a uniform electric field of magnitude 3×10^4 N C^{-1}. The dipole moment of each HCl molecule is 3.4×10^{-30} Cm. Calculate the maximum torque experienced by each HCl molecule.
2. A parallel plate capacitor has square plates of side 5 cm and separated by a distance of 1 mm. (a) Calculate the capacitance of this capacitor. (b) If a 10 V battery is connected to the capacitor, what is the charge stored in any one of the plates? (The value of $\varepsilon_o = 8.85 \times 10^{-12}$ Nm^2 C^{-2}).
3. Dielectric strength of air is 3×10^6 V m^{-1}. Suppose the radius of a hollow sphere in the Van de Graff generator is R = 0.5 m, calculate the maximum potential difference created by this Van de Graaff generator.
4. When two objects are rubbed with each other, approximately a charge of 50 nC can be produced in each object. Calculate the number of electrons that must be transferred to produce this charge.

UNIT – 2, CURRENT ELECTRICITY

1. Compute the current in the wire if a charge of 120 C is flowing through a copper wire in 1 minute.
2. A copper wire of cross-sectional area 0.5 mm^2 carries a current of 0.2 A. If the free electron density of copper is 8.4×10^{28} m^{-3} then compute the drift velocity of free electrons.
3. Determine the number of electrons flowing per second through a conductor, when a current of 32 A flows through it.
4. Calculate the equivalent resistance for the circuit which is connected to 24 V batteries and also find the potential difference across 4 Ω and 6 Ω resistors in the circuit.
5. A battery has an emf of 12 V and connected to a resistor of 3 Ω. The current in the circuit is 3.93 A. Calculate (a) terminal voltage and the internal resistance of the battery (b) power delivered by the battery and power delivered to the resistor.
6. A copper wire of 10^{-6} m^2 area of cross section, carries a current of 2 A. If the number of electrons per cubic meter is 8×10^{28}, calculate the current density and average drift velocity.
7. The resistance of a nichrome wire at 0^0C is 10Ω. If its temperature coefficient of resistance is $0.004/^0$C, find its resistance at boiling point of water. Comment on the result.
8. In a potentiometer arrangement, a cell of emf 1.25 V gives a balance point at 35 cm length of the wire. If the cell is replaced by another cell and the balance point shifts to 63 cm, what is the emf of the second cell?

UNIT – 3, MAGNETISM AND MAGNETIC EFFECTS OF ELECTRIC CURRENT

1. The repulsive force between two magnetic poles in air is 9×10^{-3} N. If the two poles are equal in strength and are separated by a distance of 10 cm, calculate the pole strength of each pole.
2. Compute the magnitude of the magnetic field of a long, straight wire carrying a current of 1 A at distance of 1m from it. Compare it with Earth's magnetic field.
3. Compute the intensity of magnetisation of the bar magnet whose mass, magnetic moment and density are 200 g, 2 A m2 and 8 g cm^{-3}, respectively.
4. Two materials X and Y are magnetized, whose intensity of magnetization are 500 Am^{-1} and 2000 Am^{-1}, respectively. If the magnetizing field is 1000 Am^{-1}, then which one among these materials can be easily magnetized?
5. An electron moving perpendicular to a uniform magnetic field 0.500 T undergoes circular motion of radius 2.80 mm. What is the speed of electron?
6. Suppose a cyclotron is operated to accelerate protons with a magnetic field of strength 1 T. Calculate the frequency in which the electric field between two Dees could be reversed.

UNIT – 4, ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT

1. A solenoid of 500 turns is wound on an iron core of relative permeability 800. The length and radius of the solenoid are 40 cm and 3 cm respectively. Calculate the average emf induced in the solenoid if the current in it changes from 0 to 3 A in 0.4 second.
2. The self-inductance of an air-core solenoid is 4.8 mH. If its core is replaced by iron core, then its self-inductance becomes 1.8 H. Find out the relative permeability of iron.
3. An ideal transformer has 460 and 40,000 turns in the primary and secondary coils respectively. Find the voltage developed per turn of the secondary if the transformer is connected to a 230 V AC mains. The secondary is given to a load of resistance 10^4 Ω. Calculate the power delivered to the load.
4. An inverter is common electrical device which we use in our homes. When there is no power in our house, inverter gives AC power to run a few electronic appliances like fan or light. An inverter has inbuilt step-up transformer which converts 12 V AC to 240 V AC. The primary coil has 100 turns and the inverter delivers 50 mA to the external circuit. Find the number of turns in the secondary and the primary current.
5. Find the impedance of a series RLC circuit if the inductive reactance, capacitive reactance and resistance are 184 Ω, 144 Ω and 30 Ω respectively. Also calculate the phase angle between voltage and current.
6. A coil of 200 turns carries a current of 0.4 A. If the magnetic flux of 4 mWb is linked with the coil, find the inductance of the coil.
7. A step-down transformer connected to main supply of 220 V is made to operate 11V,88 W lamp. Calculate (i) Transformation ratio and (ii) Current in the primary.

UNIT – 5, ELECTROMAGNETIC WAVES

1. The relative magnetic permeability of the medium is 2.5 and the relative electrical permittivity of the medium is 2.25. Compute the refractive index of the medium.
2. Compute the speed of the electromagnetic wave in a medium if the amplitude of electric and magnetic fields are 3×10^{4} N C^{-1} and 2×10^{-4} T, respectively.
3. A pulse of light of duration 10^{-6} s is absorbed completely by a small object initially at rest. If the power of the pulse is 60×10^{-3} W, calculate the final momentum of the object.
4. If the relative permeability and relative permittivity of the medium is 1.0 and 2.25, respectively. Find the speed of the electromagnetic wave in this medium.

UNIT – 6, RAY OPTICS

1. One type of transparent glass has refractive index 1.5. What is the speed of light through this glass?
2. Pure water has refractive index 1.33. What is the speed of light through it.
3. Light travels from air in to glass slab of thickness 50 cm and refractive index 1.5.
   (i) What is the speed of light in glass?
   (ii) What is the time taken by the light to travel through the glass slab?
   (iii) What is the optical path of the glass slab?
4. Light travelling through transparent oil enters in to glass of refractive index 1.5. If the refractive index of glass with respect to the oil is 1.25, what is the refractive index of the oil?
5. If the focal length is 150 cm for a glass lens, what is the power of the lens?
6. A monochromatic light is incident on an equilateral prism at an angle 30^{0} and emerges at an angle of 75^{0}. What is the angle of deviation produced by the prism?
7. The angle of minimum deviation for a prism is 37^{0}. If the angle of prism is 60^{0}, find the refractive index of the material of the prism.
8. Find the dispersive power of flint glass if the refractive indices of flint glass for red, green and violet light are 1.613, 1.620 and 1.632 respectively.
9. An object is placed at a certain distance from a convex lens of focal length 20 cm. Find the distance of the object if the image obtained is magnified 4 times.
10. Refractive index of material of the prism is 1.541. Find the critical angle.

UNIT – 7, WAVE OPTICS

1. Two light sources with amplitudes 5 units and 3 units respectively interfere with each other. Calculate the ratio of maximum and minimum intensities.
2. The wavelength of a light is 450 nm. How much phase it will differ for a path of 3 mm?
3. Calculate the distance for which ray optics is good approximation for an aperture of 5 mm and wavelength 500 nm.
4. A diffraction grating consisting of 4000 slits per centimeter is illuminated with a monochromatic light that produces the second order diffraction at an angle of 30^0. What is the wavelength of the light used?
5. The optical telescope in the Vainu Bappu observatory at Kavalur has an objective lens of diameter 2.3 m. What is its angular resolution if the wavelength of light used is 589 nm?
6. Find the polarizing angles for (i) glass of refractive index 1.5 and (ii) Water of refractive index 1.33.
7. A person has farsightedness with the minimum distance he could see clearly is 75 cm. Calculate the power of the lens of the spectacles necessary to rectify the defect.
8. The ratio of maximum and minimum intensities in an interference pattern is 36 : 1. What is the ratio of the amplitudes of the two interfering waves?
9. Light of wavelength of 5000 Å produces diffraction pattern of the single slit of width 2.5 μm. What is the maximum order of diffraction possible?

UNIT – 8, DUAL NATURE OF RADIATION AND MATTER

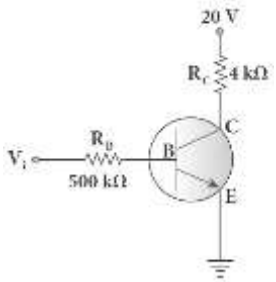
1. A radiation of wavelength 300 nm is incident on a silver surface. Will photoelectrons be observed?
2. Calculate the cut-off wavelength and cutoff frequency of x-rays from an X –ray tube of accelerating potential 20,000 V.
3. Find the de Broglie wavelength associated with an alpha particle which is accelerated through a potential difference of 400 V. Given that the mass of the proton is 1.67×10^{-27} kg.
4. How many photons per second emanate from a 50 mW laser of 640 nm?
5. Calculate the energies of the photons associated with the following radiation: (i) Violet light of 413 nm (ii) X-rays of 0.1 nm (iii) radio waves of 10 m.
6. How many photons of frequency 10^{14} Hz will make up 19.86 J of energy?
7. What should be the velocity of the electron so that its momentum equals that of 4000 Å wavelength photon.
8. Calculate the de Broglie wavelength of a proton whose kinetic energy is equal to 81.9×10^{-15} J. (Given: mass of proton is 1836 times that of electron).

UNIT – 9, ATOMIC AND NUCLEAR PHYSICS

1. The radius of the 5th orbit of hydrogen atom is 13.25 Å. Calculate the wavelength of the electron in the 5th orbit.
2. Find the (i) angular momentum (ii) velocity of the electron in the 5th orbit of hydrogen atom.
3. Calculate the radius of $^{197}_{79}Au$ nucleus.
4. Calculate the number of nuclei of carbon-14 un-decayed after 22,920 years if the initial number of carbon-14 atoms is 10,000. The half-life of carbon-14 is 5730 years.
5. Half lives of two radioactive elements A and B are 20 minutes and 40 minutes respectively. Initially, the samples have equal number of nuclei. Calculate the ratio of decayed numbers of A and B nuclei after 80 minutes.
6. Calculate the time required for 60% of a sample of radon undergo decay. (Given $T_{½}$ of radon =3.8 days.)
7. Assuming that energy released by the fission of a single $_{92}U^{235}$ nucleus is 200MeV, calculate the number of fissions per second required to produce 1 Watt power.
8. Charcol pieces of tree is found from an archeological site. The carbon-14 content of this charcol is only 17.5% that of equivalent sample of carbon from a living tree. What is the age of tree?

UNIT – 10, ELECTRONICS AND COMMUNICATION

1. Determine the wavelength of light emitted from LED which is made up of GaAsP semiconductor whose forbidden energy gap is 1.875 eV. Mention the colour of the light emitted (Take h = 6.6×10^{-34} Js).
2. In a transistor connected in the common base configuration, a $\alpha = 0.95$, $I_E = 1$ mA. Calculate the values of I_C and I_B.
3. In the circuit shown in the figure, the input voltage V_i is 20 V, V_{BE} = 0 V and V_{CE} = 0 V. What are the values of I_B, I_C, β?



4. Simplify the Boolean identity AC + ABC = AC.
5. Four silicon diodes and a 10 Ω resistor are connected as shown in figure below. Each diode has a resistance of 1Ω. Find the current flows through the 18Ω resistor.