



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

INFORMATION TECHNOLOGY

DEFINITIONS AND TERMINOLOGY

Course Name	:	SEMICONDUCTOR PHYSICS
Course Code	:	AHSB13
Program	:	B.Tech
Semester	:	II
Branch	:	INFORMATION TECHNOLOGY
Section	:	IT-A&B
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Course Faculty	:	Ms. S Charvani

OBJECTIVES:

I	To help students to consider in depth the terminology and nomenclature used in the syllabus.
II	To focus on the meaning of new words / terminology/nomenclature

DEFINITIONS AND TERMINOLOGY QUESTION BANK

S.No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
UNIT-I					
1	Recall the term mechanics.	The study of motion of particle is called mechanics.	Remember	CLO2	AHSB13.02
2	What is a crystalline solid?	It is a solid in which there is regular arrangement of atoms.	Understand	CLO2	AHSB13.02
3	What is an amorphous solid?	It is a solid in which there is an irregular arrangement of atoms.	Understand	CLO2	AHSB13.02
4	What is duality of a particle?	duality of a particle is behavior of a particle both as particle and wave..	Understand	CLO2	AHSB13.02
5	Recall the term quantum mechanics.	The study of motion of micro particles like atoms, electrons etc is called quantum mechanics.	Remember	CLO2	AHSB13.02
6	Define a wave.	A wave is a disturbance created in a medium.	Remember	CLO2	AHSB13.02
7	Explain the term wave length.	It is the distance travelled by the wave in one time period.	Understand	CLO2	AHSB13.02
8	Describe frequency of a wave.	It is the number of oscillations performed by the particle in one second.	Understand	CLO2	AHSB13.02
9	Define time period of a wave.	It is time taken by the particle to complete one oscillation.	Remember	CLO2	AHSB13.02
10	What is amplitude of a wave?	It is the maximum displacement of the particle on either sides of its mean position.	Understand	CLO3	AHSB13.02

11	How do wave length and frequency of a wave interdependent?	The wavelength is inversely proportional to frequency of the wave.	Understand	CLO3	AHSB13.02
12	What is debrogie's hypothesis?	According to debrogie's hypothesis a moving particle is always associated with both particle and wave characteristics.	Understand	CLO3	AHSB13.02
13	How is the energy of particle in a potential box vary?	the energy of particle in a potential box is quantized i.e. it is in discrete manner.	Understand	CLO3	AHSB13.02
14	Define diffraction of light.	The bending of light at an obstacle is called diffraction	Remember	CLO3	AHSB13.02
15	What do you understand by quantization of energy?	The energy is said to be quantized when it have discontinuous values.	Understand	CLO3	AHSB13.02
UNIT-II					
1	Define conductivity of a material.	The degree to which a specified material conducts electricity, calculated as the ratio of the current density in the material to the electric field which causes the flow of current.	Remember	CLO 6	AHSB13.06
2	Define resistivity of a material.	It is a measure of the resisting power of a specified material to the flow of an electric current.	Understand	CLO 6	AHSB13.06
3	What do you understand by energy spectrum of electron?	The energy spectrum of electron is the distribution of energy which composes alternate allowed and un allowed energy bands.	Understand	CLO 6	AHSB13.06
4	Describe the idea of Kronig penney model.	According to Kronig penney model the periodic potential of an electron in a metal is represented as array of potential wells.	Remember	CLO 6	AHSB13.06
5	Describe the potential energy of a free electron.	The potential energy of a free electron varies periodically when it moves in a metal.	Remember	CLO 5	AHSB13.06
6	What is excitation energy of an electron.	It is the energy supplied to an electron which moves the electron from valence band to conduction band.	Understand	CLO 5	AHSB13.06
7	When is the potential energy of a free electron minimum inside a metal.	The potential energy of a free electron minimum when it approaches a positive ion of the metal.	Remember	CLO 5	AHSB13.06
8	Give the assumption of free electron theory.	According to free electron theory, the free electrons of metals behave like ideal gas molecules.	Remember	CLO 5	AHSB13.06
9	When is the potential energy of a free electron maximum inside a metal.	The potential energy of a free electron maximum when it is in between two positive ions of the metal.	Understand	CLO 5	AHSB13.06
10	What is a metallic bond?	The chemical bonding that holds the atoms of a metal together. Metallic bonds are formed from the attraction between mobile electrons and fixed, positively charged metallic atoms.	Understand	CLO 5	AHSB13.06

11	What is a covalent bond?	The bonding in sharing of electrons take place is called covalent bond.	Understand	CLO 5	AHSB13.06
12	Explain the term activation energy.	It is the energy released when an electron recombines with a hole in a semiconductor.	Understand	CLO 6	AHSB13.06
13	What is a good conductor of electricity?	A material which allows the flow of charge carriers easily is called as a good conductor.	Understand	CLO 6	AHSB13.06
14	Describe an extrinsic semiconductor	The semiconductor in which impurities are doped to increase the electrical conductivity is called extrinsic semiconductor.	Understand	CLO 6	AHSB13.06
15	What are majority carriers in a P-type semiconductors ?	Holes are majority carriers in a P-type semiconductors.	Understand	CLO 6	AHSB13.06
16	What are majority carriers in a N-type semiconductors ?	Electrons are majority carriers in P-type semiconductors.	Understand	CLO 6	AHSB13.06
17	What are minority carriers in P-type semiconductors?	Electrons are minority carriers in P-type semiconductors.	Understand	CLO6	AHSB13.06
18	What are minority carriers in a N-type semiconductors?	Holes are majority carriers in a N-type semiconductors.	Understand	CLO6	AHSB13.06
UNIT-III					
1	What is the biasing in a light emitting diode	Light emitting diode is connected in forward biasing, to produce light	Understand	CLO7	AHSB13.07
2	What is the principle behind light emitting diode.	The electron from n side recombines with the hole on p side .light is emitted due to recombination.	Understand	CLO7	AHSB13.07
3	Explain the term diffusion in a semiconductor.	The flow of charge carriers from high density to low density is called diffusion.	Remember	CLO7	AHSB13.07
4	Describe recombination phenomena.	The combination of an electron from conduction band to valence band is called recombination.	Understand		AHSB13.07
5	What is drift velocity of an electron?	The velocity gained by an electron when an electric field is applied , is called drift velocity.	Understand	CLO7	AHSB13.07
6	Describe a photo diode?	It is a device which converts light energy to electric energy.	Remember	CLO8	AHSB13.08
7	What is the biasing used in a photo diode.	A photo diode is connected in reverse biasing.	Understand	CLO8	AHSB13.08
8	What is the principle behind photo diode.	A photo diode is is based on the principle of generation of charge carriers.	Understand	CLO8	AHSB13.08
9	What is a solar cell.	It is a device which produces electric energy using light energy.	Understand	CLO8	AHSB13.08
10	Explain the principle behind solar cell.	Solar cell depends on the principle of generation of charge carriers in presence of sun light.	Remember	CLO8	AHSB13.08
11	What is the principle behind photo diode	A photo diode is is based on the principle of generation of charge carriers.	Understand	CLO8	AHSB13.08
12	What is the biasing used in a PIN photo diode	A PIN photo diode is connected in reverse biasing	Understand	CLO8	AHSB13.08

13	Recall threshold voltage	The voltage at which current starts flowing in a light emitting diode is called threshold voltage.	Remember	CLO8	AHSB13.08
14	What is forward biasing?	When P side of a diode is connected to positive terminal of battery and N side is connected to negative terminal of battery	Understand	CLO8	AHSB13.08
15	What is reverse biasing?	When N side of a diode is connected to positive terminal of battery and P side is connected to negative terminal of battery.	Understand	CLO8	AHSB13.08
UNIT-IV					
1	Define an electric dipole.	Two equal and opposite charges separated by a distance 'r' constitute a dipole.	Remember	CLO 9	AHSB13.09
2	Describe dipole moment.	The product of charge and distance between two charges is called electric dipole moment. $\mu = q \times r$.	Remember	CLO 9	AHSB13.09
3	What is a polar dielectric ?	The dielectrics in which center of gravity of negative charge distribution does not coincide with the center of positive charge distribution are called polar dielectrics.	Understand	CLO 9	AHSB13.09
4	What is a no polar dielectric ?	The dielectrics in which center of gravity of negative charge distribution coincide with the center of positive charge distribution are called polar dielectrics.	Understand	CLO 9	AHSB13.09
5	Define Relative permittivity of the medium.	Relative permittivity is the ratio between the permittivity of the medium and the permittivity of free space. It is denoted by ϵ_r .	Remember	CLO 9	AHSB13.09
6	What is the phenomena of dipole formation called.	When a dielectric substance is placed in an electric field, then positive and negative charges are displaced in opposite direction. This phenomena is called electric polarization.	Understand	CLO 9	AHSB13.09
7	Define the term Polarizability.	The ratio of dipole moment to that of electric field applied is called Polarizability.	Remember	CLO 9	AHSB13.09
8	Describe Polarization Vector.	Polarization Vector is defined as the average dipole moment per unit volume of a dielectric. If 'N' molecules are present per unit volume.	Understand	CLO 9	AHSB13.09
9	Recall Electric Susceptibility.	The electric susceptibility ' χ ' is defined as the ratio of polarization vector to the applied electric field .	Remember	CLO 9	AHSB13.09
10	Describe the electronic Polarization	When an electric field is applied on a dielectric material then all the positive nuclei of atoms move in the field direction and all the negative electron cloud of atoms move in opposite directions, hence dipoles are formed to produce dipole moment.	Understand	CLO 9	AHSB13.09
11	Define a Magnetic dipole.	Two equal and opposite poles separated by a distance 'r' constitute a dipole.	Remember	CLO10	AHSB13.10
12	What is Magnetic flux	It is defined as the amount of magnetic lines of forces passing perpendicularly through unit area of a given material. It is denoted by ' Φ '	Remember	CLO10	AHSB13.10
13	Recall the term Intensity of Magnetization.	The magnetic moment per unit volume is called Intensity of magnetization.	Remember	CLO10	AHSB13.10

14	Define Magnetic Induction	Magnetic induction at a point is defined as the force experienced by a unit North Pole Placed at that point. It is denoted by 'B'	Remember	CLO10	AHSB13.10
15	What is Permeability?	Permeability is the ability of the medium to pass magnetic lines of forces through it.	Understand	CLO10	AHSB13.10
16	Define Magnetic susceptibility.	Magnetic susceptibility is defined as ratio of intensity of magnetization and applied magnetic field.	Remember	CLO10	AHSB13.10
17	Define relative Permeability.	relative Permeability is defined as the ratio of Permeability of medium and Permeability of free space.	Remember	CLO10	AHSB13.10
UNIT-V					
1	What do you understand by resonant cavity.	It is the arrangement of two reflecting surfaces in a lasing system.	Understand	CLO 14	AHSB13.14
2	Describe an active medium of a laser.	An active medium is the material whose atoms are excited and stimulated to produce laser light.	Understand	CLO 14	AHSB13.14
3	What is the significance of source of energy in a laser?	The source of energy excites the atoms of the active medium to produce population inversion.	Remember	CLO 14	AHSB13.14
4	Describe Optical pumping.	It is the phenomena in which light is used as source of energy to create population inversion.	Understand	CLO 14	AHSB13.14
5	What is injection current pumping mechanism.	It is the phenomena in which voltage is used as source of energy to create population inversion.	Understand	CLO 14	AHSB13.14
6	Define the term life time.	It is the time spent by the atom in an excited level before it deexcites.	Remember	CLO 14	AHSB13.14
7	What happens when light is projected on the active medium?	The atoms of the active medium are excited to higher energy levels.	Understand	CLO 14	AHSB13.14
8	Describe electric discharge pumping.	In an electric discharge pumping mechanism electrons are discharged into a gas chamber to excite the atoms.	Remember	CLO 14	AHSB13.14
9	What is the significance of a light source in an optical fiber communication system.	A light source converts electrical signal into an optical signal.	Understand	CLO 15	AHSB13.15
10	Explain the property of a decoder	A decoder converts digital signal into analog signal.	Understand	CLO 15	AHSB13.15
11	Define the term encoder.	An encoder is a device which converts analog signal into digital signal.	Remember	CLO 15	AHSB13.15
12	What is a trap.	A trap is a recombination centre in between conduction band and valence band. semiconductor.	Understand	CLO 15	AHSB13.15
13	Define a drive circuit .	Drive circuit covers digital signal to electrical signal.	Remember	CLO 15	AHSB13.15
14	What do you understand by a wave guide?.	A wave guide is a channel which transmits optical signals from one place to other.	Understand	CLO 15	AHSB13.15
15	Describe a photo detector.	A photo detector converts optical signal into an electrical signal.	Remember	CLO 15	AHSB13.15

16	What is the importance of an amplifier in communication system?	An amplifier improve the quality of the output signal by amplifying he signal.	Understand	CLO 15	AHSB13.15
17	Explain pulse dispersion.	Pulse dispersion is the pulse broadening of the output signal .	Remember	CLO 15	AHSB13.15
18	What is the purpose of a signal restorer.	Signal restorer arranges the output signal in a sequential order and coverts to digital signal.	Understand	CLO 15	AHSB13.15

Signature of the Faculty

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