11. The coordination number of $Cu$ is [AMU 1992]
(a) 1 (b) 6
(c) 8 (d) 12

12. Which one of the following is the weakest kind of bonding in solids [CBSE PMT 1992; KCET 1992]
(a) Ionic (b) Metallic
(c) Vander Waals (d) Covalent

13. In a crystal, the atoms are located at the position of [AMU 1985]
(a) Maximum potential energy
(b) Minimum potential energy
(c) Zero potential energy
(d) Infinite potential energy

14. Crystal structure of $NaCl$ is [NCERT 1982]
(a) Fcc (b) Bcc
(c) Both of the above (d) None of the above

15. What is the coordination number of sodium ions in the case of sodium chloride structure [CBSE PMT 1988]
(a) 6 (b) 8
(c) 4 (d) 12

16. The distance between the body centred atom and a corner atom in sodium ($a$ = 4.225 Å) is [CBSE PMT 1995]
(a) 3.66 Å (b) 3.17 Å
(c) 2.99 Å (d) 2.54 Å

17. A solid that transmits light in visible region and has a very low melting point possesses [J & K CET 2001]
(a) Metallic bonding (b) Ionic bonding
(c) Covalent bonding (d) Vander Waal's bonding

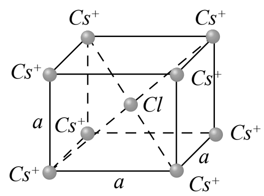
18. Atomic radius of $fcc$ is [J & K CET 2001]
(a) $\frac{a}{2}$ (b) $\frac{a}{2\sqrt{2}}$
(c) $\frac{\sqrt{3}}{4}a$ (d) $\frac{\sqrt{3}}{2}a$

19. A solid reflects incident light and it's electrical conductivity decreases with temperature. The binding in this solids
(a) Ionic (b) Covalent
(c) Metallic (d) Molecular

20. The laptop PC's modern electronic watches and calculators use the following for display
(a) Single crystal (b) Poly crystal
(c) Liquid crystal (d) Semiconductors

21. The nearest distance between two atoms in case of a bcc lattice is equal to [J & K CET 2004]
(a) $a\frac{\sqrt{2}}{3}$ (b) $a\frac{\sqrt{3}}{2}$
(c) $q\sqrt{3}$ (d) $\frac{a}{\sqrt{2}}$

22. What is the net force on a $Cl^-$ placed at the centre of the $bcc$ structure of $CsCl$ [DCE 2003; AIIMS 2004]




(a) Zero (b) $ke^2/a^2$
(c) $ke^2a^2$ (d) Data is incomplete

23. Sodium has body centred packing. If the distance between two nearest atoms is 3.7 Å, then its lattice parameter is [Pb. PET 2002]
(a) 4.8 Å (b) 4.3 Å
(c) 3.9 Å (d) 3.3 Å

24. Which of the following is an amorphous solid [AIIMS 2005; J & K CET 2004]
(a) Glass (b) Diamond
(c) Salt (d) Sugar

25. Copper has face centered cubic ($fcc$) lattice with interatomic spacing equal to 2.54Å. The value of the lattice constant for this lattice is [CBSE PMT 2005]
(a) 1.27 Å (b) 5.08 Å
(c) 2.54 Å (d) 3.59 Å

26. In good conductors of electricity, the type of bonding that exists is [CBSE PMT 1995]
(a) Ionic (b) Vander Waals

(c) Covalent (d) Metallic

**27.** Bonding in a germanium crystal (semi-conductor) is

**[CPMT 1986; KCET 1992; EAMCET (Med.) 1995; MP PET/PMT 2004]**

(a) Metallic (b) Ionic

(c) Vander Waal's type (d) Covalent

**28.** The ionic bond is absent in

**[J & K CET 2005]**

(a) *NaCl* (b) *CsCl*

(c) *LiF* (d) $H_2O$

## Semiconductors

**1.** The majority charge carriers in *P*-type semiconductor are

**[MP PMT 1999; CBSE PMT 1999; MP PET 1991; MP PET/PMT 1998; MH CET 2003]**

(a) Electrons (b) Protons

(c) Holes (d) Neutrons

**2.** A *P*-type semiconductor can be obtained by adding

**[NCERT 1979; BIT 1988; MP PMT 1987; 90]**

(a) Arsenic to pure silicon

(b) Gallium to pure silicon

(c) Antimony to pure germanium

(d) Phosphorous to pure germanium

**3.** The valence of an impurity added to germanium crystal in order to convert it into a *P*-type semi conductor is

**[MP PMT 1989; CPMT 1987]**

(a) 6 (b) 5

(c) 4 (d) 3

**4.** In a semiconductor, the concentration of electrons is $8\times10^{14}/cm^3$ and that of the holes is $5\times10^{12}cm^3$. The semiconductor is **[MP PMT 1997; RPET 1999; Kerala PET 2002]**

(a) *P*-type (b) *N*-type

(c) Intrinsic (d) *PNP*-type

**5.** In *P*-type semiconductor, there is **[MP PMT 1989]**

(a) An excess of one electron

(b) Absence of one electron

(c) A missing atom

(d) A donar level

**6.** The valence of the impurity atom that is to be added to germanium crystal so as to make it a *N*-type semiconductor, is

**[MNR 1993; MP PET 1994; CBSE PMT 1999; AIIMS 2000]**

(a) 6 (b) 5

(c) 4 (d) 3

**7.** Silicon is a semiconductor. If a small amount of *As* is added to it, then its electrical conductivity **[MP PMT 1996]**

(a) Decreases (b) Increases

(c) Remains unchanged (d) Becomes zero

**8.** When the electrical conductivity of a semi-conductor is due to the breaking of its covalent bonds, then the semiconductor is said to be

**[AIIMS 1997; KCET (Engg.) 2002]**

(a) Donar (b) Acceptor

(c) Intrinsic (d) Extrinsic

**9.** A piece of copper and the other of germanium are cooled from the room temperature to 80 K, then which of the following would be a correct statement

**[IIT-JEE 1988; Bihar CEE 1992; CBSE PMT 1993; MP PET 1997; RPET 1999; AIEEE 2004]**

(a) Resistance of each increases

(b) Resistance of each decreases

(c) Resistance of copper increases while that of germanium decreases

(d) Resistance of copper decreases while that of germanium increases

**10.** To obtain *P*-type *Si* semiconductor, we need to dope pure *Si* with **[IIT-JEE 1988; MP PET 1997, 93; Pb. PMT 2001, 02; UPSEAT 2004]**

(a) Aluminium (b) Phosphorous

(c) Oxygen (d) Germanium

**11.** Electrical conductivity of a semiconductor

**[MP PMT 1993, 2000; RPET 1996]**

(a) Decreases with the rise in its temperature

(b) Increases with the rise in its temperature

(c) Does not change with the rise in its temperature

(d) First increases and then decreases with the rise in its temperature

12. Three semi-conductors are arranged in the increasing order of their energy gap as follows. The correct arrangement is
[MP PMT 1993]
(a) Tellurium, germanium, silicon
(b) Tellurium, silicon, germanium
(c) Silicon, germanium, tellurium
(d) Silicon, tellurium, germanium

13. When a semiconductor is heated, its resistance
[KCET 1992; MP PMT 1994; MP PET 1992, 2002; RPMT 2001; DCE 2001]
(a) Decreases (b) Increases
(c) Remains unchanged (d) Nothing is definite

14. In an insulator, the forbidden energy gap between the valence band and conduction band is of the order of
[DPMT 1988; EAMCET (Engg.) 1995; MP PET 1996]
(a) $1\,MeV$ (b) $0.1\,MeV$
(c) $1\,eV$ (d) $5\,eV$

15. A *N*-type semiconductor is
[AFMC 1988; RPMT 1999]
(a) Negatively charged (b) Positively charged
(c) Neutral (d) None of these

16. The energy band gap of $Si$ is
[MP PET 1994, 2002; BHU 1995; RPMT 2000]
(a) $0.70\,eV$
(b) 1.1 *eV*
(c) Between $0.70\,eV$ to $1.1\,eV$
(d) 5 *eV*

17. The forbidden energy band gap in conductors, semiconductors and insulators are $EG_1, EG_2$ and $EG_3$ respectively. The relation among them is
[MP PMT 1994; RPMT 1997]
(a) $EG_1 = EG_2 = EG_3$ (b) $EG_1 < EG_2 < EG_3$
(c) $EG_1 > EG_2 > EG_3$ (d) $EG_1 < EG_2 > EG_3$

18. Which statement is correct
[MP PMT 1994]
(a) *N*-type germanium is negatively charged and *P*-type germanium is positively charged
(b) Both *N*-type and *P*-type germanium are neutral
(c) *N*-type germanium is positively charged and *P*-type germanium is negatively charged
(d) Both *N*-type and *P*-type germanium are negatively charged

19. When *Ge* crystals are doped with phosphorus atom, then it becomes [AFMC 1995; Orissa PMT 2004]
(a) Insulator (b) *P*-type
(c) *N*-type (d) Superconductor

20. Let $n_P$ and $n_e$ be the number of holes and conduction electrons respectively in a semiconductor. Then
[MP PET 1995]
(a) $n_P > n_e$ in an intrinsic semiconductor
(b) $n_P = n_e$ in an extrinsic semiconductor
(c) $n_P = n_e$ in an intrinsic semiconductor
(d) $n_e > n_P$ in an intrinsic semiconductor

21. Wires *P* and *Q* have the same resistance at ordinary (room) temperature. When heated, resistance of $P$ increases and that of *Q* decreases. We conclude that
[MP PMT 1995; MP PET 2001]
(a) *P* and *Q* are conductors of different materials
(b) *P* is *N*-type semiconductor and *Q* is *P*-type semiconductor
(c) *P* is semiconductor and *Q* is conductor
(d) *P* is conductor and *Q* is semiconductor

22. The impurity atoms which are mixed with pure silicon to make a *P*-type semiconductor are those of [MP PMT 1995]
(a) Phosphorus (b) Boron
(c) Antimony (d) Copper

23. Holes are charge carriers in
[IIT-JEE 1996]
(a) Intrinsic semiconductors (b) Ionic solids
(c) *P*-type semiconductors (d) Metals

24. In extrinsic *P* and *N*-type, semiconductor materials, the ratio of the impurity atoms to the

pure semiconductor atoms is about

[MP PET 2003]

(a) 1 (b) $10^{-1}$

(c) $10^{-4}$ (d) $10^{-7}$

**25.** A hole in a *P*-type semiconductor is [MP PET 1996]

(a) An excess electron (b) A missing electron

(c) A missing atom (d) A donor level

**26.** The forbidden gap in the energy bands of germanium at room temperature is about

[MP PMT/PET 1998]

(a) $1.1eV$ (b) $0.1eV$

(c) $0.67eV$ (d) $6.7eV$

**27.** In *P*-type semiconductor the majority and minority charge carriers are respectively

[EAMCET 1994; MP PMT/PET 1998; MH CET 2000]

(a) Protons and electrons (b)Electrons and protons

(c) Electrons and holes (d) Holes and electrons

**28.** At zero Kelvin a piece of germanium [MP PET 1999]

(a) Becomes semiconductor

(b) Becomes good conductor

(c) Becomes bad conductor

(d) Has maximum conductivity

**29.** Electronic configuration of germanium is 2, 8, 18 and 4. To make it extrinsic semiconductor small quantity of antimony is added

[MP PET 1999]

(a) The material obtained will be *N*-type germanium in which electrons and holes are equal in number

(b) The material obtained will be *P*-type germanium

(c) The material obtained will be *N*-type germanium which has more electrons than holes at room temperature

(d) The material obtained will be *N*-type germanium which has less electrons than holes at room temperature

**30.** A semiconductor is cooled from $T_1K$ to $T_2K$. Its resistance

[MP PET 1999]

(a) Will decrease

(b) Will increase

(c) Will first decrease and then increase

(d) Will not change

**31.** If $N_P$ and $N_e$ be the numbers of holes and conduction electrons in an extrinsic semiconductor, then

[MP PMT 1999; AMU 2001]

(a) $N_P > N_e$

(b) $N_P = N_e$

(c) $N_P < N_e$

(d) $N_P > N_e$ or $N_P < N_e$ depending on the nature of impurity

**32.** In intrinsic semiconductor at room temperature, number of electrons and holes are

[EAMCET (Engg.) 1995; JIPMER 2001, 02]

(a) Equal (b) Zero

(c) Unequal (d) Infinite

**33.** (USS 133) Indium impurity in germanium makes

[EAMCET (Engg.) 1995]

(a) *N*-type (b) *P*-type

(c) Insulator (d) Intrinsic

**34.** Fermi level of energy of an intrinsic semiconductor lies

[EAMCET (Med.) 1995]

(a) In the middle of forbidden gap

(b) Below the middle of forbidden gap

(c) Above the middle of forbidden gap

(d) Outside the forbidden gap

**35.** In a semiconductor the separation between conduction band and valence band is of the order of

[EAMCET (Med.) 1995; AIIMS 2000]

(a) $100\,eV$ (b) $10\,eV$

(c) $1\,eV$ (d) $0\,eV$

**36.** The intrinsic semiconductor becomes an insulator at

[EAMCET (Med.) 1995; KCET (Engg./Med.) 1999; MP PET 2000; CBSE PMT 2001]

(a) $0°C$ (b) $-100°C$

(c) $300\,K$ (d) $0\,K$

**37.** The addition of antimony atoms to a sample of intrinsic germanium transforms it to a material which is

[AMU 1995]

(a) Superconductor (b) An insulator

(c) *N*-type semiconductor (d)*P*-type semiconductor

**38.** Resistance of semiconductor at $0°K$ is **[RPET 1997]**

(a) Zero (b) Infinite

(c) Large (d) Small

**39.** In a good conductor the energy gap between the conduction band and the valence band is

**[KCET 1993; EMCET (Med.) 1994]**

(a) Infinite (b) Wide

(c) Narrow (d) Zero

**40.** The impurity atom added to germanium to make it *N*-type semiconductor is **[KCET 1993; KCET (Engg./Med.) 2000]**

(a) Arsenic (b) Iridium

(c) Aluminium (d) Iodine

**41.** When *N*-type of semiconductor is heated

**[CBSE PMT 1993; DPMT 2000]**

(a) Number of electrons increases while that of holes decreases

(b) Number of holes increases while that of electrons decreases

(c) Number of electrons and holes remains same

(d) Number of electrons and holes increases equally

**42.** To obtain a *P*-type germanium semiconductor, it must be doped with **[CBSE PMT 1997; Pb. PET 2000]**

(a) Arsenic (b) Antimony

(c) Indium (d) Phosphorus

**43.** The temperature coefficient of resistance of a semiconductor

**[AFMC 1998, MNR 1998]**

(a) Is always positive

(b) Is always negative

(c) Is zero

(d) May be positive or negative or zero

**44.** *P*-type semiconductor is formed when **[RPET 1999]**

A. *As* impurity is mixed in *Si*

B. *Al* impurity is mixed in *Si*

C. *B* impurity is mixed in *Ge*

D. *P* impurity is mixed in *Ge*

(a) A and C (b) A and D

(c) B and C (d) B and D

**45.** In case of a semiconductor, which of the following statement is wrong

**[Pb. PMT 1999]**

(a) Doping increases conductivity

(b) Temperature coefficient of resistance is negative

(c) Resisitivity is in between that of a conductor and insulator

(d) At absolute zero temperature, it behaves like a conductor

**46.** Energy bands in solids are a consequence of

**[DCE 1999, 2000; AIEEE 2004]**

(a) Ohm's Law

(b) Pauli's exclusion principle

(c) Bohr's theory

(d) Heisenberg's uncertainty principle

**47.** In a *P*-type semiconductor

**[AIIMS 1997; Orissa JEE 2002; MP PET 2003]**

(a) Current is mainly carried by holes

(b) Current is mainly carried by electrons

(c) The material is always positively charged

(d) Doping is done by pentavalent material

**48.** At ordinary temperatures, the electrical conductivity of semi conductors in $mho/meter$ is in the range **[MP PET 2003]**

(a) $10^{-3}$ to $10^{-4}$ (b) $10^{6}$ to $10^{9}$

(c) $10^{-6}$ to $10^{-10}$ (d) $10^{-10}$ to $10^{-16}$

**49.** When the temperature of silicon sample is increased from $27°C$ to $100°C$, the conductivity of silicon will be

**[RPMT 1999]**

(a) Increased (b) Decreased

(c) Remain same (d) Zero

**50.** In a *P*-type semiconductor, germanium is doped with

**[AFMC 1999]**

(a) Boron (b) Gallium

(c) Aluminium (d) All of these

**51.** In *N*-type semiconductors, majority charge carriers are

**[AIIMS 1999]**

(a) Holes (b) Protons

(c) Neutrons (d) Electrons

**52.** Semiconductor is damaged by the strong current due to

**[MH CET 2000]**

(a) Lack of free electron (b) Excess of electrons

(c) Excess of proton (d) None of these

**53.** GaAs is **[RPMT 2000]**

(a) Element semiconductor

(b) Alloy semiconductor

(c) Bad conductor

(d) Metallic semiconductor

**54.** If $n_e$ and $n_h$ are the number of electrons and holes in a semiconductor heavily doped with phosphorus, then

**[MP PMT 2000]**

(a) $n_e >> n_h$ (b) $n_e << n_h$

(c) $n_e \le n_h$ (d) $n_e = n_h$

**55.** An *N*-type and *P*-type silicon can be obtained by doping pure silicon with

**[EAMCET (Med.) 2000]**

(a) Arsenic and Phosphorous (b) Indium and Aluminium

(c) Phosphorous and Indium (d) Aluminium and Boron

**56.** *N*-type semiconductors will be obtained, when germanium is doped with

**[AIIMS 2000]**

(a) Phosphorus (b) Aluminium

(c) Arsenic (d) Both (a) or (c)

**57.** The state of the energy gained by valance electrons when the temperature is raised or when electric field is applied is called as

**[CBSE PMT 2000]**

(a) Valance band (b) Conduction band

(c) Forbidden band (d) None of these

**58.** To obtain electrons as majority charge carriers in a semiconductor, the impurity mixed is **[MP PET 2000]**

(a) Monovalent (b) Divalent

(c) Trivalent (d) Pentavalent

**59.** For germanium crystal, the forbidden energy gap in joules is

**[MP PET 2000]**

(a) $1.12 \times 10^{-19}$ (b) $1.76 \times 10^{-19}$

(c) $1.6 \times 10^{-19}$ (d) Zero

**60.** A pure semiconductor behaves slightly as a conductor at

**[MH CET (Med.) 2001; BHU 2000; AFMC 2001]**

(a) Room temperature (b) Low temperature

(c) High temperature (d) Both (b) and (c)

**61.** Which is the correct relation for forbidden energy gap in conductor, semi conductor and insulator

**[RPMT 2001; AIEEE 2002]**

(a) $\Delta Eg_c > \Delta Eg_{sc} > \Delta Eg_{insulator}$

(b) $\Delta Eg_{insulator} > \Delta Eg_{sc} > \Delta Eg_{conductor}$

(c) $\Delta Eg_{conductor} > \Delta Eg_{insulator} > \Delta Eg_{sc}$

(d) $\Delta Eg_{sc} > \Delta Eg_{conductor} > \Delta Eg_{insulator}$

**62.** The band gap in Germanium and silicon in *eV* respectively is

**[MP PMT 2001]**

(a) 0.7, 1.1 (b) 1.1, 0.7

(c) 1.1, 0 (d) 0, 1.1

**63.** *P*-type semiconductors are made by adding impurity element **[MP PMT 2001]**

(a) *As* (b) *P*

(c) *B* (d) *Bi*

**64.** At room temperature, a *P*-type semiconductor has

**[Kerala PMT 2002]**

(a) Large number of holes and few electrons

(b) Large number of free electrons and few holes

(c) Equal number of free electrons and holes

(d) No electrons or holes

**65.** In intrinsic semiconductor at room temperature, number of electrons and holes are **[JIPMER 2001, 02; MP PMT 2002]**

(a) Unequal (b) Equal

(c) Infinite (d) Zero

**66.** The valence band and conduction band of a solid overlap at low temperature, the solid may be

[Orissa JEE 2002; BCECE 2004]

(a) A metal (b) A semiconductor
(c) An insulator (d) None of these

**67.** Which impurity is doped in *Si* to form *N*-type semi-conductor? [CBSE PMT 1996; AIEEE 2002]
(a) *Al* (b) *B*
(c) *As* (d) None of these

**68.** In a semiconductor [AIEEE 2002; AIIMS 2002]
(a) There are no free electrons at any temperature
(b) The number of free electrons is more than that in a conductor
(c) There are no free electrons at 0 *K*
(d) None of these

**69.** The energy band gap is maximum in [AIEEE 2002]
(a) Metals (b) Superconductors
(c) Insulators (d) Semiconductors

**70.** The process of adding impurities to the pure semiconductor is called
[MH CET 2002]
(a) Drouping (b) Drooping
(c) Doping (d) None of these

**71.** When phosphorus and antimony are mixed in zermaniun, then
[CPMT 2003]
(a) *P*-type semiconductor is formed
(b) *N*-type semiconductor is formed
(c) Both (a) and (b)
(d) None of these

**72.** To a germanium sample, traces of gallium are added as an impurity. The resultant sample would behave like
[AIIMS 2003]
(a) A conductor
(b) A *P*-type semiconductor
(c) An *N*-type semiconductor
(d) An insulator

**73.** For non-conductors, the energy gap is
[EAMCET (Engg.) 1995; MP PET 1996; RPET 2003]
(a) 6 *eV* (b) 1.1 *eV*
(c) 0.8 *eV* (d) 0.3 *eV*

**74.** Donor type impurity is found in
[RPET 2003]
(a) Trivalent elements (b) Pentavalent elements
(c) In both the above (d) None of these

**75.** The difference in the variation of resistance with temperature in a metal and a semiconductor arises essentially due to the difference in the [AIEEE 2003]
(a) Variation of scattering mechanism with temperature
(b) Crystal structure
(c) Variation of the number of charge carriers with temperature
(d) Type of bon

**76.** The charge on a hole is equal to the charge of
[MP PMT 2004]
(a) Zero (b) Proton
(c) Neutron (d) Electron

**77.** When germanium is doped with phosphorus, the doped material has [MP PMT 2004]
(a) Excess positive charge
(b) Excess negative charge
(c) More negative current carriers
(d) More positive current carriers

**78.** A *Ge* specimen is doped with *Al*. The concentration of acceptor atoms is $\sim 10^{21}$ $atoms/m^3$. Given that the intrinsic concentration of electron hole pairs is $\sim 10^{19}/m^3$, the concentration of electrons in the specimen is
[AIIMS 2004]
(a) $10^{17}/m^3$ (b) $10^{15}/m^3$
(c) $10^{4}/m^3$ (d) $10^{2}/m^3$

**79.** Which of the following has negative temperature coefficient of resistance
[AFMC 2004]
(a) Copper (b) Aluminium
(c) Iron (d) Germanium

**80.** In semiconductors at a room temperature [CBSE PMT 2004]

(a) The valence band is partially empty and the conduction band is partially filled

(b) The valence band is completely filled and the conduction band is partially filled

(c) The valence band is completely filled

(d) The conduction band is completely empty

**81.** Regarding a semiconductor which one of the following is wrong **[CPMT 2004]**

(a) There are no free electrons at room temperature

(b) There are no free electrons at 0 *K*

(c) The number of free electrons increases with rise of temperature

(d) The charge carriers are electrons and holes

**82.** Which of the following statements is true for an *N*-type semi-conductor **[CPMT 2004]**

(a) The donor level lies closely below the bottom of the conduction band

(b) The donor level lies closely above the top of the valence band

(c) The donor level lies at the halfway mark of the forbidden energy gap

(d) None of above

**83.** Choose the correct statement **[DCE 2004]**

(a) When we heat a semiconductor its resistance increases

(b) When we heat a semiconductor its resistance decreases

(c) When we cool a semiconductor to 0 *K* then it becomes super conductor

(d) Resistance of a semiconductor is independent of temperature

**84.** In a *P*-type semi-conductor, germanium is dopped with **[MH CET 2003]**

(a) Gallium (b) Boron

(c) Aluminium (d) All of these

**85.** A piece of semiconductor is connected in series in an electric circuit. On increasing the temperature, the current in the circuit will **[RPMT 2003]**

(a) Decrease (b) Remain unchanged

(c) Increase (d) Stop flowing

**86.** Intrinsic semiconductor is electrically neutral. Extrinsic semiconductor having large number of current carriers would be **[AMU (Engg.) 2001]**

(a) Positively charged

(b) Negatively charged

(c) Positively charged or negatively charged depending upon the type of impurity that has been added

(d) Electrically neutral

**87.** If $n_e$ and $v_d$ be the number of electrons and drift velocity in a semiconductor. When the temperature is increased **[Pb. CET 2000]**

(a) $n_e$ increases and $v_d$ decreases

(b) $n_e$ decreases and $v_d$ increases

(c) Both $n_e$ and $v_d$ increases

(d) Both $n_e$ and $v_d$ decreases

**88.** In extrinsic semiconductors **[EAMCET (Engg.) 1999]**

(a) The conduction band and valence band overlap

(b) The gap between conduction band and valence band is more than 16 eV

(c) The gap between conduction band and valence band is near about 1 eV

(d) The gap between conduction band and valence band will be 100 eV and more

**89.** Resistivity of a semiconductor depends on **[MP PMT 1999]**

(a) Shape of semiconductor

(b) Atomic nature of semiconductor

(c) Length of semiconductor

(d) Shape and atomic nature of semiconductor

90. Electric current is due to drift of electrons in [CPMT 1996]

(a) Metallic conductors

(b) Semi-conductors

(c) Both (a) and (b)

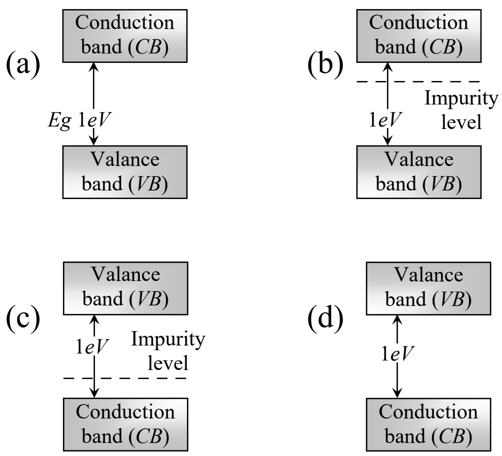
(d) None of these

91. The energy gap of silicon is 1.14 $eV$. The maximum wavelength at which silicon will begin absorbing energy is [MP PMT 1993]

(a) 10888 $\AA$ (b) 1088.8 $\AA$

(c) 108.88 $\AA$ (d) 10.888 $\AA$

92. Which of the following energy band diagram shows the $N$-type semiconductor [RPET 1986]




93. The mobility of free electron is greater than that of free holes because

(a) The carry negative charge

(b) They are light

(c) They mutually collide less

(d) They require low energy to continue their motion

94. The relation between the number of free electrons in semiconductors ($n$) and its temperature ($T$) is

(a) $n \propto T^2$ (b) $n \propto T$

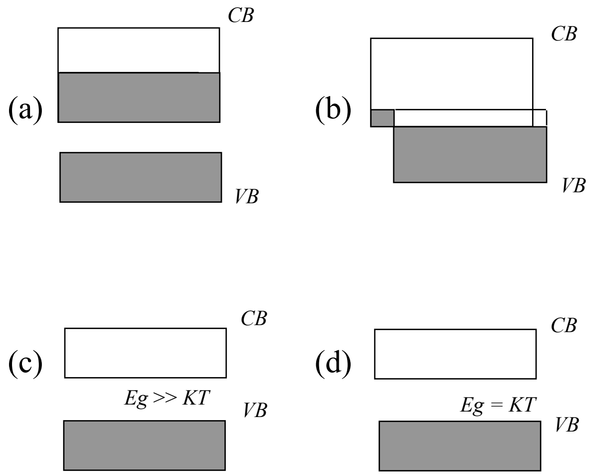
(c) $n \propto \sqrt{T}$ (d) $n \propto T^{3/2}$

95. The electron mobility in $N$-type germanium is 3900 $cm^2/v\text{-}s$ and its conductivity is 6.24 $mho/cm$, then impurity concentration will be if the effect of cotters is negligible

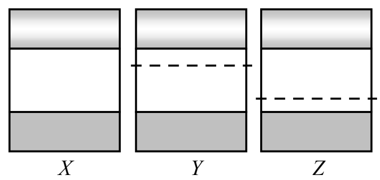
(a) $10^{15}$ $cm^3$ (b) $10^{13}$ $/cm^3$

(c) $10^{12}$ $/cm^3$ (d) $10^{16}$ $/cm^3$

96. Which of the energy band diagrams shown in the figure corresponds to that of a semiconductor [Orissa JEE 2003]




97. The energy band diagrams for three semiconductor samples of silicon are as shown. We can then assert that [Haryana CEE 1996]




(a) Sample $X$ is undoped while samples $Y$ and $Z$ have been doped with a third group and a fifth group impurity respectively

(b) Sample $X$ is undoped while both samples $Y$ and $Z$ have been doped with a fifth group impurity

(c) Sample $X$ has been doped with equal amounts of third and fifth group impurities while samples $Y$ and $Z$ are undoped

(d) Sample $X$ is undoped while samples $Y$ and $Z$ have been doped with a fifth group and a third group impurity respectively

**98.** Carbon, silicon and Germanium atoms have four valence electrons each. Their valence and conduction band are separated by energy band gaps represented by $(E_g)_C$. $(E_g)_{Si}$ and $(E_g)_{Ge}$ respectively. Which one of the following relationship is true in their case **[CBSE PMT 2005]**

(a) $(E_g)_C > (E_g)_{Si}$ (b) $(E_g)_C = (E_g)_{Si}$

(c) $(E_g)_C < (E_g)_{Ge}$ (d) $(E_g)_C < (E_g)_{Si}$

**99.** A semiconductor dopped with a donor impurity is **[AFMC 2005]**

(a) *P*-type (b) *N*-type

(c) *NPN* type (d) *PNP* type

**100.** In a semiconducting material the mobilities of electrons and holes are $\mu_e$ and $\mu_h$ respectively. Which of the following is true **[AIIMS 2005]**

(a) $\mu_e > \mu_h$ (b) $\mu_e < \mu_h$

(c) $\mu_e = \mu_h$ (d) $\mu_e < 0; \mu_h > 0$

**101.** Doping of intrinsic semiconductor is done **[Orissa JEE 2005]**

(a) To neutralize charge carriers

(b) To increase the concentration of majority charge carriers

(c) To make it neutral before disposal

(d) To carry out further purification

## Semiconductor Diode

**1.** In the forward bias arrangement of a *PN*-junction diode **[MP PMT 1994, 96, 99]**

(a) The *N*-end is connected to the positive terminal of the battery

(b) The *P*-end is connected to the positive terminal of the battery

(c) The direction of current is from *N*-end to *P*-end in the diode

(d) The *P*-end is connected to the negative terminal of battery

**2.** In a *PN*-junction diode

(a) The current in the reverse biased condition is generally very small

(b) The current in the reverse biased condition is small but the forward biased current is independent of the bias voltage

(c) The reverse biased current is strongly dependent on the applied bias voltage

(d) The forward biased current is very small in comparison to reverse biased current

**3.** The cut-in voltage for silicon diode is approximately

(a) 0.2 V (b) 0.6 V

(c) 1.1 V (d) 1.4 V

**4.** The electrical circuit used to get smooth *dc* output from a rectifier circuit is called **[KCET 2003]**

(a) Oscillator (b) Filter

(c) Amplifier (d) Logic gates

**5.** *PN*-junction diode works as a insulator, if connected **[CPMT 1987]**

(a) To A.C. (b) In forward bias

(c) In reverse bias (d) None of these

**6.** The reverse biasing in a *PN* junction diode **[MP PMT 1991; EAMCET 1994; CBSE PMT 2003]**

(a) Decreases the potential barrier

(b) Increases the potential barrier

(c) Increases the number of minority charge carriers

(d) Increases the number of majority charge carriers

**7.** The electrical resistance of depletion layer is large because

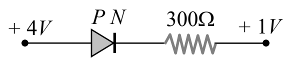
(a) It has no charge carriers

(b) It has a large number of charge carriers

(c) It contains electrons as charge carriers

(d) It has holes as charge carriers

**8.** In the circuit given below, the value of the current is **[MP PET 1993]**

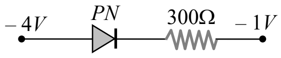



(a) 0 *amp* (b) $10^{-2}$ *amp*

(c) $10^2$ *amp* (d) $10^{-3}$ *amp*

**9.** What is the current in the circuit shown below

**[AFMC 2000; RPMT 2001]**




(a) 0 *amp* (b) $10^{-2}$ *amp*

(c) 1 *amp* (d) 0.10 *amp*