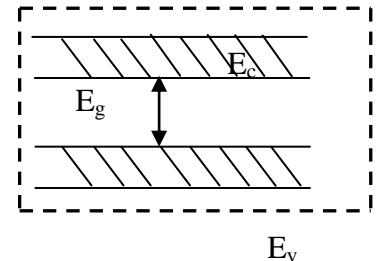


SEMI-CONDUCTOR AND ELECTRONICS

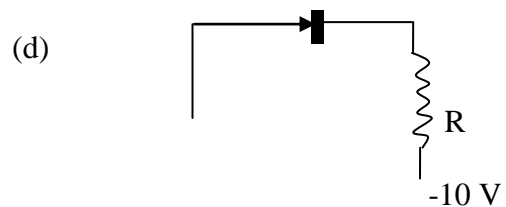
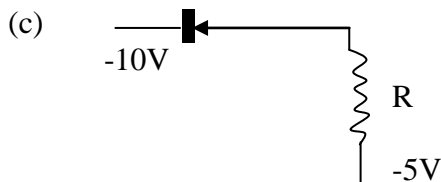
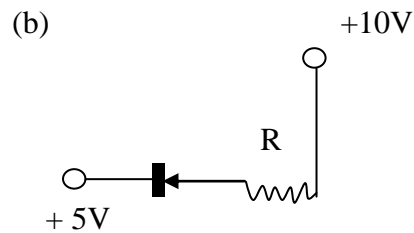
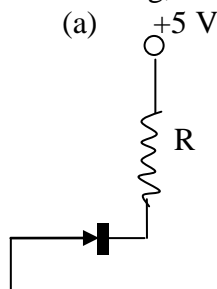
1. At absolute zero, Si acts as
(a) Non metal (b) metal (c) insulator (d) none of these
2. By increasing the temperature, the specific resistance of a conductor and a semiconductor
(a) Increases for both (b) decreases for both
(c) increases, decreases (d) decreases, increases
3. The energy band gap is maximum in
(a) Metals (b) superconductors (c) insulator (d) semiconductor
4. The part of a transistor which is most heavily doped to produce large number of majority carries is
(a) Emmiter (b) base (c) collector (d) can be any of the above three
5. A strip of copper and another germanium are cooled from room temperature to 80 K. the resistance of
(a) Each of these decreases
(b) Copper strip increases and that of germanium decreases
(c) Copper strip decrease and that of germanium increases
(d) Each of these increases
6. The difference in the variation of resistance with temperature in a metal and a semiconductor arises essentially due to the difference in the
(a) Crystal structure
(b) Variation of the number of charge carries with temperature
(c) Type of bonding
(d) Variation for scattering mechanism with temperature
7. IN the middle of the depletion layer of a reverse- biased p-n junction, the
(a) Electric field is zero (b) potential is maximum
(c) electric field is maximum (d) potential is zero
8. When npn transistor is used as amplifer
(a) Electrons move from base to collector
(b) holes move from emitter to base
(c) electrons move from collector to base
(d) holes move from base to emitter
9. For a transistor amplifier in common emitter configuration having load impedance of $1\text{ k}\Omega$ ($h_{fe} = 50$ and $h_{oe} = 25$) the current gain is
(a) -5.2 (b) -15.7 (c) -24.8 (d) -48.78
10. A piece of copper and another of germanium are cooled from room temperature to 77 K, the resistance of
(a) Each of them increases
(b) each of them decrease
(c) copper decrease and germanium increases
(d) copper increases and germanium increase
11. When p-n junction diode is forward biased
(a) The depletion region is reduced and barrier height is increased
(b) The depletion region is widened and barrier height is reduced.
(c) Both the depletion region and barriers height reduced.
(d) Both the depletion region and barrier height increased
12. The electrical conductivity of a semiconductor increases when electromagnetic radiation of wavelength shorter than 2480 nm is incident on it. The band gap in (eV) for the semiconductor is
(a) 1.1 eV (b) 2.5 eV (c) 0.5 eV (d) 0.7 eV
13. In a common base amplifier, the phase difference between the input signal voltage and about voltage is
(a) $\frac{\pi}{4}$ (b) π (C) 0 (d) $\frac{\pi}{2}$
14. In a full wave rectifier circuit operating from 50 Hz mains frequency, the fundamental frequency in the ripple would be
(a) 50 Hz (b) 25 Hz (c) 100 Hz (d) 70.7Hz

15. A solid which is transparent to visible light and whose conductivity increases with temperature is formed by
 (a) Metallic binding (b) Ionic binding
 (c) Covalent binding (d) van der waals binding
16. If the ratio of the concentration of electrons that of holes in a semiconductor $7/5$ and the ratio of currents is $5/4$, then what us the ratio of their drift velocities?
 (a) $4/7$ (b) $5/8$ (c) $4/5$ (d) $5/4$
17. In a common mode of a transistor, t collector current is 5.458mA for an emit current is 5.60mA . The value of the base current amplification factor (β) will be
 (a) 48 (b) 49 (c) 50 (d) 51
19. In the lattice constant of this condition band width Semiconductor is decreased, then Band gap Which of the following is correct?

Valence band width

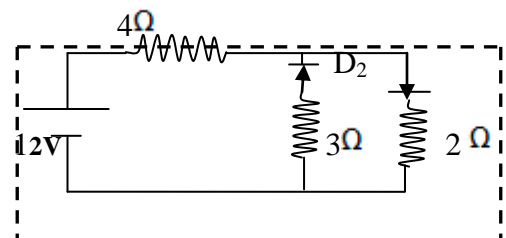


- (a) All E_g , E_g , E_v decrease (b) All E_g , E_g , E_v decrease
 (c) E_g and E_v increase but E_g decreases (d) E_g and E_v decrease but E_g increases
20. In the following, which one of the diodes is reverse biased?



21. The circuit has two oppositely connect ideal diodes in parallel. What is the current following in the circuit?

- (a) 1.33 A (b) 1.71 A
 (c) 2.00 A (d) 2.31 A



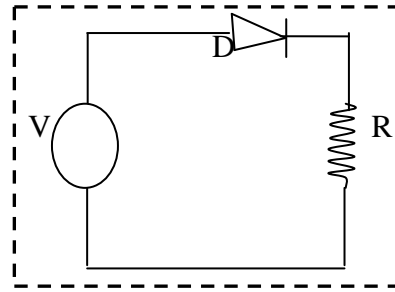
22. Carbon, silicon and germ anium have four valence electron each. At room temperature which one of the following statement is most appropriate?

- (a) The number of free electrons for conduction is significant only in Si and Ge but small in C.
 (b) The number of free conduction electrons is significant in C but small in Si and Ge
 (c) The number of free conduction electrons is negligible small in all the three
 (d) The number of free electrons for conduction is significant in all the three

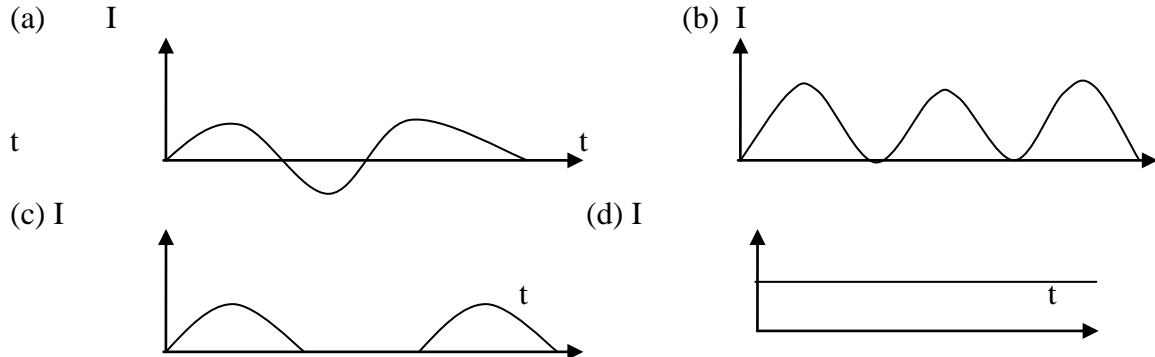
23. A working transistor with its three legs marked P,Q and R is tested using a multimeter. No conduction is found between P and Q. by connecting the common (negative) terminal of the multimeter to R and the other (positive) terminal to P or Q some resistance is seen on the multimeter. Which of the following is true for the transistor?

- (a) It is a pnp transistor with R as emitter
 (b) It is an npn transistor with R as collector
 (c) It is an npn transistor with R as base
 (d) It is a pnp transistor with R as collector

24. An p-n junction (D) shown in the figure can act as a rectifier. An alternating current source (V) is connected in the circuit .

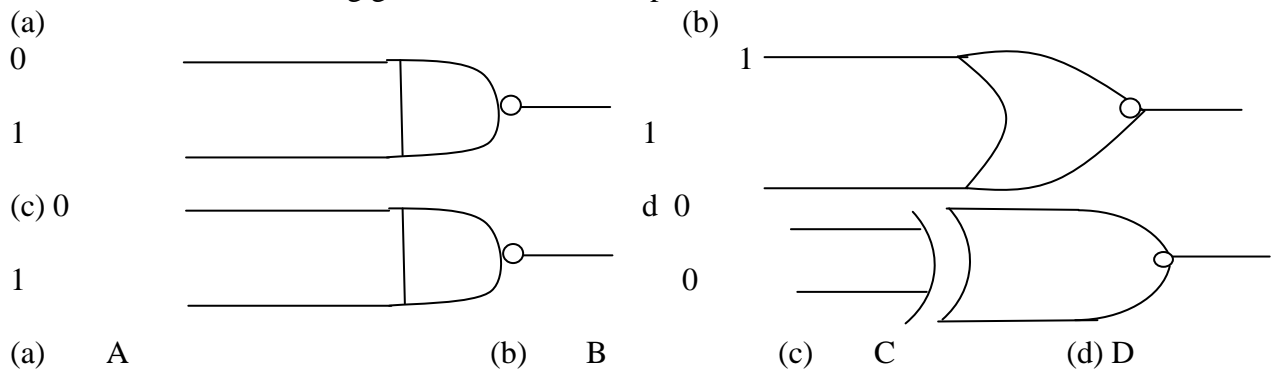


The current (I) in the resistor R can be shown by



25. The cause of the potential barriers in a p n diode is :
- Depletion of positive charge near the junction
 - Concentration of positive charges near the junction \
 - Depletion of negative charges near the junction
 - Concentration of positive and negative charges near the junction
26. A semi-conduction device is connected in a series in circuit with a battery and a resistance. A current is allowed to pass through the circuit. If the polarity of the battery is reversed, the current drops to almost zero. The device may be:
- a p – n junction
 - an intrinsic semi-conductor
 - a p-type semi-conductor
 - an n-type semiconductor
27. The transfer ration β of a transistor is 50. The input resistance of the transistor when used in the common emitter configuration is $1\text{ k}\Omega$. The peak value of the collection AC system for an AC input voltage of 0.01 V peak is
- $100\mu\text{ A}$
 - $0.01\mu\text{ A}$
 - 0.25 mA
 - $500\mu\text{ A}$

28. Which one of the following gates will have an output of 1?



29. The truth table given below is for which gate?

Input		Out put
A	B	C
0	0	1
0	1	1
1	0	1
1	1	0

- (a) XOR (b) OR (c) AND (d) NAND

30. Which of the following when added as an impurity into silicon produces n-type semiconductor?

- (a) P (b) Al (c) B (d) Mg

31. In a junction diode, the holes are due to:

- (a) protons (b) extra electrons (c) neutrons (d) missing electrons

32. Depletion layer consists of:

- (a) electrons (b) protons (c) mobile charge carriers (d) immobile ions

33. In forward bias the width of depletion layer in a p-n junction diode:

- (a) increases (b) decreases (c) remains constant (d) first increases then decreases

34. In p-type semiconductor, the major charge carriers are;

- (a) holes (b) electrons (c) protons (d) neutrons

35. Sodium has body centered packing. If the distance between two nearest atoms is 3.7 \AA then the lattice parameter is:

- (a) 3.3 \AA (b) 3.9 \AA (c) 4.3 \AA (d) 4.8 \AA

37. If α and β are current gains in common base and common emitter configuration of a transistor, then β is equal to

- (a) $\frac{1}{\alpha}$ (b) $\frac{\alpha}{1+\alpha}$ (c) $\frac{\alpha}{1-\alpha}$ (d) $\alpha - \frac{1}{\alpha}$

38. The truth table given below

Input		Output
A	B	Y
0	0	0
1	0	0
0	1	0
1	1	1

- (a) AND gate (b) NOR gate (c) OR gate (d) NAND gate

39. Si and Cu are cooled to a temperature of 300k, then resistivity:

- (a) for Si increases and for Cu decreases (b) for Cu increases and for Si decreases
(c) decreases for both Si and Cu (d) increases for both Si and Cu

40. In a common-base configuration of a transistor $\frac{\Delta i_C}{\Delta i_E} = 0.98$, then current gain in common emitter configuration of transistor will be:

- (a) 49 (b) 98 (c) 4.9 (d) 24.5

Ans. 1 Semiconductors are insulators at low temperature.

Ans. 3. Maximum in insulators and overlapping in metals.

Ans. 2. Use $R_t = R_0 \left(\frac{T}{273} \right)$
Ans. 5 (c)

Ans. 6 (b)

Ans. 7 (a)

Ans. 8 (a)

Ans. 9 (d)

Ans. 10 (d)

Ans. 11 (c)

Ans 12. (c)

Ans. 13 (c)

Ans. 14 (c)

Ans. 15 (c)

Ans. 16 (d)

Ans. 17 (b)

Ans. 19 (c)

Ans. 20 (a)

Ans.21 (c)

Ans. 22 (a)

Ans. 23 (c)

Ans. 24 (c)

Ans. 25 d)

Ans. 26 (a)

Ans. 27 (d)

Ans. 28 (c)

Ans. 29 (d)

Ans. 30 (a)

Ans. 31 (d)

Ans. 32 (d)

Ans. 33 (b)

Ans. 34 (a)

Ans. 35 (c)

Ans. 37 (c)

Ans. 38 (a)

Ans. 39 (a)

Ans. 40 (a)