NEET PHYSICS

Topic: Semi Conductor

Q.1 In conductors -

(A) conduction band is completely empty but forbidden energy gap is small

(B) conduction and valence bands are overlapped

(C) valence band is completely filled but the conduction band is completely empty

(D) no energy band is present

Q.2 The forbidden energy gap of a germanium semiconductor is 0.75 eV. The minimum thermal energy of electrons reaching the conduction band from the valence band should be -

(A) 0.5 eV (B) 0.75 eV

(C) 0.25 eV (D) 1.5eV

Q.3 The energy of a photon of sodium light (λ = 5890Å) equals the band gap of a semiconductor. The minimum energy required to create an electron-hole pair is -

(A) 0.026 eV (B) 0.31 eV

(C) 2.1eV (D) 6.4 eV

Q.4 The forbidden energy band gap in conductors, semiconductors and insulators are EG_1, EG_2 and EG_3 respectively. The relation among them is -

(A) $EG_1 = EG_2 = EG_3$ (B) $EG_1 < EG_2 < EG_3$

(C) $EG_1 > EG_2 > EG_3$ (D) $EG_1 < EG_2 > EG_3$

Q.5 On increasing temperature the specific resistance of a semiconductor -

(A) decreases (B) increases

(C) remains constant (D) becomes zero

Q.6 Which of the following statements is not correct ?

(A) Resistance of semiconductor decreases with increase in temperature

(B) In an electric field, displacement of holes is opposite to the displacement of electrons

(C) Resistance of a conductor decreases with the increase in temperature

(D) n-type semiconductors are neutral

Q.7 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 -

(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

Q.8 In a good conductor the energy gap between the conduction band and the valence band is -

(A) Infinite (B) Wide

(C) Narrow (D) Zero

Q.9 In a semiconducting material the mobilities of electrons and holes are μ_e and μ_h respectively. Which of the following is true ?

(A) $\mu_e > \mu_h$ (B) $\mu_e < \mu_h$

(C) $\mu_e = \mu_h$ (D) $\mu_e < 0; \mu_h > 0$

Q.10 Those materials in which number of holes in valence band is equal to number of electrons in conduction band are called

(A) conductors

(B) Intrinsic semiconductors

(C) p-type semiconductors

(D) n-type semiconductors

Q.11 In p-type semiconductor holes move in

(A) forbidden region

(B) conduction band

(C) valence band

(D) all the above regions

Q.12 Which of the following statement is wrong ?

(A) Resistance of extrinsic semiconductors can be changed as required

(B) In n-type semiconductor the number of electrons increases in valence band

(C) In p-type semiconductors the number of holes increases in valence band

(D) In pure semiconductor fermi band is situated in between the valence band and conduction band

Q.13 P-type semiconductor is formed when -

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

Q.14 In extrinsic semiconductors -

(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

Q.15 Fermi level of energy of an intrinsic semiconductor lies -

(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

Q.16 If n_e and v_d be the number of electrons and drift velocity in a semiconductor. When the temperature is increased -

(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

Q.17 The electron mobility in N-type germanium is 3900 cm^2/v.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) $10^{16}/cm^3$

Q.18 In semiconductor the concentrations of electrons and holes are $8 \times 10^{18}/m^3$ and $5 \times 10^{18}/m^3$ respectively. If the mobilities of electrons and hole are 2.3 m^2/volt-sec and 0.01 m^2/volt-sec respectively, then semiconductor is -

(A) N-type and its resistivity is 0.34 ohm-metre

(B) P-type and its resistivity is 0.034 ohm-metre

(C) N-type and its resistivity is 0.034 ohm-metre

(D) P-type and its resistivity is 3.40 ohm-metre

Q.19 A potential difference of 2V is applied between the opposite faces of a Ge crystal plate of area 1 cm^2 and thickness 0.5 mm. If the concentration of electrons in Ge is $2 \times 10^{19}/m^3$ and mobilities of electrons and holes are $0.36 \frac{m^2}{volt-sec}$ and $0.14 \frac{m^2}{volt-sec}$ respectively, then the current flowing through the plate will be -

(A) 0.25 A

(B) 0.45 A

(C) 0.56 A

(D) 0.64 A

Q.20 A potential barrier of 0.50 V exists across a P-N junction. If the depletion region is 5.0×10^{-7} m wide, the intensity of the electric field in this region is -

(A) 1.0×10^6 V/m

(B) $1.0 \times 10^{5\backslash}$ V/m

(C) 2.0×10^5 V/m

(D) 2.0×10^6 V/m

Q.21 If no external voltage is applied across P-N junction, there would be -

(A) No electric field across the junction

(B) An electric field pointing from N-type to P-type side across the junction

(C) An electric field pointing from P-type to N-type side across the junction

(D) A temporary electric field during formation of P-N junction that would subsequently disappear

Q.22 No bias is applied to a P-N junction, then the current -

(A) Is zero because the number of charge carriers flowing on both sides is same

(B) Is zero because the charge carriers do not move

(C) Is non-zero

(D) None of these

Q.23 Just before the reverse breakdown in a semiconductor diode -

(A) The forward current is much larger then the reverse current

(B) The forward current is much less then the reverse current

(C) The forward current is equal to the reverse current

(D) The reverse current is much large than the forward current

Q.24 The main cause of avalanche breakdown is -

(A) collision ionisation

(B) high dopring

(C) recombination of electron and holes

(D) none of these

Q.25 The main cause of Zener breakdown is -

(A) the base semiconductor being germanium

(B) production of electron-hole pair due to electric field

(C) low doping

(D) high doping

Q.26 Which of the following statements is correct ?

(A) The deplection region of P-N junction diode increases with forward biasing

(B) The depletion region of P-N junction diode decreases with reverse biasing

(C) The depletion region of P-N junction diode does not change with biasing

(D) The deplection region of P-N junction diode decreases with forward biasing

Q.27 When reverse bias in a junction diode is increased, the width of depletion layer -

(A) increase (B) decreases

(C) does not change (D) fluctuate

Q.28 A semiconductor device is connected in a series circuit with a battery and resistance. A current is found to pass through the circuit. If the polarity of the battery is reversed, the current drops almost to zero. The device may be -

(A) A P-type semiconductor

(B) An N-type semiconductor

(C) A PN-junction

(D) An intrinsic semiconductor

Q.29 The approximate ratio of resistances in the forward and reverse bias of the PN-junction diode is -

(A) $10^2 : 1$ (B) $10^{-2} : 1$

(C) $1 : 10^{-4}$ (D) $1 : 10^4$

Q.30 The dominant mechanisms for motion of charge carriers in forward and reverse biased silicon P-N junctions are -

(A) Drift in forward bias, diffusion in reversebias

(B) Diffusion in forward bias, drift in reverse bias

(C) Diffusion in both forward and reverse bias

(D) Drift in both forward and reverse bias

ANSWER KEY

Que.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Ans.	B	B	C	B	A	C	D	D	A	B
Que.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ans.	C	B	C	C	A	A	D	A	D	A
Que.	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Ans.	B	A	A	A	B	D	A	C	D	B