Question Bank for IA-II of EP-1

Q1. A semiconductor has ..... temperature coefficient of resistance.

1. Positive
2. Zero
3. Negative
4. None of the above

Q2. A semiconductor has generally ..... valence electrons.

1. 2
2. 3
3. 6
4. 4

Q3. The resistivity of a pure silicon is about .....

1. 100 Ω cm
2. 6000 Ω cm
3. 3 x 10^{5} Ω m
4. 6 x 10^{-8} Ω cm

Q4. Addition of pentavalent impurity to a semiconductor creates many .....

1. Free electrons
2. Holes
3. Valence electrons
4. Bound electrons

Q5. A hole in a semiconductor is defined as .....

1. A free electron
2. The incomplete part of an electron pair bond
3. A free proton
4. A free neutron

Q6. As the doping to a pure semiconductor increases, the bulk resistance of the semiconductor .....

1. Remains the same
2. Increases
3. Decreases
4. None of the above

Q7. In a semiconductor, current conduction is due to .....

1. Only holes
2. Only free electrons
3. Holes and free electrons
4. None of the above

Q8. The random motion of holes and free electrons due to thermal agitation is called .....

1. Diffusion
2. Pressure
3. Ionisation
4. None of the above

Q9. A p-n junction act as a .....

1. Controlled switch
2. Bidirectional switch
3. Unidirectional switch
4. None of the above

Q10. The leakage current across a p-n junction is due to .....

1. Minority carriers
2. Majority carriers
3. Junction capacitance
4. None of the above

Q11. With forward bias to a p-n junction, the width of depletion layer .....

1. Decreases
2. Increases
3. Remains the same
4. None of the above

Q12. At absolute temperature, an intrinsic semiconductor has .....

1. A few free electrons
2. Many holes
3. Many free electrons
4. No holes or free electrons

Q13. At room temperature, an intrinsic silicon crystal act approximately as

1. A battery
2. A conductor
3. An insulator
4. A piece of copper wire

Q14. Certain specimen of metal has 7.87×10^{28} free electron per cubic meter and the mobility of electrons in the metal is 34.8 cm^2/Vs. Conductivity of the metal is

1. 4.382×10^5S/m
2. 43.82×10^5S/m
3. 438.2×10^5S/m
4. 4382×10^5S/m

Q15. A p-type semiconductor has an acceptor density of 10^{20} atoms/m^3 and intrinsic concentration of 2.5×1019 m-1 at 300K. The electron concentration in this p-type semiconductor is

1. 6.23×10^{18}
2. 62.5×10^{19}
3. 62.5×10^{18}
4. 62.5×10^{19}

Q16. De-Broglie equation states the:

1. dual nature
2. particle nature
3. wave nature
4. none of these

Q17. Kinetic energy of emitted electrons depends upon:

1. Frequency
2. intensity
3. nature of atmosphere surrounding the electrons
4. none of these

Q18. The ratio of specific charge of an alpha particle to the proton is:

1. 1:2
2. 2:1
3. 4:1
4. 1:4

Q19. The momentum of an electron that emits a wavelength of 2 Å. will be:

1. 6.4×10^{-36} $kgms^{-1}$

2. 3.3×10^{-24} $kgms^{-1}$
3. 3.3×10^{-34} $kgms^{-1}$
4. none of these

Q20. X-rays are:
1. deflected by an electric field
2. deflected by a magnetic field
3. deflected by both electric and magnetic fields
4. not deflected by electric and magnetic fields

Q21. What is the de-Broglie wavelength of an electron accelerated from rest through a potential difference of 100 volts?
1. 12.3 Å
2. 1.23 Å
3. 0.123 Å
4. None of these

Q22. The de-Broglie wavelength of particle of mass 1 mg moving with a velocity of 1 ms^{-1}, in terms of Planck's constant h, is given by (in metre):
1. 10^5 h
2. 10^6 h
3. 10^{-3} h
4. 10^3 h

Q23. "The position and velocity of a small particle like electron can't be simultaneously determined." This statement is
1. Heisenberg uncertainty principle
2. Principle of de Broglie's wave nature of electron
3. Pauli's exclusion principle
4. Aufbau's principle

Q24. In an atom, the Orbital is
1. Circular path around the nucleus in which the electron revolves
2. Space around the nucleus where the probability of finding the electron is maximum
3. Amplitude of electrons wave
4. None of these

Q25. For a quantum wave particle, E = _____
1. $\hbar$ k
2. $\hbar$ ω
3. $\hbar$ ω/2
4. $\hbar$ k/2

Q26. Which of the following is not a characteristic of wave function?
1. Continuous
2. Single valued
3. Differentiable
4. Physically Significant

Q27. The square of the magnitude of the wave function is called_____
1. Current density
2. probability density
3. zero density
4. volume density

Q28. What is the frequency of light having a wavelength of 4.50×10^{-6} cm?
1. 2.84×10^{-12} s^{-1}

2. 2.10 x 10^4 s^{-1}
3. 4.29 x 10^{14} s^{-1}
4. 6.67 x 10^{15} s^{-1}

Q29. In superconductivity the conductivity of a material becomes

1. Zero
2. Finite
3. Infinite
4. None of the above

Q30. Which of the following are the properties of superconductors?

1. They are diamagnetic in nature
2. They have zero resistivity
3. They have infinite conductivity
4. All of the above