UNIT -22 SOLID STATE ELECTRONICS

MULTIPLE CHOICE QUESTIONS

1. A semiconductor is an element with a valence electron ---
   (a) Four (b) Eight
   (c) Two (d) One

2. A pure semiconductor is known as
   (a) Extrinsic **(b) Intrinsic**
   (c) Transistor (d) Diode

3. An acceptor atom is also called
   (a) Penta-valent atom **(b) Trivalent atom**
   (c) Minority carrier (d) Majority carrier

4. With which one of the following elements should silicon be doped to give a p-type of semiconductor?
   (a) Germanium (b) Arsenic
   (c) Selenium **(d) Boron**

5. For a full-wave rectifier, the output frequency
   (a) Equals one-half the input frequency (b) Equals the line frequency
   (c) Equals two times the input (d) Is three times the line frequency

6. LED construction needs a semiconductor material is:
   (a) Silicon (b) Germanium
   (c) Gallium **(d) Gallium arsenide**

7. The frequency of a half-wave signal is
   (a) Twice the line frequency **(b) Equal to the line frequency**
   (c) One-half of the line frequency (d) One-fourth of the line frequency

8. The voltage gain of an emitter follower circuit is
   (a) High (b) Low
   (c) Very high **(d) close to 1**

9. What is also called as the conventional amplifier?
   (a) Common-collector circuit (b) Emitter follower circuit
   (c) Common base circuit **(d) Common emitter circuit**

10. An op-amp with negative feedback provides an output parameter.
    (a) Gain (b) Bandwidth
    (c) Input-output impedance **(d) All of these**

EXAM PRACTICE MCQs

1. An n-type semiconductor can be obtained by doping pure silicon with:
   (a) Boron (b) Aluminum
   (c) Gallium **(d) Arsenic**
2. The donor impurity must have _____ electrons.
   (a) 3 (b) 4
   (c) 5 (d) 6
3. N-type semiconductor is obtained by doping silicon with:
   (a) Phosphorus (b) Aluminum
   (c) Boron (d) Germanium
4. What kind of semiconductor is formed when phosphorus is added to silicon?
   (a) P-type **(b) N-type**
   (c) PNP-type (d) NPN-type
5. The minority carriers in n-type semiconductors are:
   (a) Electrons **(b) Holes**
   (c) Positions (d) Protons
6. A semiconductor in its purest form is called.....
   (a) Insulator (b) Superconductor
   (c) Intrinsic semiconductor (d) Extrinsic semiconductor
7. A P-type semiconductor results when
   (a) A Pentavalent impurity is added to an intrinsic semiconductor
   (b) A trivalent impurity is added to an intrinsic semiconductor
   (c) Either a pentavalent or trivalent impurity is added to an intrinsic semiconductor
   (d) None of the above
8. An intrinsic semiconductor at absolute zero.....
   (a) Becomes an extrinsic semiconductor
   (b) Behaves like an insulator
   (c) Disintegrates into pieces
   (d) Becomes a superconductor
9. A semiconductor has.... temperature coefficient of resistance.
   (a) Zero (b) Positive
   (c) Negative (d) infinity
10. A doped semiconductor is also known as
    (a) Intrinsic semiconductor **(b) Extrinsic semiconductor**
    (c) Diffused semiconductor (d) superconductor
11. Which of the following cannot exist outside a semiconductor
    (a) Hole (b) Electron
    (c) .Both (a) and (b) (d) photon
12. As the temperature of a semiconductor increases its
    (a) Conductivity increases (b) Resistivity increases
    (c) Atomic number decreases (d) temperature coefficient becomes zero

13 The conduction band
(a) Is always above the forbidden energy level
(b) Is the region of free electrons
(c) Concentrates holes for the flow of current
(d) Is a range of energies corresponding to the energies of the free electrons

14 ..... has the highest mobility.
(a) Electron
(b) Positive ions
(c) positron
(d) Neutron

15 The atomic number of germanium is.....
(a) 4
(b) 8
(c) 16
(d) 32

16 The crystal diode is used as a
(a) Rectifier
(a) Amplifier
(a) Oscillator
(a) all of the above

17 The collector current I_C and emitter current I_E have---?
(a) Same sign in both n-p-n and p-n-p transistors.
(b) Opposite sign in both n-p-n and p-n-p transistors.
(c) No sign in both n-p-n and p-n-p transistors
(d) None of the above

18 A transistor has _____.
(a) One PN junction
(b) Two PN junctions
(c) Three PN junctions
(d) Four PN junctions

19 The element that has the biggest size in a transistor is _____.
(a) Collector
(b) Base
(c) Emitter
(d) all of these

20 In a PNP transistor, the current carriers are _____.
(a) Acceptor ions
(b) Donor ions
(c) Free electrons
(d) Holes

21 In a transistor, the base current is about _____ of the emitter current.
(a) 25 %
(b) 20 %
(c) 35 %
(d) 5 %

22 The relation between β and α is _____.
(a) β = 1/(1-α)
(b) β = (1-α)/α
(c) β = α/(1-α)
(d) β = 1/(1+α)

23 The value of β for a transistor is generally _____.
(a) 1
(b) Less than 1
(c) Between 20 and 500
(d) Above 500

24 The phase difference between the input and output voltage in a common base arrangement is ___.
(a) 180º
(b) 90º
(c) 270º
(d) 0º

25 The voltage gain of a transistor connected in a common collector arrangement is _____.
(a) Equal to 1
(b) More than 10
(c) More than 100
(d) Less than 1