Institute of Management & Sciences *(A project of SCPT)*

Solved Question Bank of Basic Electronics
Course: Basic Electronics BS-IT 1st Semester
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1: Why pure semiconductors are insulator at 0°K?

Ans: O K is absolute zero. At absolute zero, the electrons of the semi conductors are trapped and are immovable from their electron shell as they are in a low energy state. This makes the pure semiconductor an insulator.

2: What is the effect of temperature on barrier voltage?

Ans: On a high temperature, KE (Kinetic energy) is high. The movement of electron is fast. It narrows the barrier voltage.

3: Difference b/w electron and hole?

Ans: electron is negative charge carrier that moves around the nucleus while holes are the positive charge carriers.

4: Why electrons have greater mobility then hole in semiconductor material?

Ans: free electrons have greater mobility than holes to move them because they are already disconnected from their itoms.

5: Describe briefly energy bands in solid?

Ans: Representing the n-energy level in a single energy band of an isolated atom will become a band of energy in solids.

6: Define drift current in good conductor?

Ans: The flow of charge carriers, which is due to the applied voltage or electric field is called drift current. So in good conductors it is less.

7: Diff. b/w drift velocity and Fermi speed?

The drift velocity is the flow velocity that a particular such as electrons, attain due to an electric field.

Fermi speed may be defined as the energy which corresponds to the centre of gravity of conduction electronsand holes weighted according to their energies.

8:Explain effect of doping on semiconductor?

Ans: When we increase the doping level in semiconductors it converts into good conductors.

9:What is the effect of doping level on width of depletion layer?

Ans: if the doping level is heavy the width of depletion layer is thin. If the doping level is light then the width of depletion layer is thick.

10: Define Ohms Law? And give names of two non ohmic devices.

Ans: Ohm's Law states that the voltage is directly proportional to the current keeping resistance and temperature same or constant.

Names of ohmic devices: a) Diode **b)** Resistor.

11: Do Pure semiconductors obey Ohms Law?

Ans: No, because conductivity of semiconductors increase with temperature. It means they have negative temperature co-efficient of resistance.

12: **Express proportional voltage formulae for two resistances connected in series?**

Ans: $V_1 = V * R_1/R$

$V_2 = V * R_2/R$

14: What is avalanche Breakdown in reverse biased P-N junction?

Ans: This form of breakdown occur in junction which is lightly doped have wide depletion layer where the electric field is not strong enough to produce zener breakdown.

15: **Give at least three applications of P-N junction?**

Ans: a) Demodulation b) Switching c) Encoders

16: **What do you know about silver Oxide cell?**

Ans: It is a primary cell with an open circuit voltage of 1.5V. It has a cathode of silver oxide and an anode of zinc in an alkaline electrolyte. (Learn more at book page # 80)

17: Discuss difference between insulator and conductor?

Ans: the material through which current can flow is called conductors while the material through which current cannor flow is called insulator.

18: Define drift current in a good conductor?

Ans: See answer of question # 6

19: **Can a transformer operate on DC?**

Ans: No, a transformer can't operate DC.

20: **Define threshold voltage? Give its value for Si and Ge Junction?**

Ans: The minimum voltage that is required to break junction is known as threshold voltage or cut-in voltage or knee voltage. Silicon: 0.7 volt, Ge: 03v

21: Define zero reference level? Why we need it during voltage measurements at different points in electric circuit?

Ans: The level at zero voltage is called zero reference level or ground level. We need it during voltage measurement because of we can calculate real value.

22: Define rectification?

Ans: The process of convert AC into DC is called rectification.

23: Under what condition a transistor can operate in active region?

Ans: a) when emitter-base junction is forward-biased.

b) when collector-base junction is reverse-biased.

24: What are the conditions for proper working of a transistor in normal circuits?

Ans: a) emitter-base junction is forward-biased.

b) collector-base junction is reverse-biased.

25: Draw symbols for NPN and PNP transistor.

Ans: pg # 276

26: Draw the circuit diagram of a transistor used as a common collector configuration?

Ans: pg # 282

27: Why collector-Base junction is always reverse biased?

Ans: Collector base junction is always reverse biased because to conduct current through it.

28: Which factors control the capacitance of the capacitor?

Ans: The capacitance of a capacitor depends on the following factors:

1: Plate Area: Capacitance increases directly with increase in plate area ***(A).***

2: Plate Separation: As plate separation (d) decreases, capacitance increases and vice versa.

3: Type of Dielectric: It depends on the relative permittivity of the dielectric medium used.

(Learn more at book page # 62)

29: **Differentiate transition capacitance and diffusion capacitance?**

Ans: The capacitive effect is present when the junction is forward biased. It is called diffusion capacitance while the capacitive effect is present when the junction is reverse biased. It is called transition capacitance.

30: What is the basic principle behind the propagation of light in optical fiber?

Ans: Total internal reflection of is the basic principle.

31: In an optical fiber, why reflective index of core is kept higher than cladding?

Ans: The reflection index of the rod is higher than refractive index of the cladding material in order to utilize the phenomenon of total internal reflection for the propagation of light through the rod.

32: **Why optical fibers are better than metallic wires?**

Ans: Optical fibers have greater information carrying capacities than metallic conductors. Fiber optics uses light signals while metallic wires uses electrical signal.

33: Write down two examples of non-linear resistor?

Ans: *a)* Incandescent Bulb *b)* LED

34. Define silicon controlled rectifier (SCR) with its symbolic representation.

It is a trijunction PNPN device having three external connections: Anode (A), cathode (C) and gate (G).

See graphical representation on page # 268

35. What is the source of magnetism?

Power is the source of magnetism.

36. How electrons are multiplied in photomultiplier tube?

When light falls on the cathode, photoelectrons are emitted which are accelerated towards dynode 1, since it is at a higher potential. On cladding with this dynode, they liberate secondary electrons which are attracted by dynode no. 2, since it is at a relatively still higher potential. These electrons release further secondary electrons from it which are attracted by dynode 3. This process of secondary omission from different dynodes continues till the electrons are finally collected by the anode. It is obvious that at each dynode, the number of secondary keeps on multiplying.

37. Write down the significance of inductor, how it respond to AC?

Book page no. 55 (from second last line) ,to 56 (first six lines)

38. On what factors inductance of an inductor depends?

It depends on permeability of the core material, cross-sectional area, square of the number of turns of the coil and core length.

39. Draw symbols of an air-core and iron-core inductor?

Page no. 55

40. Why we use series voltage dividers circuit?

Series voltage dividers can be used for loads needed voltages less than the battery voltage. In fact, such voltage dividers circuits are used when it is necessary to obtain different values of voltage from a single energy source.

41. What are carrier waves?

the process of converting the low frequency signal with a very high frequency radio wave is called carrier wave.

42. Define modulation?

The process of combining audio frequency signal with radio frequency carrier wave is known as modulation.

43. What is frequency modulation?

In this case, the information signal changes the frequency of the carrier wave without changing its amplitude or phase.

44. What is amplitude modulation?

In this case, the information signal changes the amplitude of the carrier wave without changing its frequency or phase.

56: What is the first ionization energy of an electron in hydrogen atom?

Ans:

1. **Why PIN photodiodes have faster response than even the P-N photodiode?**

Ans: one of the advantage of PIN photodiode is decrease in capacitance because capacitance is inversely proportional to the separation of P- and N-regions. It allows a diode a faster response time.

2. **Why we need filters in the electronic circuits?**

Ans: we need filters in electronic circuit to remove the fluctuation and pulsations (called ripples) from the ripple tank.

3. **What is the principle of LED?**

Ans: as the name indicates, it is forward biased PN junction which emits visible light when energized.

4. **The color of light emitted by LED depends on what?**

Ans: The colour of a light emitting light depends on the type of material used as given below:

a) GaAs **b)** GaP **c**) GaAsP (Learn more at book page # 235)

5. **Define solar cell? Draw its symbol?**

Ans: It is also called solar energy converter and is basically a P-N junction device which converts solar energy into electric energy. (See its symbol at book page # 83)

6. **Briefly describe total internal reflection?**

Ans: if the angel of incident a limit is reached when angle of incident is greater than a critical angel then light may does not reflect but it reflect back into the same medium called total internal reflection.

7. **If total current drawn from four 1.5v cells connected in series is 1 ampere, how much current each cell supplies?**

Solution: 1 ampere

8. **Define ripple factor?**

Ans: The AC factor in DC voltages is called ripple factor.

9. **What is a filter circuit?**

Ans: Filter circuits are used to remove the unwanted parts from the output.

10. **Why silicon is invariably used in the manufacture of junction photodiodes?**

Ans: Silicon has lattice energy. It can bear more voltages so we used it in a junction photodiodes.

11. **Why we use cells in series and parallel connection?**

Ans: We use cells in series to increase the voltages and in parallel to increase the current.

12. **Mention at least five energy sources.**

Ans: a) Solar b) Hydro c) Thermal d) Hydra e) Wind

13. Give two applications of transformers.

Ans: **a)** It changes the voltage of one level to other level.

b) It isolates the one system to other.

14. What is the principle of transformer?

Ans: Mutual Inductance is the principle of transformer.

15. Diff. b/w mobile charge carriers and immobile ions?

Mobile charge carriers are those which are in high amount in the extrinsic semiconductor while immobile ions are those whaich are in low amount in the extrinsic semiconductors.

16. Define expiatory and etching?

Removal of materials from its physical surrounding is called expiatory while the removal of material from its chips by chemical means.

17. Write the advantages of IC?

i. It has very small size.
ii. It has low voltage.
iii. It is cheap in price.
iv. It is easily available.
v. It is used in active and passive cell.

18. Write advantages of FM?

i. The frequency range of FM is greater than AM.
ii. The S/N ratio is smaller than AM.

19. What is the effect of frequency on iron core?

Due to low inductance, the frequency of iron core increases.

20. Name the popular ways of turning SCR on?

i. Turning amplitude
ii. UJT amplitude

21. What is the effect of frequency on ferrite core?

In ferrite core, the frequency is low due to it, the eddy current loss is minimum.