



Mid-Term Assignment

Total Marks: 30

Instructor: M Khalid Hamid

Subject: Basic Electronics

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Q1: What would be an advantage of a 50 Ω voltage source compared to a 600 Ω voltage source?

Advantage:

Most RF circuits are 50 ohms.

Most audio circuits are 600 ohms.

There are variations and exceptions.

50 voltages is less expansive than 600 voltage source

In an RF circuit, it is usual for the source (signal generator), the load (input circuit of a receiver), and the cable connecting them together to all have the same impedance, usually 50 ohm.

Q1 b: Which approximation does the technician normally use when performing initial troubleshooting procedures? Why?

\the first step in troubleshooting is Verify that a problem actually exists. Because that a technician knows that if a problem actually exists or not. There are two major stages in the troubleshooting process. The first stage is identifying the issue. The second stage is performing the actual repair (or taking other steps that identifying the issue has made clear

Q1 C: What are some of the reasons for using a The venin or Norton circuit?

The venin's and Norton's theorems are important for circuit analysis as they are used to simplify the circuit. The venin's theorem says that if you take any two terminal of a complex network you can replace the circuit across it by a voltage source and a resistor in series. This simplifies the circuit drastically.

Q2: A

Explain how the transformer turns ratio affects the rectified output voltage of full wave rectifier?

The center tapped full wave rectifier uses a center tapped transformer to convert the input AC voltage into output DC voltage. When input AC voltage is applied, the secondary winding of the center tapped transformer divides this input AC voltage into two parts: positive and negative.

Q2:B

Compare the center-tapped rectifier and the bridge rectifier?

The main difference between a Center Tapped and Bridge Rectifier is that one uses center tapped transformer while another does not require a center tapped transformer. Both these types are full wave rectifiers but their method of converting AC input into DC is different by employing different numbers of diodes.

Q2:C

- **List the advantages and disadvantages of the RC filter and LC filter?**
- **Advantages of LC filter :**

In choke input filter, current flows continuously. Therefore, the transformer is used more efficiently.

Ripple content at the output is low.

It is less dependent on the load current.

DC voltage drop across L is much smaller because its de resistance R is very small.

- **Disadvantages of LC Filter:**

Large size and weight of inductors,

More cost,

External hold is produced by inductor.

- **Advantages of RC filter:**

An RC filter allows the peak value of the rectified signal to pass through to the load resistor. The resistor, R is much greater than the at the ripple frequency. Therefore, the ripple is reduced before it reaches to the load.

- **Disadvantages of RC filter:**

The main disadvantage of RC filter is the loss of dc voltage across each R. Therefore, RC filter is suitable only for light loads. i.e. small load current.

Q3: A

- **Tell me why a very small current exists in a reverse-biased diode?**

A reverse-biased diode prevents current from going through it, due to the expanded depletion region. In actuality, a very small amount of current can and does go through a reverse-biased diode, called the leakage current, but it can be ignored for most purposes.

Q3: B

- **I want to know why a light emitting diode produces light. Tell me about it.**

- Light emitting diodes are made from a very thin layer of fairly heavily doped semiconductor material and depending on the semiconductor material used and the amount of doping, when forward biased an LED will emit a colored light at a particular spectral wavelength.

Q3:C

- **Do holes' flow in a conductor? Why or why not? What happens to holes when they reach the end of a semiconductor?**

Electron holes do exist in conductors: inside p-type silicon conductors. ... "Holes" are positive ions inside a semiconductor crystal. They have a genuine positive charge; as if that semiconductor atom has an extra proton. This positive ion can move, but the excess proton itself doesn't move around.

That is, the electron is free until it falls into a hole. Holes and electrons are the two types of charge carriers responsible for current in semiconductor materials. A hole is the absence of an electron in a particular place in an atom. Although it is not a physical particle in the same sense as an electron, a hole can be passed from atom to atom in a semiconductor material.

Q3: D

- **Why is recombination important in a diode?**

there should be recombination current. Because of that some electrons and holes disappear after some time and for compensation an electron is supplied by battery diffusion process. If there is not recombination, then how is diffusion going on? Because after some time there is equilibrium and no diffusion current.

Q3: E

- **What is surface leakage current?**

Definition:

the surface leakage current is due to the conduction on the surface of the insulation where the conductor emerges and points of ground potential. This current is not desired in the test results and should therefore be eliminated by carefully cleaning the surface of the conductor to eliminate the leakage paths, ...

**diode reverse current that passes along the surface of the semiconductor materials.
known surface leakage current.**