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Q1)

A)

Effect of the Turns Ratio on the Output Voltage:If the transformer's turn's ratio is 1, the peak value of the rectified output voltage equals half thepeak value of the primary input voltage less the barrier potential,. This is because half of the

primary voltage appears across each half of the secondary windingVp (sec) = Vp (pri).we will begin referring to the forward voltage due to the barrier potential as the diode drop.In order to obtain an output voltage with a peak equal to the input peak (less the diode drop), astep-up transformer with a turns ratio of n = 2 must be used, as shown inFigure (c).In this case,the total secondary voltage (Vsec) is twice the primary voltage (2Vpri), so the voltage acrosseach half of the secondary is equal to Vpri.In any case, the output voltage of a center-tapped full-wave rectifier is always one-half of thetotal secondary voltage less the diode drop, no matter what the turn's ratio.Vout = (Vsec/2) — 0.7 V

B)

The main difference between a **Center Tapped** and **Bridge Rectifier** is that one uses **center tapped** transformer while another do 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.

C)

RC filters	LC filters
The RC filter is only useful for small load currents.	The LC filters are useful for heavy load currents.
More power dissipated in RC filter.	Less power dissipated in LC filter.
It has poor voltage regulation.	It has good voltage regulation.
It is cheaper.	It is costlier.
It also requires ventilation to conduct away the heat produced in the resistor.	It does not require any ventilation because the heat is not produced in the inductor.
It has high ripple factor.	It has low ripple factor.
RC is fine for filtering low power signals.	LC is fine for filtering high power signals.

Q2)

A)

In 50 -^- voltage the source has low resistance value, as a result low power loss across the source so power delivered by the source will be more,so more power will be delivered to load.

But in 600 -^- voltage, power loss will be high as a result power delivered will be less So less power will be delivered to load

B)

The first step in troubleshooting the outputs is to isolate the problem to either the module, the field device, or the wiring.
First check that the source of power to the output module is at the specified level. check the output device's current specifications to determine if the device is pulling too much current.
If the module's output status indicator fails to turn on despite receiving the instruction to turn on from the central processing unit, it's faulty. If the indicator does turn on and the field device doesn't activate, then check for voltage at the output terminal to be sure that the switching device is, in fact, operational. If no

voltage is present, then you should replace the module. If voltage is present, then the problem lies in the wiring or the field device. At this point, make sure the field wiring to the module's terminal or to the terminal block has a good connection and that no wires are broken.

C)

Thevenin's Theorem is especially **useful** in analyzing power systems and other **circuits** where one particular resistor in the **circuit** (called the “load” resistor) is subject to change, and re-calculation of the **circuit** is necessary with each trial value of load resistance, to determine voltage across it and current.

Q3)

A)

It is seen that in a **reverse**-**biased diode**, some **current** flows through the depletion region. This **current** is called leakage **current**. ... Minority carriers of each material are pushed through the depletion zone to the junction. This action causes a **very small** leakage **current** to occur.

B)

A **light**-**emitting diode** (**LED**) is a semiconductor **light** source **that emits light** when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. ... The first visible-**light** LEDs were of low intensity and limited to red.

C)

Simply put, a **conductor** is **not** a system that is missing any electrons. So, it doesn't have any **holes.**

Semiconductors are characterized by two types of mobile carriers, electrons in the conduction band and **holes** in the valence band. ... When an electron falls from the

conduction band into the valence band, into a **hole**, a recombination process **occurs** and an electron **hole** pair disappears.

D)

Radiative **Recombination**. Radiative **recombination** is the mechanism responsible for photoemission in semiconductor light emitting **diodes** and is mainly associated with band to band **recombination** as a result of the high energy differences associated with a complete band gap transition.

E)

Definition of **surface leakage current** -> diode reverse **current** that passes along the **surface** of the semiconductor materials. Definition of "**surface leakage current**" diode reverse **current** that passes along the **surface** of the semiconductor materials.