5.4 LC filter

It is a combination of inductor and capacitor filter. Here an inductor is connected in series and a capacitor is connected in parallel to the load as shown in fig 5.6. As discussed earlier, a series inductor filter will reduce the ripple, when increasing the load current. But in case of a capacitor filter it is reverse that when increasing current the ripple also increases. So a combination of these two filters would make ripple independent of load current. The ripple factor of a chock input filter is given by $\gamma = 1.194/LC$ **(by taking f=50Hz)**

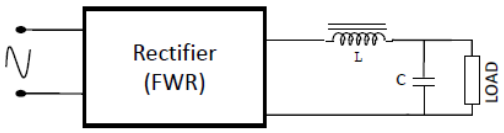

Fig 5.6 Rectifier with LC filter

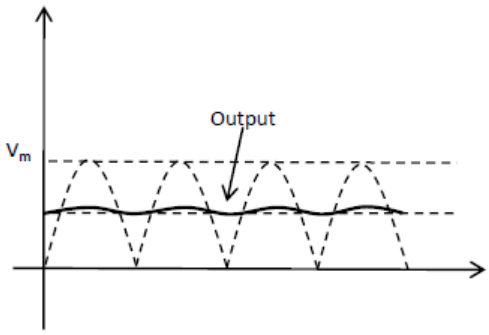

Fig 5.7 output waveform of Rectifier with LC filter

Since the d.c. resistance of the inductor is very low it allows d.c. current to flow easily through it. The capacitor appears open for d.c. and so all d.c. component passes through it. The capacitor appears open for d.c. and so all d.c components passes through the load resistor R_L.

5.4.1 Bleeder resistor

For optimum functioning, the inductor requires a minimum current to flow through, at all time. When the current falls below this rat, the output will increase sharply and hence the regulation become poor. To keep up the circuit current above this minimum value, a resistor is permanently connected across the filtering capacitor and is called **bleeder resistor**. This resistor always draws a minimum current even if the external load is removed. It also provides a path for the capacitor to discharge when power supply is turned off.

Preview from Notesale.co.uk
Page 3 of 4

Advantages

- Reduced ripples at the output
- Action is independent of load current

Disadvantages

- Low output voltage
- Bulky and large in size
- Not suit to connect with HWR.

5.5 π – filter (Capacitor input filter) or CLC filter

This filter is basically a capacitor filter followed by an LC filter as shown in fig 5.8. Since its shape (C-L-C) is like the letter π it is called π – filter. It is also called capacitor input filter because the rectifier feeds directly into the capacitor C_1. Here the first capacitor C_1 offers a low reactance to a.c. component of rectifier output but provide more reactance to d.c components. Therefore most of the a.c. components will bypass through C_1 and the d.c. component flows through chock L. The chock offers very high reactance to the a.c. component. Thus it blocks a.c. components while pass the d.c. The capacitor C_2 bypasses any other a.c. component appears across the load and we get study d.c. output as shown below. The ripple factor in a π-section filter is given by $\gamma = \sqrt{2}\, X_{C1} X_{C2} / X_L R_L$

www.edutalks.org