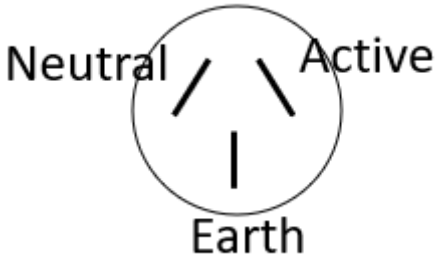
Lesson 10 – Answers

Q1 Complete the following table with regards to 240 V wiring.

Wire	Colour	Voltage to Ground
Active	**Brown**	**240 V**
Neutral	**Blue**	**0**
Earth	**Yellow and green**	**0**

Q2 Looking at the pin end of a three-pin plug, identify the terminals.



Q3 What is a power supply?

A power supply is a device that provides the required electric power for an electrical load.

Q4 What are the advantages of a linear power supply.

Advantages of LPS

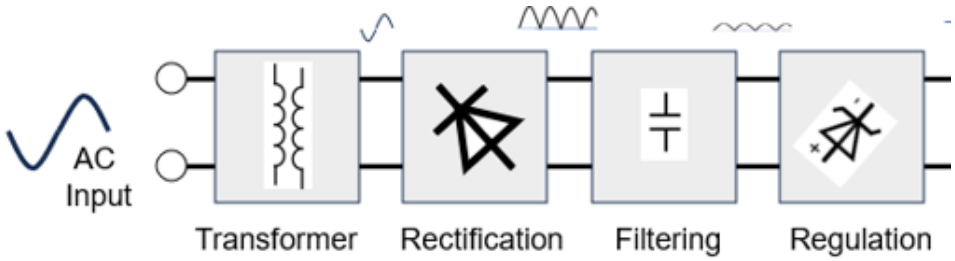
- The power supply is continuous.
- The circuitry is simple.
- These are reliable systems.
- This system dynamically responds to load changes.
- As the components operate in linear region, the noise is low.
- The ripple is very low in the output voltage.

Q5 What are the disadvantages of a switch mode power supply?

Disadvantages of SMPS

- The noise is present due to high frequency switching.
- The circuit is complex.
- Produces electromagnetic interference.

Q6 What are the five zones of a linear power supply and explain each?



Q7 What is the difference in the output of a half wave rectifier compared to a full wave rectifier?

Half wave has alternat peaks and a full wave has continual peaks.

E Peak = 1.4 x E RMS
E AV = 0.45 x E RMS
E PRV = 1.4 to 2.8 E RMS
Ripple = 50 Hz

E Peak = 1.4 x E RMS
E AV = 0.9 x E RMS
E PRV = 2.8 E RMS
Ripple = 100 Hz

Q8 Describe how a full wave rectifier works.

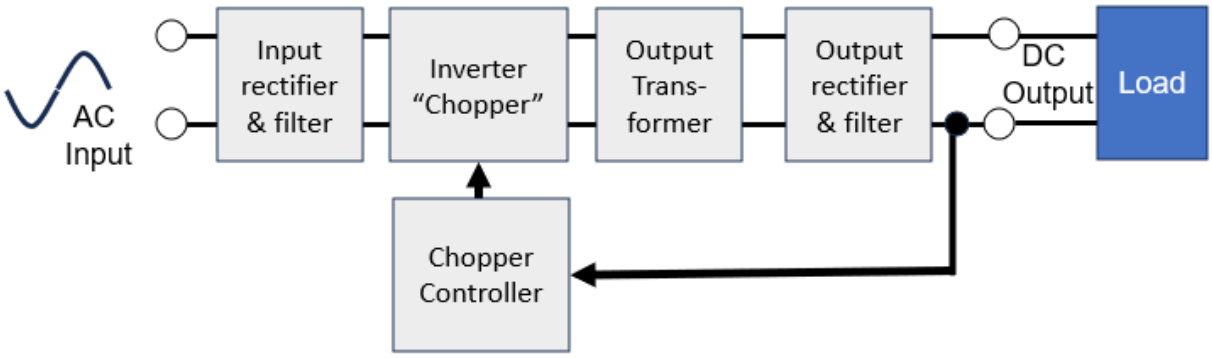
A bridge rectifier is a circuit of four diodes that is used in converting alternating current (AC) from the input terminals to direct current (DC) on the output terminals.

Q9 What size filter capacitor is needed to restrain the ripple voltage to 0.25 V with a load of 200 mA and the frequency of 100 Hz?

$$C = \frac{I\ x\ t}{E}$$

C = (0.2 x 0.01) / 0.25 = 0.008 or 8 mF capacitor

Q10 Draw the block diagram of a SMPS and name the parts.



Q11 Why is a RCD better than a fuse?

The RCD is faster acting and prevents the full current of a fuse passing through the short.

Q12 Calculate a possible filter capacitor for the following output.

- Current draw is 1.5 A
- Ripple frequency is 100 Hz **1/100 = 0.01 Sec**
- P to P voltage is 0.5 V

C = (1500 x 0.01) / 0.5

= 15 / 0.5 = 7.5 mF