

Distinguish, differentiate, compare & explain what is the main difference between Linear Power Supply and SMPS. Comparison and Differences.

## **Difference between Linear Power Supply and SMPS**

S.No.	Linear Power Supply	SMPS - Switch Mode Power Supply
1	Large and heavy in size.	Small and light in size.
2	Their efficiency is about 30 to 40%.	Its efficiency is about 70 to 95%.
3	In terms of complexity, they are Simple.	Switching power supply is complex.
4	In EMI, the linear power supply has low noise.	Noise filtering is required.
5	High in price due to the material.	Low in price.

Linear power supplies use power dissipation to achieve voltage regulation. A linear power supply must be designed to supply enough voltage to overcome conditions of low input voltage while supplying maximum rated load current. There are additional voltage drops in the rectifiers, the linear regulator circuit, and the transformer. Finally, the filter capacitors have a ripple voltage imposed by the rectified AC. The lowest point of the ripple voltage must be higher than the minimum required for the regulator circuit. The linear regulator works like a variable resistor, dropping the input voltage to the level required by the output. To meet all of the worst case conditions, a linear supply, under typical conditions may dissipate as heat an amount of power equal to the power consumed by the load. Under high input voltage conditions, the power lost as heat dissipation may be double that of the load. Switch Mode power supplies use the principle of quantized power transfer to implement voltage regulation. Through the control of transistors operating as switches (on or off) with energy storage components such as inductors and capacitors, a switch mode power supply transfers just enough energy from the input to the output to achieve the desired output voltage and currents.