1. What is the primary function of a chopper in power electronics?

a) To convert AC power to DC power
b) To regulate voltage in a circuit
c) To amplify electrical signals
d) To control the speed of electric motors

Answer: b) To regulate voltage in a circuit

Explanation: Choppers are primarily used in power electronics to regulate voltage levels by controlling the average voltage applied to a load through the use of pulse-width modulation (PWM) techniques.

2. In a step-up chopper, the output voltage is:

a) Always higher than the input voltage
b) Always lower than the input voltage
c) Sometimes higher and sometimes lower than the input voltage
d) Equal to the input voltage

Answer: a) Always higher than the input voltage

Explanation: A step-up chopper increases the output voltage by converting a portion of the input voltage into a series of pulses with a higher average value.

3. What is the main difference between a buck regulator and a boost regulator?

a) Buck regulators decrease voltage, while boost regulators increase voltage

b) Buck regulators increase voltage, while boost regulators decrease voltage
c) Buck regulators and boost regulators both decrease voltage
d) Buck regulators and boost regulators both increase voltage

Answer: a) Buck regulators decrease voltage, while boost regulators increase voltage

Explanation: Buck regulators step down the input voltage to a lower output voltage, while boost regulators step up the input voltage to a higher output voltage.

4. Which type of regulator is suitable for applications requiring a stable output voltage lower than the input voltage?

a) Buck regulator
b) Boost regulator
c) Buck-boost regulator
d) Step-up chopper

Answer: a) Buck regulator

Explanation: Buck regulators are ideal for applications where the output voltage needs to be lower than the input voltage and require stable voltage regulation.

5. What is the purpose of a buck-boost regulator?

a) To step up the input voltage
b) To step down the input voltage
c) To maintain a constant output voltage regardless of input fluctuations
d) To regulate voltage only in AC circuits

Answer: c) To maintain a constant output voltage regardless of input fluctuations

Explanation: Buck-boost regulators are capable of both stepping up and stepping down the input voltage to maintain a constant output voltage, making them suitable for applications with varying input voltages.

6. Which of the following is a characteristic of switched-mode power supplies (SMPS)?

a) They operate only in continuous conduction mode
b) They are less efficient compared to linear power supplies
c) They use high-frequency switching to regulate the output voltage
d) They are not suitable for voltage regulation

Answer: c) They use high-frequency switching to regulate the output voltage

Explanation: SMPS utilize high-frequency switching of semiconductor devices to regulate the output voltage efficiently, allowing for smaller and lighter power supply designs.

7. What is the primary advantage of a switched-mode power supply (SMPS) over traditional linear power supplies?

a) Higher efficiency
b) Lower cost
c) Simplicity of design
d) Higher output voltage

Answer: a) Higher efficiency

Explanation: SMPS operate with higher efficiency compared to linear power supplies, resulting in less power dissipation and lower energy costs.

8. Which of the following statements is true regarding the principle of operation of a buck regulator?

a) The output voltage is always higher than the input voltage
b) It utilizes PWM to control the output voltage
c) It steps up the input voltage to a higher output voltage
d) It operates by continuously conducting current through the inductor

Answer: b) It utilizes PWM to control the output voltage

Explanation: Buck regulators control the output voltage by varying the duty cycle of the PWM signal, which regulates the average output voltage supplied to the load.

9. What is the main function of the feedback loop in a switched-mode power supply (SMPS)?

a) To regulate the input voltage
b) To regulate the output current
c) To stabilize the output voltage
d) To control the switching frequency

Answer: c) To stabilize the output voltage

Explanation: The feedback loop in an SMPS compares the output voltage with a reference voltage and adjusts the duty cycle of the switching device to maintain a stable output voltage.

10. Which component is responsible for energy storage and transfer in a switched-mode power supply (SMPS)?

a) Capacitor
b) Resistor
c) Inductor
d) Transformer

Answer: c) Inductor

Explanation: The inductor in an SMPS stores energy during the on-time of the switching cycle and transfers it to the output during the off-time, smoothing out the output voltage and current.