

KNOWLEDGE PROBE ANSWER KEY: Switching Power Supplies

DC-DC Converters: Charge Pumps, Forward Converters, and Flyback Converters

Objectives

1. Explain the features and benefits of a bus architecture power system.
2. Define DC-DC converter.
3. State what distinguishes a switching regulator from the DC-DC converters described in this section.
4. List three main types of DC-DC converters.
5. Explain the operation of a charge pump.
6. Explain the operation of a forward converter.
7. Name two types of forward converters and explain the difference.
8. Explain the operation of a flyback converter.
9. Name two places where flyback converters are used.
10. Explain the features of the AC-DC supply often used to furnish the input to a DC-DC converter.

Questions

1. What is the name given to the form of power distribution system that uses heavy conductors to distribute unregulated power to multiple loads?
 - a. Single point of distribution
 - b. AC power distribution
 - c. Feedback distribution
 - d. Bus distribution
2. Which of the following is NOT one of the three ways that the voltages for the multiple loads in the bus distribution power system are developed?
 - a. DC-DC converter
 - b. Switching regulator
 - c. Voltage divider
 - d. Linear regulator
3. What is the main advantage of the bus power distribution method?
 - a. Higher efficiency
 - b. Less voltage drop over the distribution system at higher currents
 - c. Lower cost
 - d. Better regulation
4. A DC-DC converter is one that
 - a. Changes one DC level to a higher level
 - b. Changes one DC level to a lower level
 - c. Changes one DC value to another at the opposite polarity
 - d. All of the above
 - e. None of the above



5. How is a DC-DC converter different from a switching regulator?
 - a. A switching regulator is actually a form of DC-DC converter.
 - b. A switching regulator has an AC input.
 - c. A DC-DC converter is unregulated.
 - d. The two are nothing alike.
6. Which of the following is NOT a common type of DC-DC converter?
 - a. Buck regulator
 - b. Charge pump
 - c. Flyback converter
 - d. Forward converter
 - e. None of the above
7. Which of the following is NOT a part of a charge pump?
 - a. Capacitors
 - b. Pulsed DC input
 - c. MOSFET switches
 - d. Rectifier diodes
8. Which of the following is NOT a characteristic of a charge pump?
 - a. Often eliminates the need for additional power supplies
 - b. Can furnish high currents
 - c. Can supply low currents
 - d. Stores power in capacitors
9. How is the desired output voltage level achieved in a forward converter?
 - a. Selecting the correct input voltage
 - b. Putting a linear regulator on the output
 - c. Using a switching regulator on the output
 - d. Using a step-up transformer
10. Forward converters use PWM for regulation.
 - a. True
 - b. False
11. A push-pull forward converter is preferred over the single transistor type because it is
 - a. Delivers more power at higher voltages
 - b. Less expensive
 - c. Better at regulating its output voltage
 - d. Has multiple outputs
12. How are multiple output voltages achieved in forward and flyback converters?
 - a. Voltage multipliers
 - b. Different voltage regulator outputs
 - c. Multiple windings on the transformer
 - d. Multiple outputs are not permitted on these type of converters.



13. In a flyback converter, what must happen for the power to be delivered to the load?
 - a. The capacitor discharges into the load
 - b. The MOSFET switch turns on
 - c. The MOSFET switch turns off
 - d. The field around the series inductor collapses
14. Which of the following is NOT a major application for a flyback converter?
 - a. Low voltage high current computer power supply
 - b. TV picture tube high voltage
 - c. Video monitor CRT high voltages
 - d. Any high voltage low current supply
15. The AC-DC supply often used to supply the input to a DC-DC converter uses a transformer to set the input voltage level.
 - a. True
 - b. False
16. What is the name of the circuit used at the AC input to an AC-DC supply?
 - a. Linear regulator
 - b. Switching regulator
 - c. Transient suppressor
 - d. Low pass filter.
17. How are the diodes used in the AC-DC supply for an input voltage level of 120 volts?
 - a. Bridge rectifier
 - b. Voltage doubler
 - c. Half wave rectifier
 - d. Standard full wave rectifier
18. What is the effect on an unregulated output if the load changes in a DC-DC converter circuits with multiple outputs but only one PWM regulator?
 - a. All output voltages are fully regulated for both line and load variations.
 - b. None of the unregulated outputs are regulated for AC variations.
 - c. The output is regulated for AC line variations but not load variations.
 - d. None of the outputs are regulated for load variations.