Switching Amplifiers:
Amplifier Fundamentals

Objectives:

1. Describe the classifications of analog amplifiers.
2. Differentiate between classes of amplifiers.
3. Describe amplifier performance in terms of gain, frequency response, the power output, efficiency, and the total harmonic distortion.
4. Describe the effects of harmonic distortion related to amplifier types.
5. Explain the use and application of linear and switching amplifiers.
6. Describe the types of switching amplifiers.
7. Calculate amplifier performance.
8. Explain switching amplifier operation at the component level.
9. Evaluate the advantages and disadvantages of switching amplifiers.

1. A small signal amplifier is used to boost the voltage level of small input signals ranging from
   a. 3 to 4 volts
   b. 5 to 8 volts
   c. Micro volts to 2 volts
   d. More than 8 volts

2. The application of amplifiers is usually defined by the
   a. Frequency of operation
   b. Input signal
   c. Output power
   d. Output signal

3. Audio power amplifiers have a typical bandwidth of
   a. DC to 1 MHz
   b. 1 MHz to 100+ GHz
   c. 20 Hz to 20 kHz
   d. 0 Hz to 1 GHz

4. Linear amplifiers have an output that is directly proportional to the input. The transistors are biased in the linear region of their characteristics. They accurately reproduce the input signal at a higher voltage or power level that is
   a. Biased in the linear region of the operating characteristics
   b. Directly proportional to the input
   c. Inversely proportional to the input
   d. Both a and b
   e. Both b and c

5. Class A amplifiers conduct for
   a. A period equal to the PWM
   b. More than one half of the sine wave input cycle
   c. One half of the sine wave input cycle of 180°
   d. The complete sine wave input cycle of 360°

6. Gain is the ratio of_____ to _____ in a power amplifier.
   a. Current, voltage
   b. Power input, power output
   c. Power output, power input
   d. Voltage, current

7. The amount of power capable of being supplied to the load is usually expressed in
   a. Amps
   b. Current
   c. Volts
   d. Watts

8. Efficiency is expressed mathematically as the ratio of
   a. Power output to power input
   b. Power output to source power input (DC)
   c. Signal output to signal input
   d. Source power input (DC) to power output

9. Total harmonic distortion (THD) may be expressed in dB or more typically as a
   a. Percentage
   b. Power
   c. Ratio
   d. Voltage

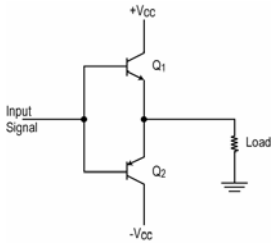
10. A complementary symmetry amplifier is a good power amplifier because the emitter follower has a
    a. High input impedance and a low output impedance
    b. Large voltage gain
    c. Low input impedance and a high output impedance
    d. Small voltage gain

11. In a practical complementary symmetry amplifier, diodes are used in the bias circuit to
    a. Adjust the bias level
    b. Block the input
    c. Prevent thermal runaway
    d. Set the collector current

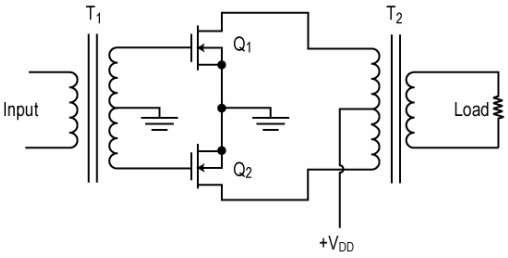
12. Theoretical efficiency of a class B amplifier is _____ maximum under ideal conditions even though this is rarely achieved in practice.
    a. 32.5%
    b. 78.5%
    c. 80-90%

d. 97%

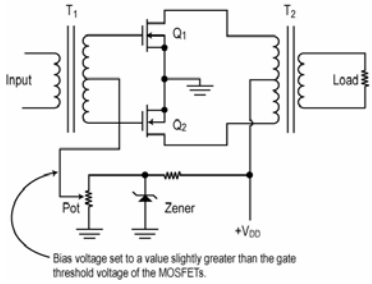
13. In a class AB amplifier heat sinks are necessary because almost _____ of the power is lost as heat.
    a. All
    b. One eighth
    c. One fourth
    d. One half



14. What type of amplifier is shown here?
    a. Class D
    b. Complementary symmetry
    c. Transformer coupled
    d. Transformer coupled class AB



15. What type of amplifier is shown here?
    a. Class A
    b. Class C
    c. Transformer coupled
    d. Transformer coupled class AB



16. What type of amplifier is shown here?
    a. Class A
    b. Class C

c. Transformer coupled
d. Transformer coupled class AB