

General Class Review

G7 Practical Circuits

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KM6OTE

Topics on Exam

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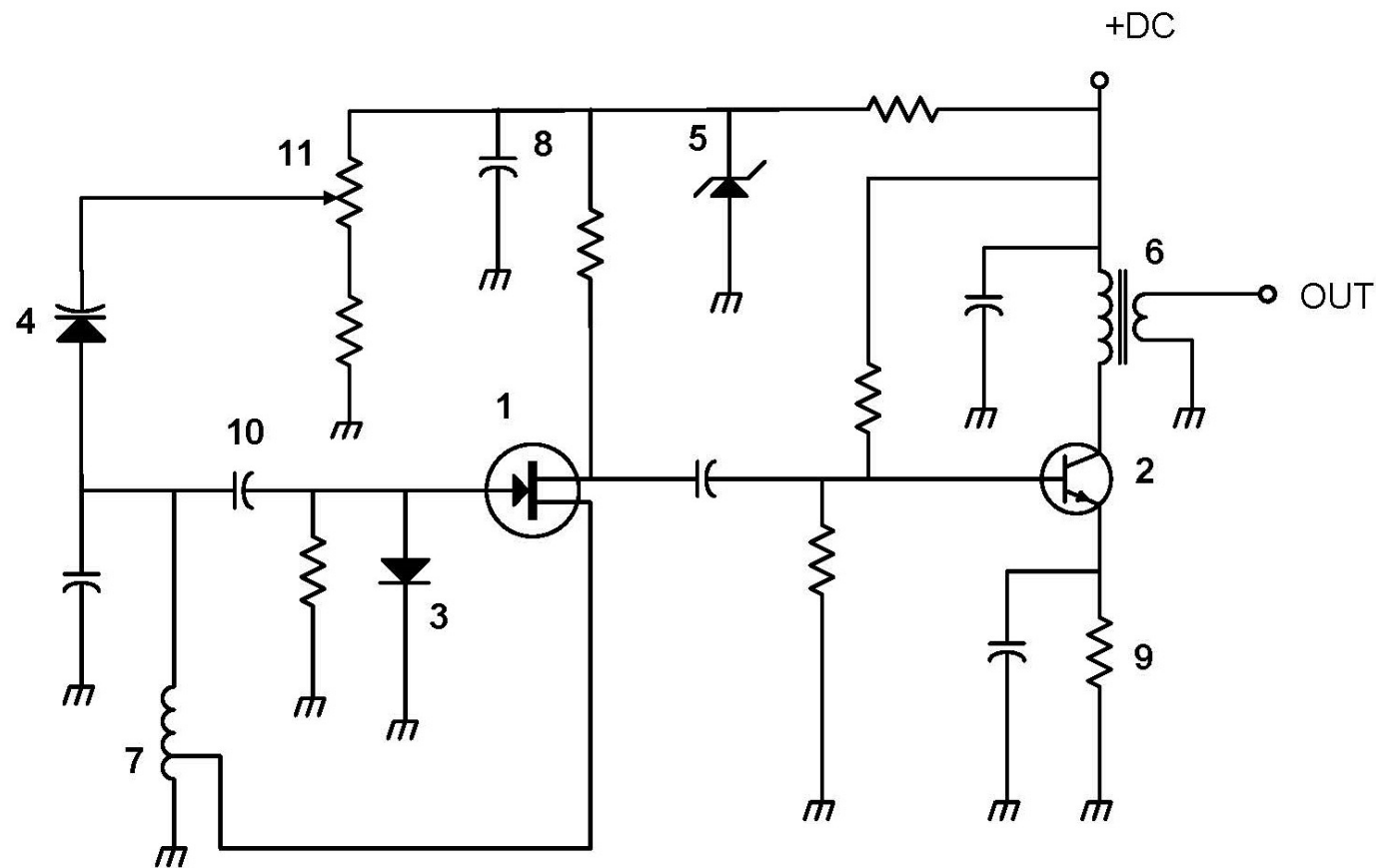


Figure G7-1

G7A9 field effect transistor

G7A10 zener diode

G7A11 NPN junction transistor

G7A12 solid core transformer

G7A10 tapped inductor

Refer to pg 4-9, fig. 4.4

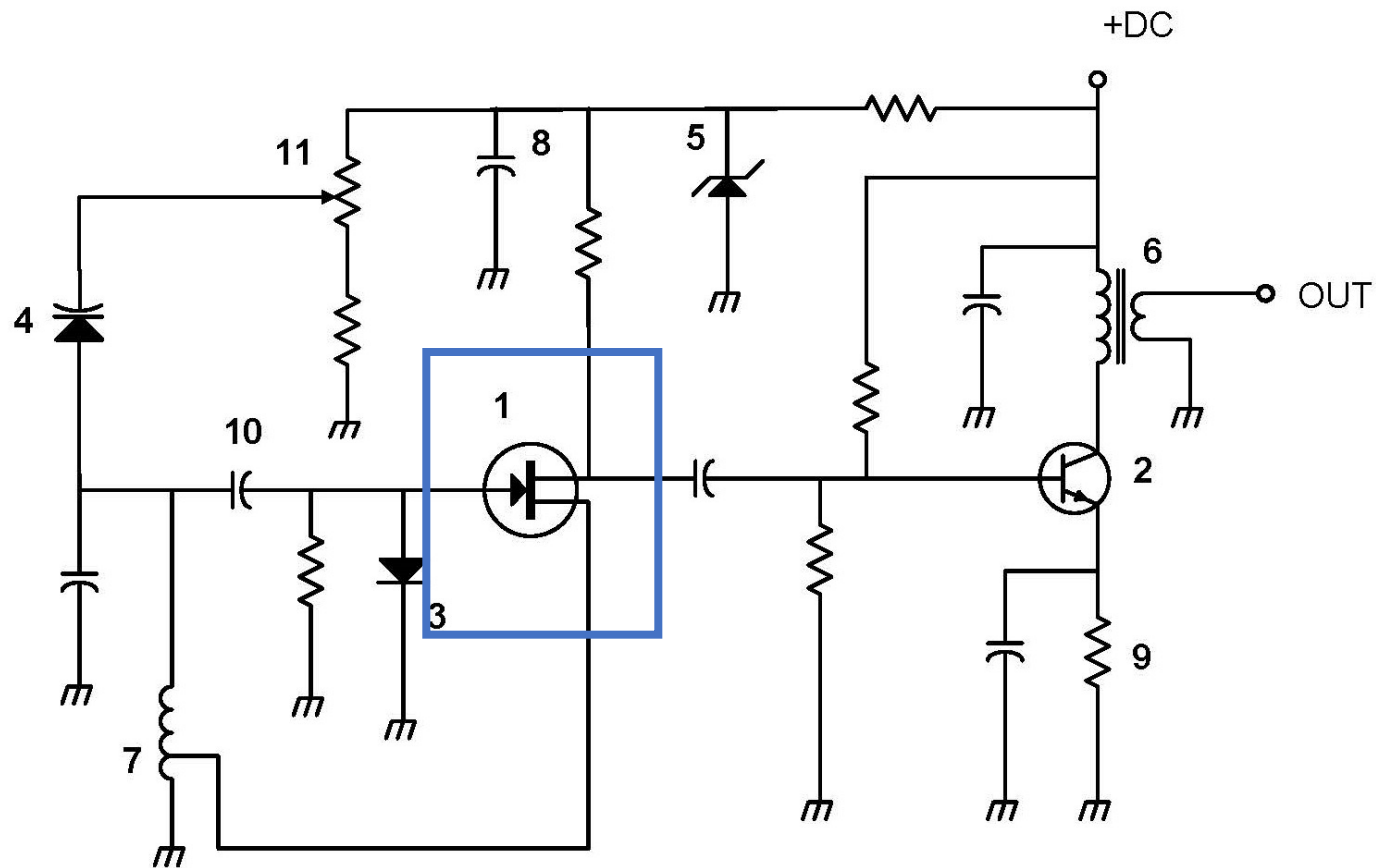


Figure G7-1

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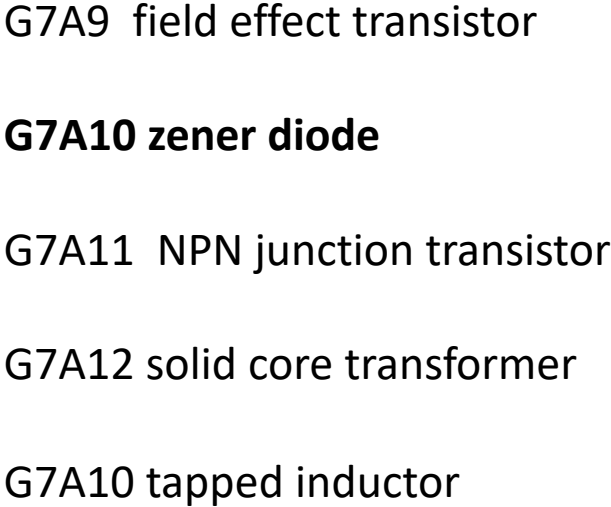


Figure G7-1

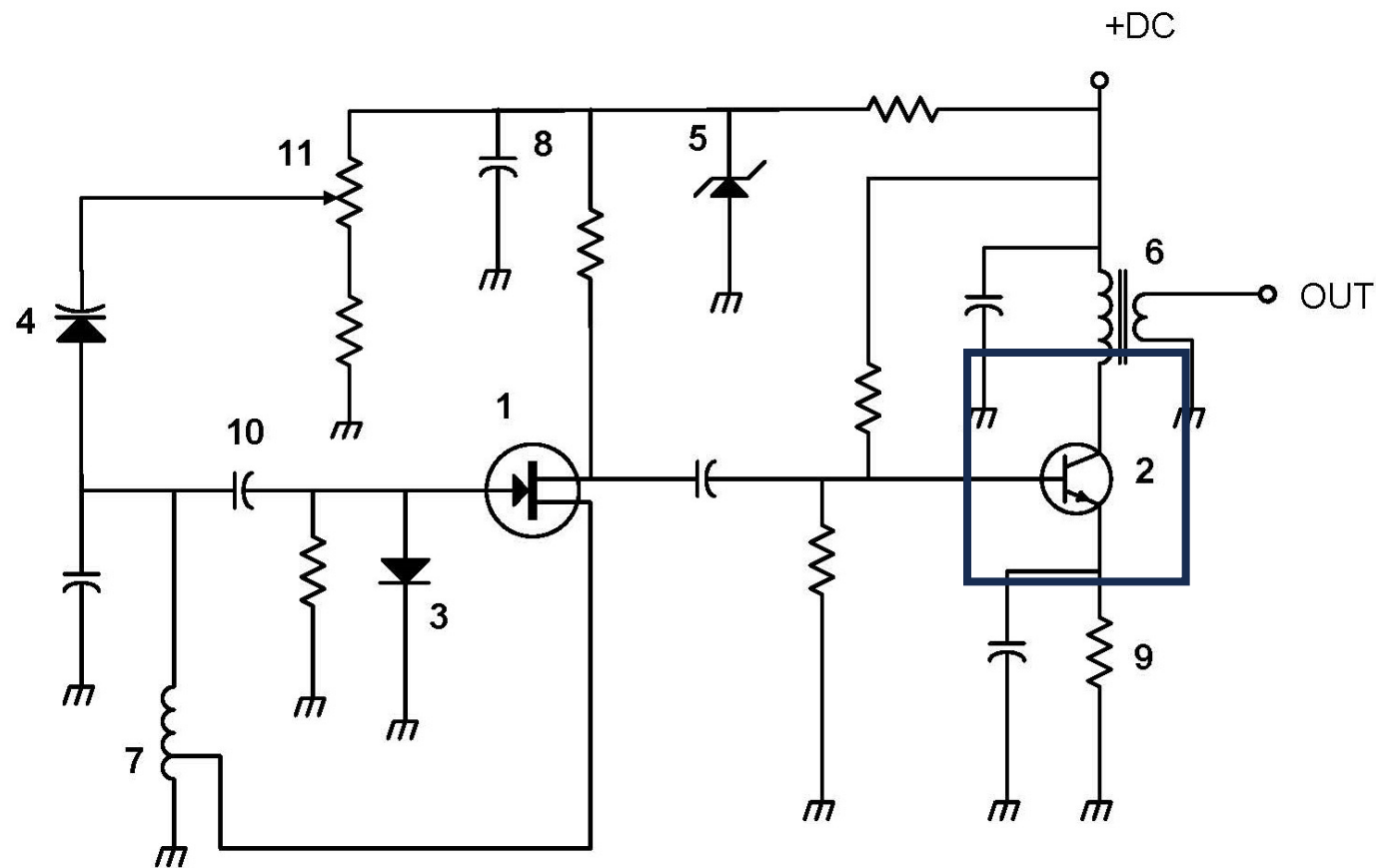


Figure G7-1

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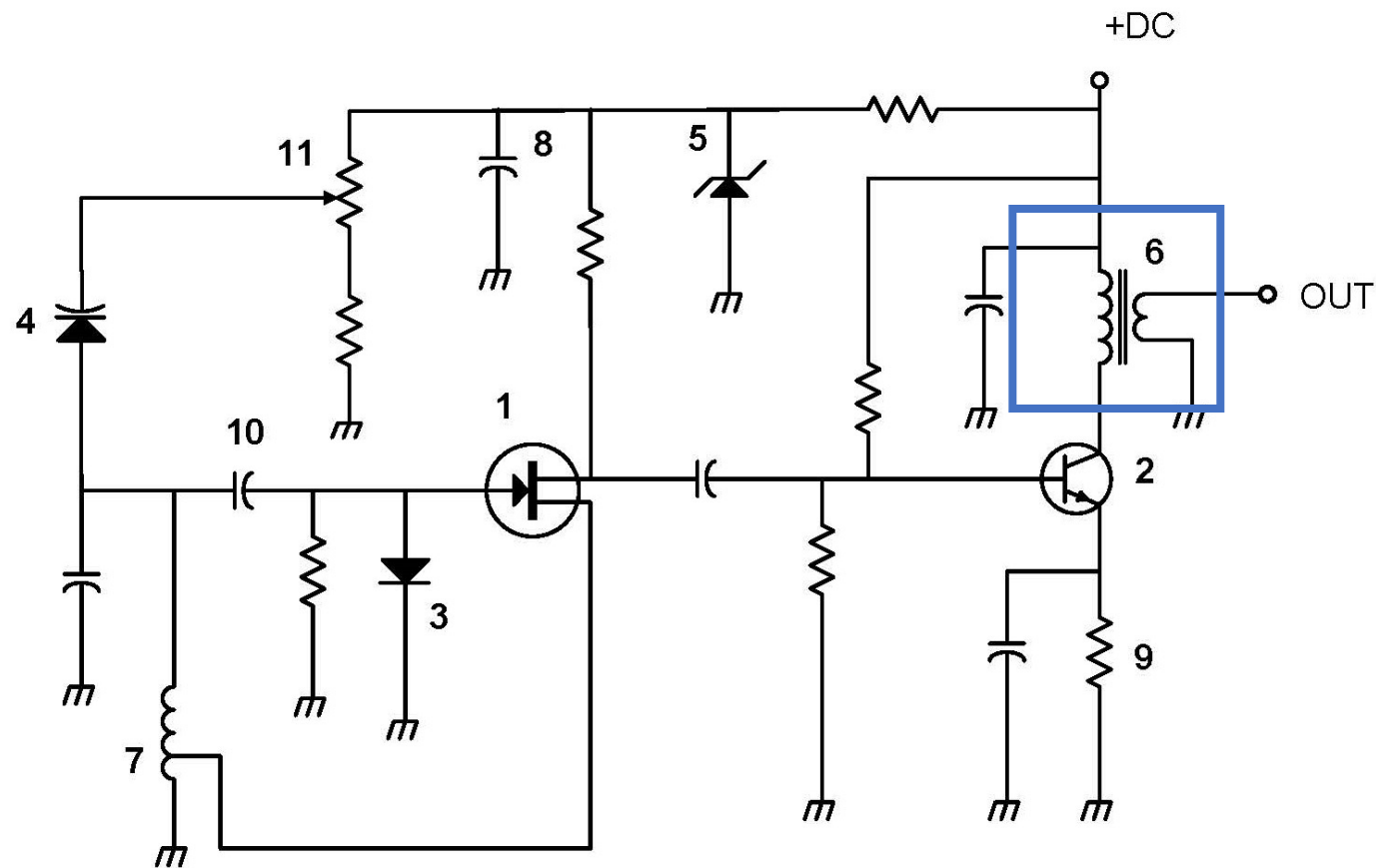


Figure G7-1

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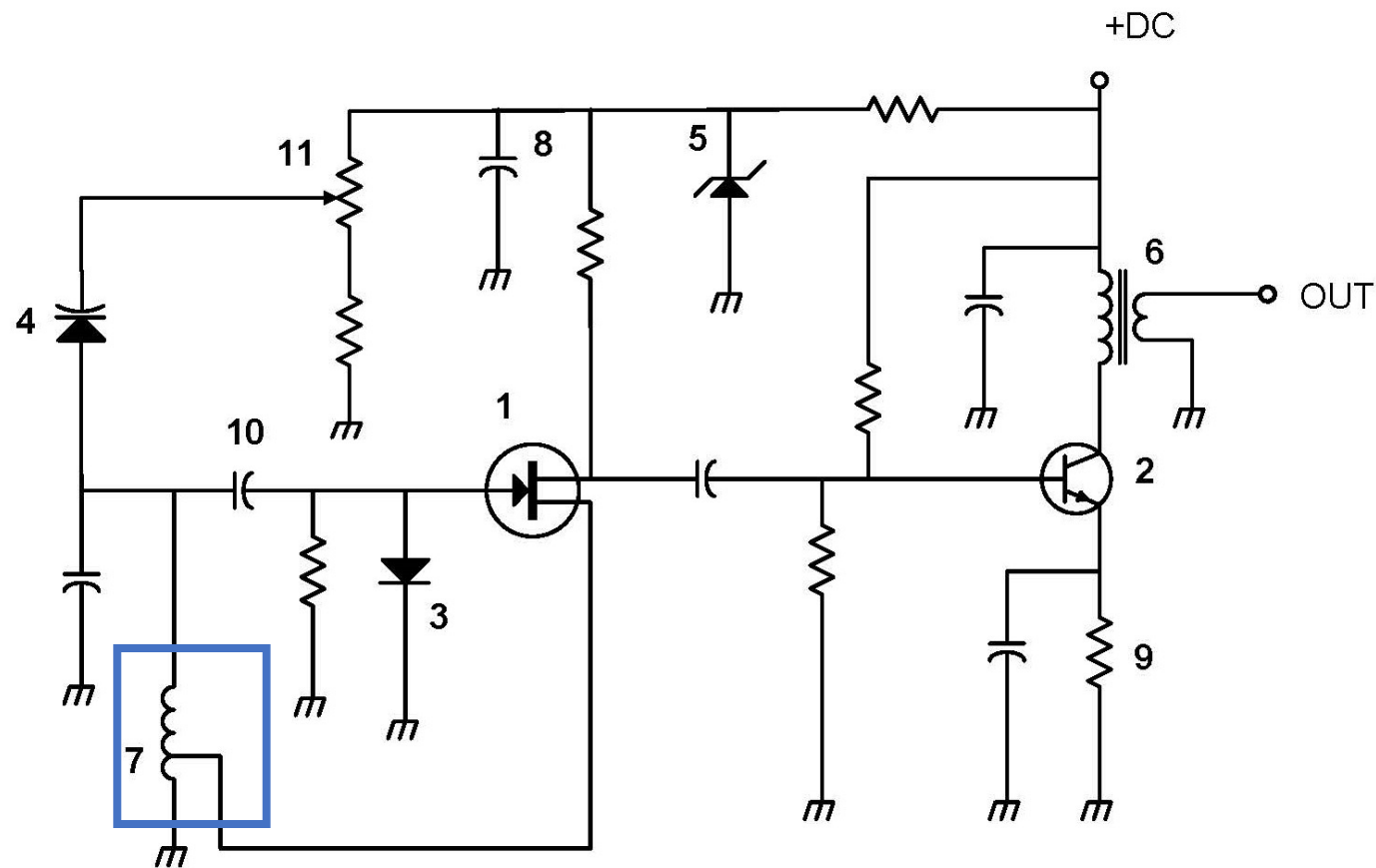


Figure G7-1

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G7A10 zener diode

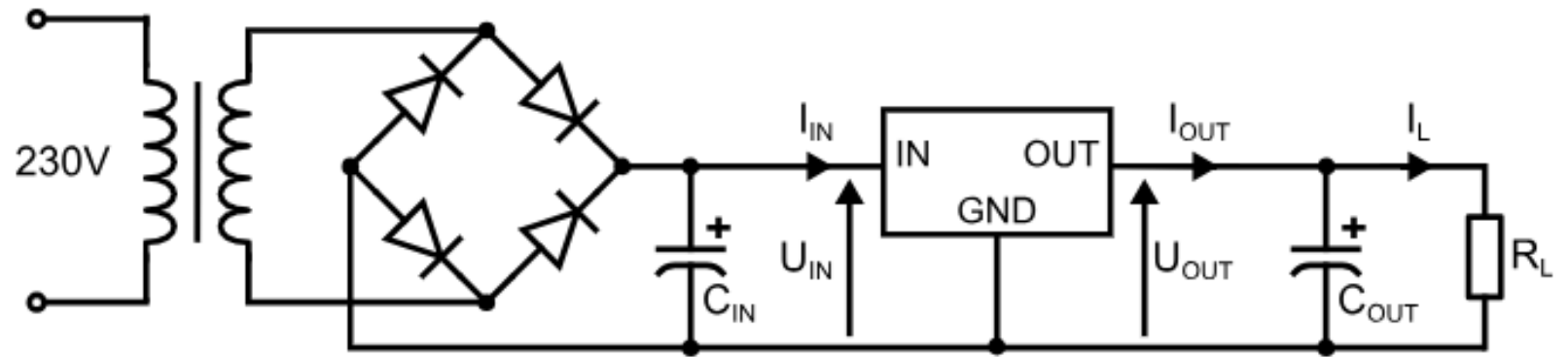
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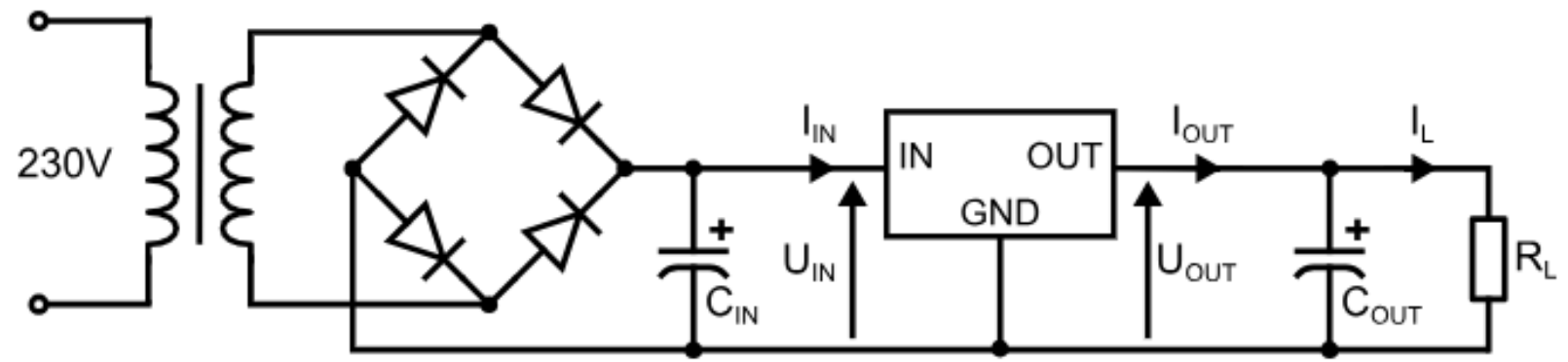
Practical Circuits - Power Supply

- G7A01
- What is the function of a power supply bleeder resistor?
- A. It acts as a fuse for excess voltage
- B. It discharges the filter capacitors when power is removed
- C. It removes shock hazards from the induction coils
- D. It eliminates ground loop current



Practical Circuits - Power Supply

- G7A01 (B)
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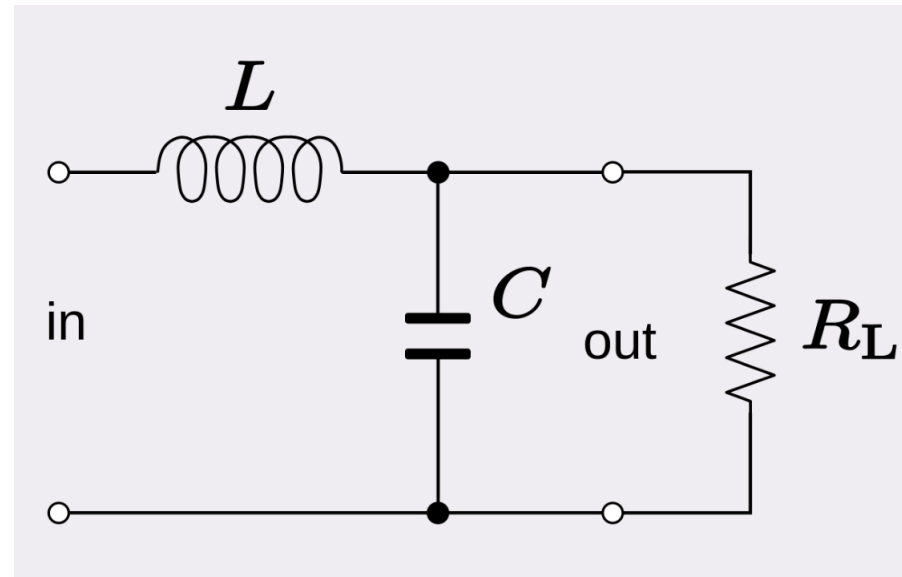


Practical Circuits - Power Supply

- G7A02
- Which of the following components are used in a power supply filter network?
- A. Diodes
- B. Transformers and transducers
- C. Capacitors and inductors
- D. All these choices are correct

Practical Circuits - Power Supply

- G7A02 (C)
- Which of the following components are used in a power supply filter network?
- A. Diodes
- B. Transformers and transducers
- **C. Capacitors and inductors**
- D. All these choices are correct

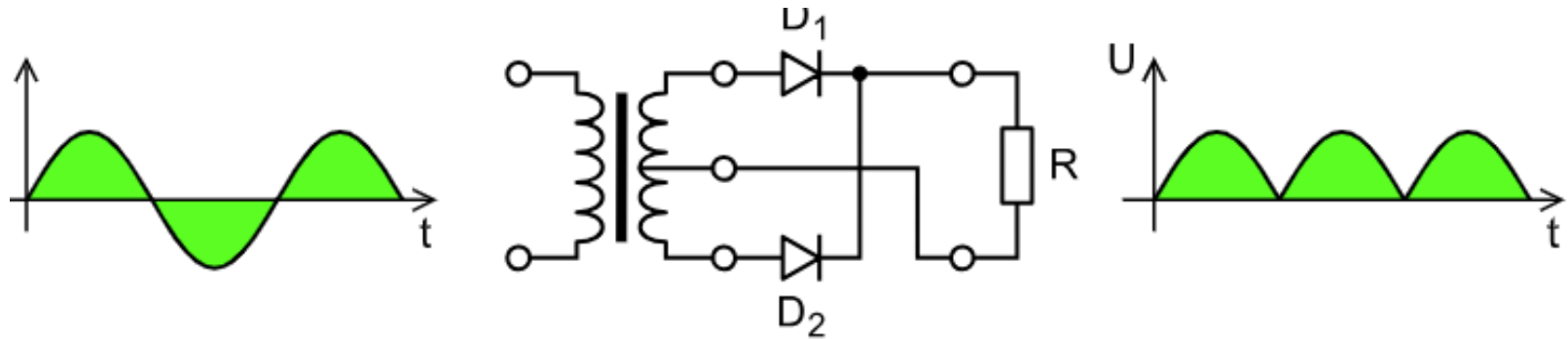


Practical Circuits - Power Supply

- G7A03
- Which type of rectifier circuit uses two diodes and a center-tapped transformer?
- A. Full-wave
- B. Full-wave bridge
- C. Half-wave
- D. Synchronous

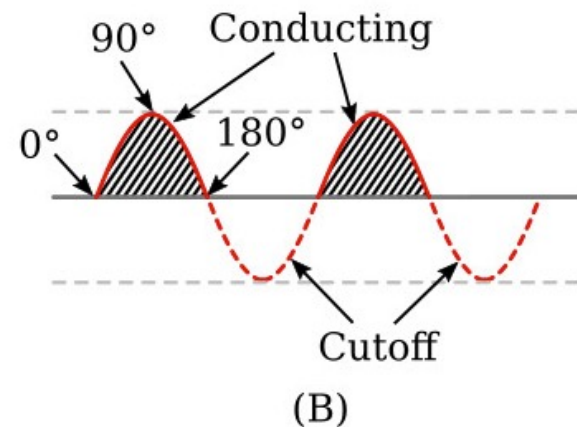
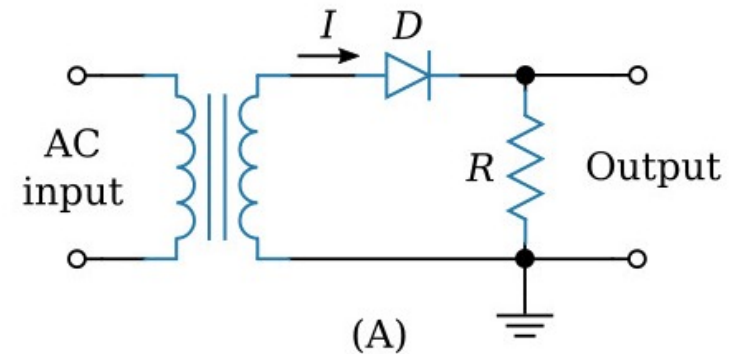
Practical Circuits - Power Supply

- G7A03 (A)
- Which type of rectifier circuit uses two diodes and a center-tapped transformer?
- **A. Full-wave**
- B. Full-wave bridge
- C. Half-wave
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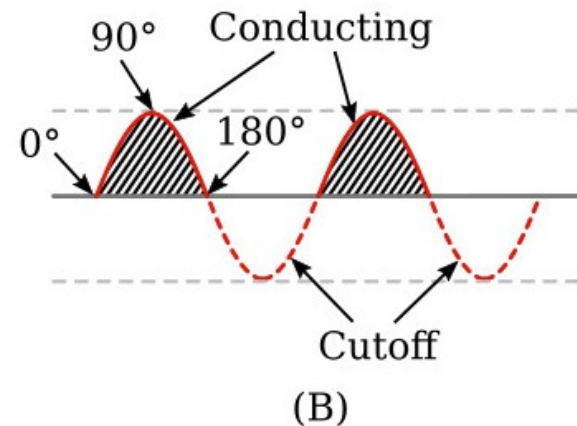
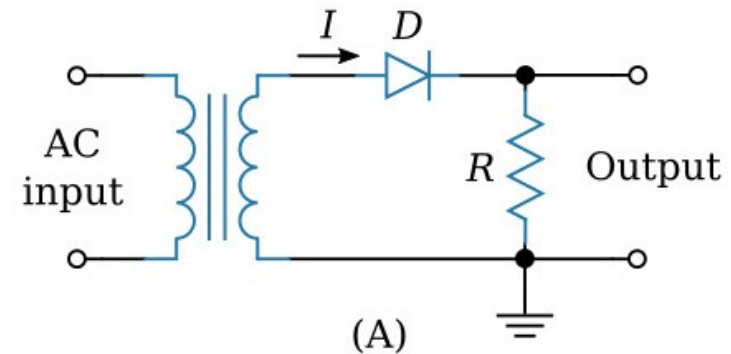
Practical Circuits - Power Supply

- G7A04
- What is characteristic of a half-wave rectifier in a power supply?
- A. Only one diode is required
- B. The ripple frequency is twice that of a full-wave rectifier
- C. More current can be drawn from the half-wave rectifier
- D. The output voltage is two times the peak input voltage



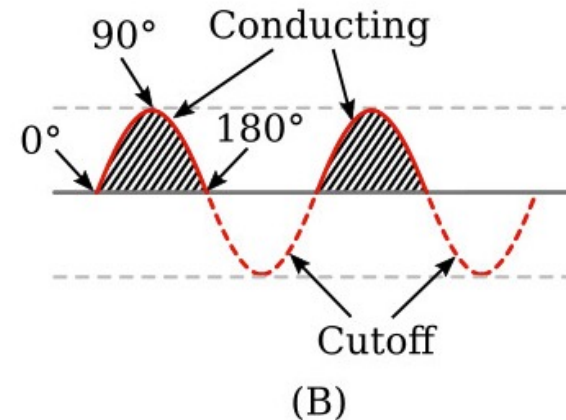
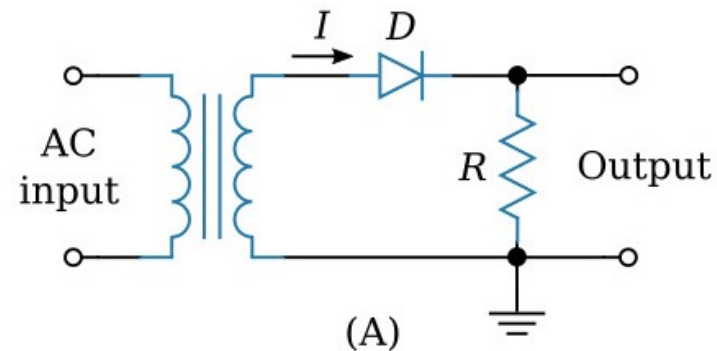
Practical Circuits - Power Supply

- G7A04 (A)
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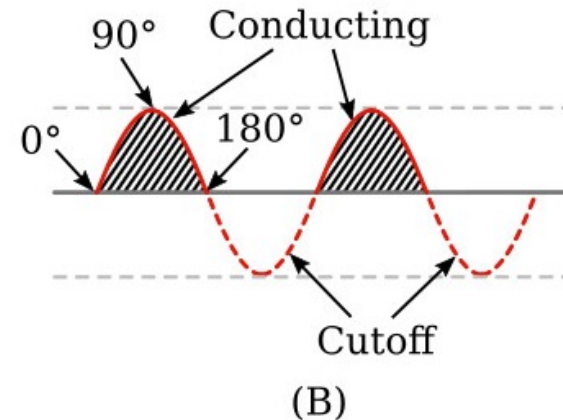
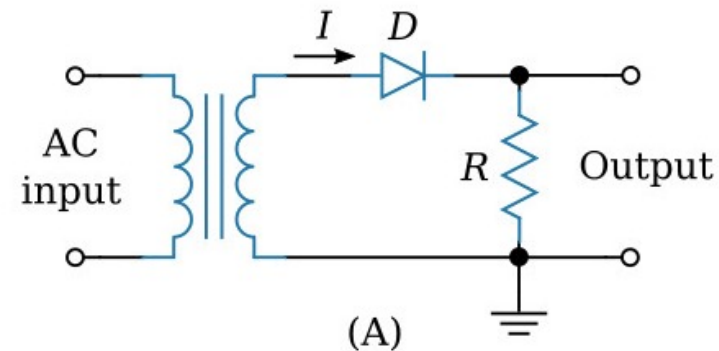
Practical Circuits - Power Supply

- G7A05
- What portion of the AC cycle is converted to DC by a half-wave rectifier?
- A. 90 degrees
- B. 180 degrees
- C. 270 degrees
- D. 360 degrees



Practical Circuits - Power Supply

- G7A05 (B)
- What portion of the AC cycle is converted to DC by a half-wave rectifier?
- A. 90 degrees
- **B. 180 degrees**
- C. 270 degrees
- D. 360 degrees

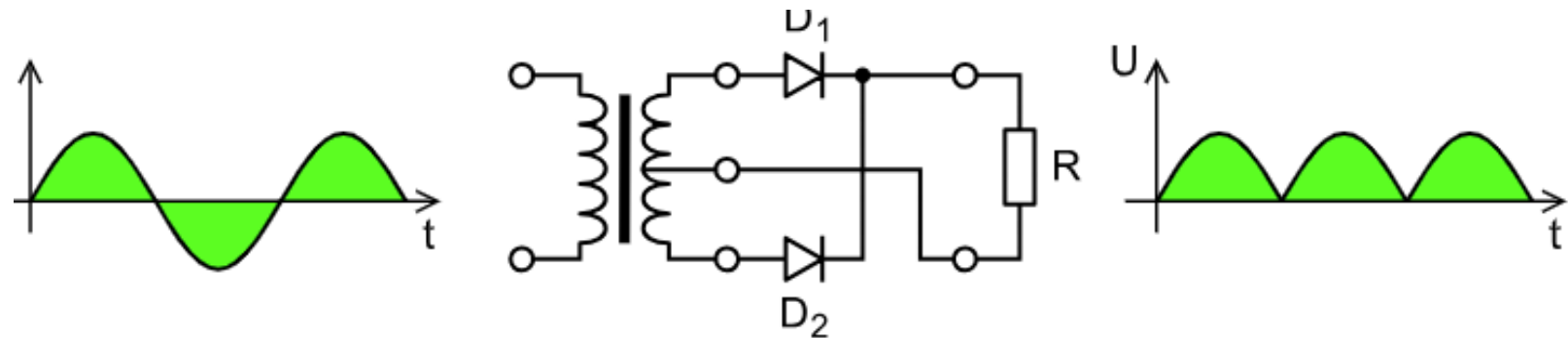


Practical Circuits - Power Supply

- G7A06
- What portion of the AC cycle is converted to DC by a full-wave rectifier?
- A. 90 degrees
- B. 180 degrees
- C. 270 degrees
- D. 360 degrees

Practical Circuits - Power Supply

- G7A06 (D)
- What portion of the AC cycle is converted to DC by a full-wave rectifier?
- A. 90 degrees
- B. 180 degrees
- C. 270 degrees
- **D. 360 degrees**

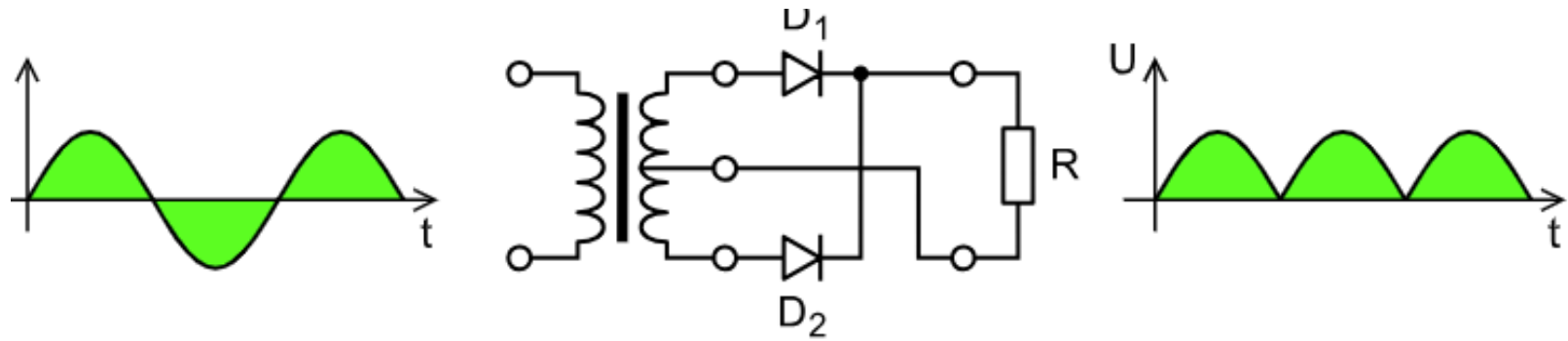


Practical Circuits - Power Supply

- G7A07
- What is the output waveform of an unfiltered full-wave rectifier connected to a resistive load?
- A. A series of DC pulses at twice the frequency of the AC input
- B. A series of DC pulses at the same frequency as the AC input
- C. A sine wave at half the frequency of the AC input
- D. A steady DC voltage

Practical Circuits - Power Supply

- G7A07 (A)
- What is the output waveform of an unfiltered full-wave rectifier connected to a resistive load?
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Practical Circuits - Power Supply

- G7A08
- Which of the following is characteristic of a switch mode power supply as compared to a linear power supply?
 - A. Faster switching time makes higher output voltage possible
 - B. Fewer circuit components are required
 - C. High-frequency operation allows the use of smaller components
 - D. Inherently more stable

Practical Circuits - Power Supply

- G7A08 (C)
- Which of the following is characteristic of a switch mode power supply as compared to a linear power supply?
 - A. Faster switching time makes higher output voltage possible
 - B. Fewer circuit components are required
 - **C. High-frequency operation allows the use of smaller components**
 - D. Inherently more stable

Practical Circuits -Ampifiers

- G7B01
- What is the purpose of neutralizing an amplifier?
- A. To limit the modulation index
- B. To eliminate self-oscillations
- C. To cut off the final amplifier during standby periods
- D. To keep the carrier on frequency

Practical Circuits -Ampifiers

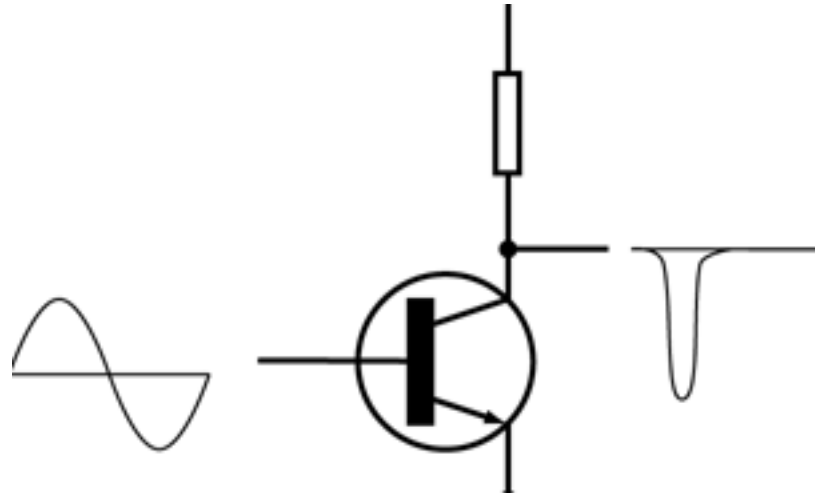
- G7B01 (B)
- What is the purpose of neutralizing an amplifier?
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- **B. To eliminate self-oscillations**
- C. To cut off the final amplifier during standby periods
- D. To keep the carrier on frequency

Practical Circuits - Amplifiers

- G7B02
- Which of these classes of amplifiers has the highest efficiency?
- A. Class A
- B. Class B
- C. Class AB
- D. Class C

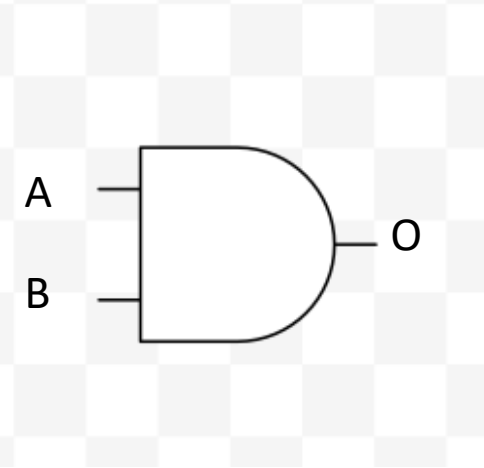
Practical Circuits - Amplifiers

- G7B02 (D)
- Which of these classes of amplifiers has the highest efficiency?
- A. Class A
- B. Class B
- C. Class AB
- **D. Class C**



Practical Circuits - Digital

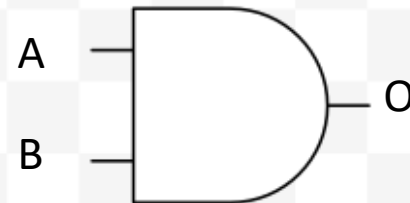
- G7B03
- Which of the following describes the function of a two-input AND gate?
- A. Output is high when either or both inputs are low
- B. Output is high only when both inputs are high
- C. Output is low when either or both inputs are high
- D. Output is low only when both inputs are high



Practical Circuits - Digital

- G7B03 B
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- C. Output is low when either or both inputs are high
- D. Output is low only when both inputs are high

Truth Table		
A	B	O
0	0	0
1	0	0
0	1	0
1	1	1

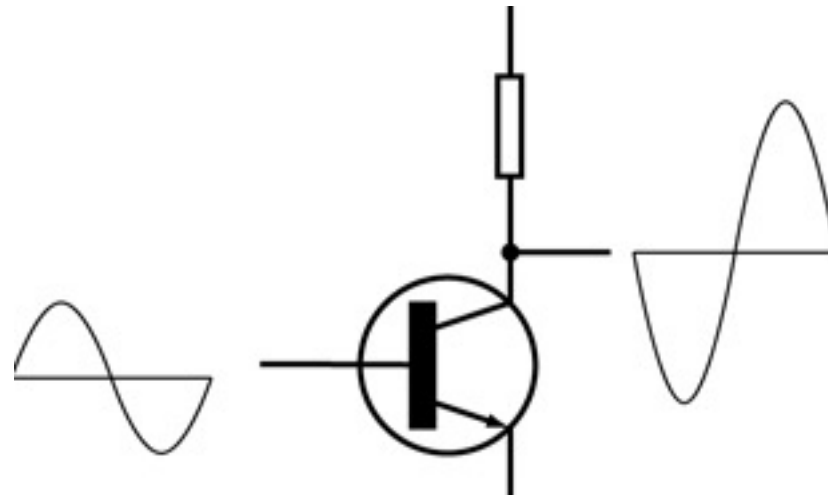


Practical Circuits - Amplifiers

- G7B04
- In a Class A amplifier, what percentage of the time does the amplifying device conduct?
- A. 100%
- B. More than 50% but less than 100%
- C. 50%
- D. Less than 50%

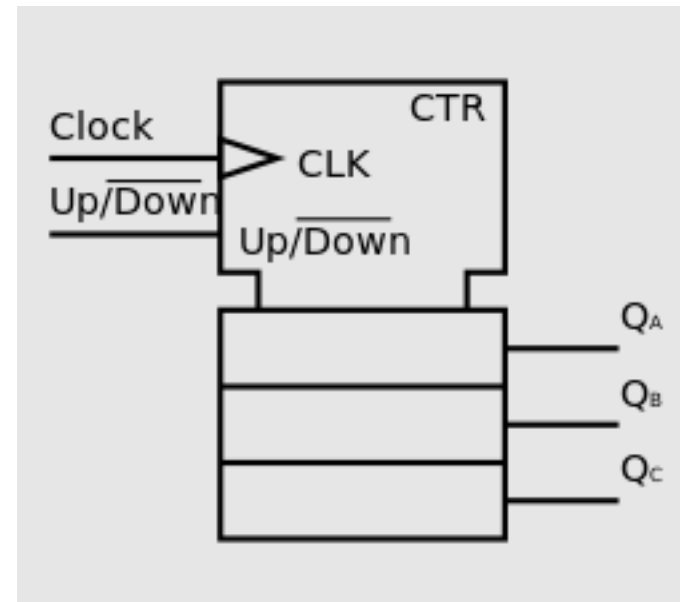
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Practical Circuits - Digital

- How many states does a 3-bit binary counter have?
- A. 3
- B. 6
- C. 8
- D. 16



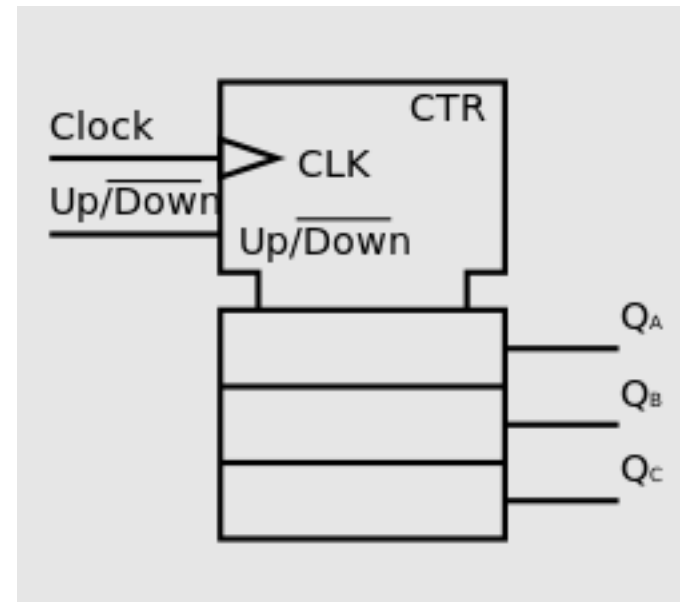
Practical Circuits - Digital

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- A. 3
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- **C. 8**
- D. 16

States = 2^n

n = bits

States = 8



Practical Circuits - Digital

- G7B06
- What is a shift register?
- A. A clocked array of circuits that passes data in steps along the array
- B. An array of operational amplifiers used for tri-state arithmetic operations
- C. A digital mixer
- D. An analog mixer

Practical Circuits - Digital

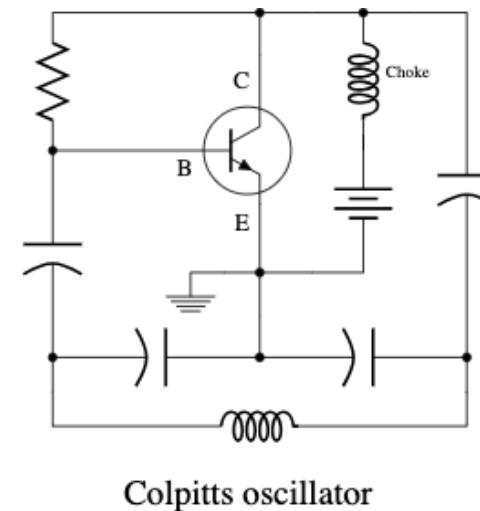
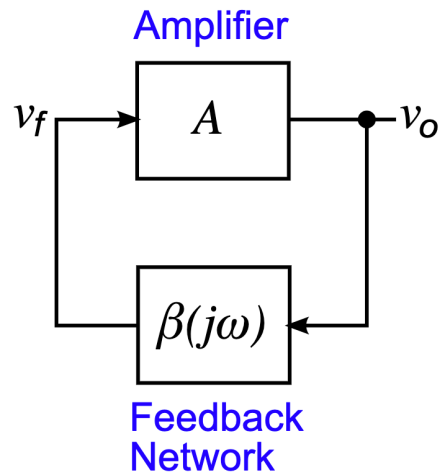
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Practical Circuits - Oscillator

- G7B07
- Which of the following are basic components of a sine wave oscillator?
- A. An amplifier and a divider
- B. A frequency multiplier and a mixer
- C. A circulator and a filter operating in a feed-forward loop
- D. A filter and an amplifier operating in a feedback loop

Practical Circuits - Oscillator

- G7B07 (D)
- Which of the following are basic components of a sine wave oscillator?
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- B. A frequency multiplier and a mixer
- C. A circulator and a filter operating in a feed-forward loop
- **D. A filter and an amplifier operating in a feedback loop**



Practical Circuits - Amplifiers

- G7B08
- How is the efficiency of an RF power amplifier determined?
- A. Divide the DC input power by the DC output power
- B. Divide the RF output power by the DC input power
- C. Multiply the RF input power by the reciprocal of the RF output power
- D. Add the RF input power to the DC output power

Practical Circuits - Amplifiers

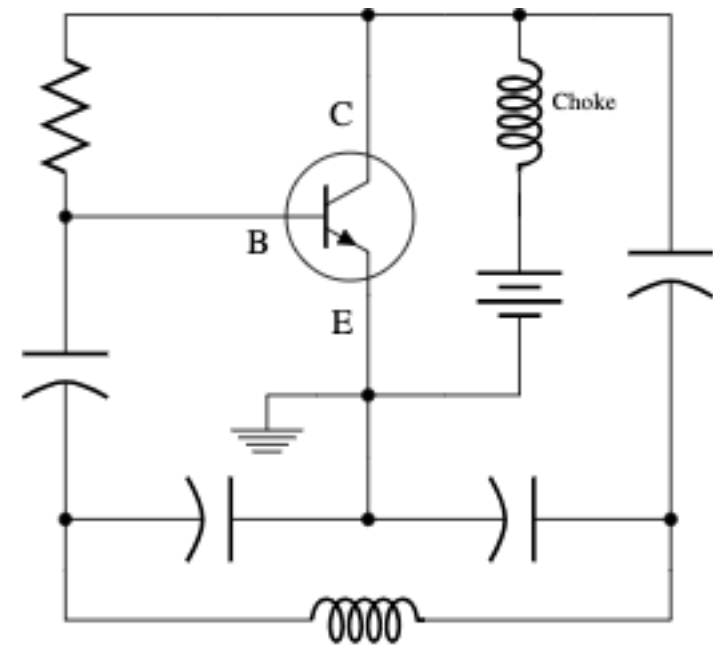
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Practical Circuits - Oscillator

- G7B09
- What determines the frequency of an LC oscillator?
 - A. The number of stages in the counter
 - B. The number of stages in the divider
 - C. The inductance and capacitance in the tank circuit
 - D. The time delay of the lag circuit

Practical Circuits - Oscillator

- G7B09 (C)
- What determines the frequency of an LC oscillator?
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- B. The number of stages in the divider
- **C. The inductance and capacitance in the tank circuit**
- D. The time delay of the lag circuit



Colpitts oscillator

Practical Circuits - Amplifiers

- G7B10
- Which of the following describes a linear amplifier?
- A. Any RF power amplifier used in conjunction with an amateur transceiver
- B. An amplifier in which the output preserves the input waveform
- C. A Class C high efficiency amplifier
- D. An amplifier used as a frequency multiplier

Practical Circuits - Amplifiers

- G7B10 (B)
- Which of the following describes a linear amplifier?
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- C. A Class C high efficiency amplifier
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Practical Circuits - Amplifiers

- G7B11
- For which of the following modes is a Class C power stage appropriate for amplifying a modulated signal?
- A. SSB
- B. FM
- C. AM
- D. All these choices are correct

Practical Circuits - Amplifiers

- G7B11 (B)
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- C. AM
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Practical Circuits

- G7C01
- What circuit is used to select one of the sidebands from a balanced modulator?
- A. Carrier oscillator
- B. Filter
- C. IF amplifier
- D. RF amplifier

Practical Circuits

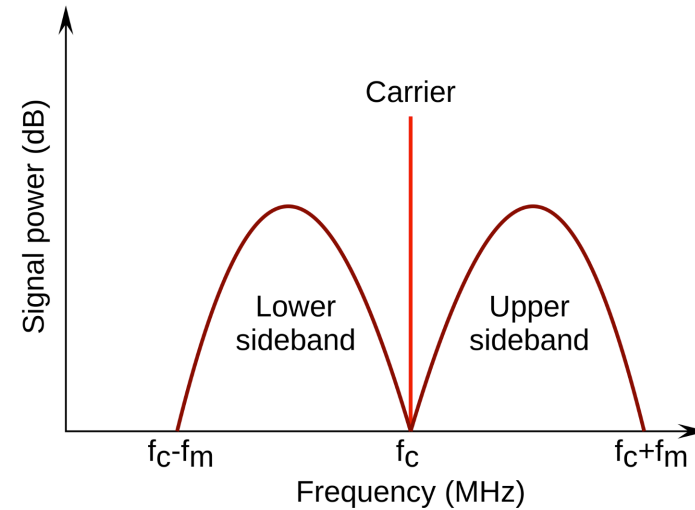
- G7C01 (B)
- What circuit is used to select one of the sidebands from a balanced modulator?
- A. Carrier oscillator
- **B. Filter**
- C. IF amplifier
- D. RF amplifier

Practical Circuits

- G7C02
- What output is produced by a balanced modulator?
- A. Frequency modulated RF
- B. Audio with equalized frequency response
- C. Audio extracted from the modulation signal
- D. Double-sideband modulated RF

Practical Circuits

- G7C02 (D)
- What output is produced by a balanced modulator?
- A. Frequency modulated RF
- B. Audio with equalized frequency response
- C. Audio extracted from the modulation signal
- **D. Double-sideband modulated RF**



Practical Circuits

- G7C03
- What is one reason to use an impedance matching transformer at a transmitter output?
- A. To minimize transmitter power output
- B. To present the desired impedance to the transmitter and feed line
- C. To reduce power supply ripple
- D. To minimize radiation resistance

Practical Circuits

- G7C03 (B)
- What is one reason to use an impedance matching transformer at a transmitter output?
- A. To minimize transmitter power output
- **B. To present the desired impedance to the transmitter and feed line**
- C. To reduce power supply ripple
- D. To minimize radiation resistance

Practical Circuits

- G7C04
- How is a product detector used?
 - A. Used in test gear to detect spurious mixing products
 - B. Used in transmitter to perform frequency multiplication
 - C. Used in an FM receiver to filter out unwanted sidebands
 - D. Used in a single sideband receiver to extract the modulated signal

Practical Circuits

- G7C04 (D)
- How is a product detector used?
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- B. Used in transmitter to perform frequency multiplication
- C. Used in an FM receiver to filter out unwanted sidebands
- **D. Used in a single sideband receiver to extract the modulated signal**

Practical Circuits

- G7C05
- Which of the following is characteristic of a direct digital synthesizer (DDS)?
- A. Extremely narrow tuning range
- B. Relatively high-power output
- C. Pure sine wave output
- D. Variable output frequency with the stability of a crystal oscillator

Practical Circuits

- G7C05 (D)
- Which of the following is characteristic of a direct digital synthesizer (DDS)?
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- C. Pure sine wave output
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Practical Circuits

- G7C06
- Which of the following is an advantage of a digital signal processing (DSP) filter compared to an analog filter?
- A. A wide range of filter bandwidths and shapes can be created
- B. Fewer digital components are required
- C. Mixing products are greatly reduced
- D. The DSP filter is much more effective at VHF frequencies

Practical Circuits

- G7C06 (A)
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Practical Circuits-Filters

- G7C07
- What term specifies a filter's attenuation inside its passband?
- A. Insertion loss
- B. Return loss
- C. Q
- D. Ultimate rejection

Practical Circuits-Filters

- G7C07 (A)
- What term specifies a filter's attenuation inside its passband?
- **A. Insertion loss**
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- C. Q
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Practical Circuits - Receivers

- G7C08
- Which parameter affects receiver sensitivity?
- A. Input amplifier gain
- B. Demodulator stage bandwidth
- C. Input amplifier noise figure
- D. All these choices are correct

Practical Circuits - Receivers

- G7C08 (D)
- Which parameter affects receiver sensitivity?
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- B. Demodulator stage bandwidth
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- **D. All these choices are correct**

Practical Circuits-SDR

- G7C09
- What is the phase difference between the I and Q RF signals that software-defined radio (SDR) equipment uses for modulation and demodulation?
 - A. Zero
 - B. 90 degrees
 - C. 180 degrees
 - D. 45 degrees

Practical Circuits-SDR

- G7C09 (B)
- What is the phase difference between the I and Q RF signals that software-defined radio (SDR) equipment uses for modulation and demodulation?
 - A. Zero
 - **B. 90 degrees**
 - C. 180 degrees
 - D. 45 degrees

Practical Circuits-SDR

- G7C10
- What is an advantage of using I-Q modulation with software-defined radios (SDRs)?
- A. The need for high resolution analog-to-digital converters is eliminated
- B. All types of modulation can be created with appropriate processing
- C. Minimum detectible signal level is reduced
- D. Automatic conversion of the signal from digital to analog

Practical Circuits-SDR

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Practical Circuits-SDR

- G7C11
- Which of these functions is performed by software in a software-defined radio (SDR)?
- A. Filtering
- B. Detection
- C. Modulation
- D. All these choices are correct

Practical Circuits-SDR

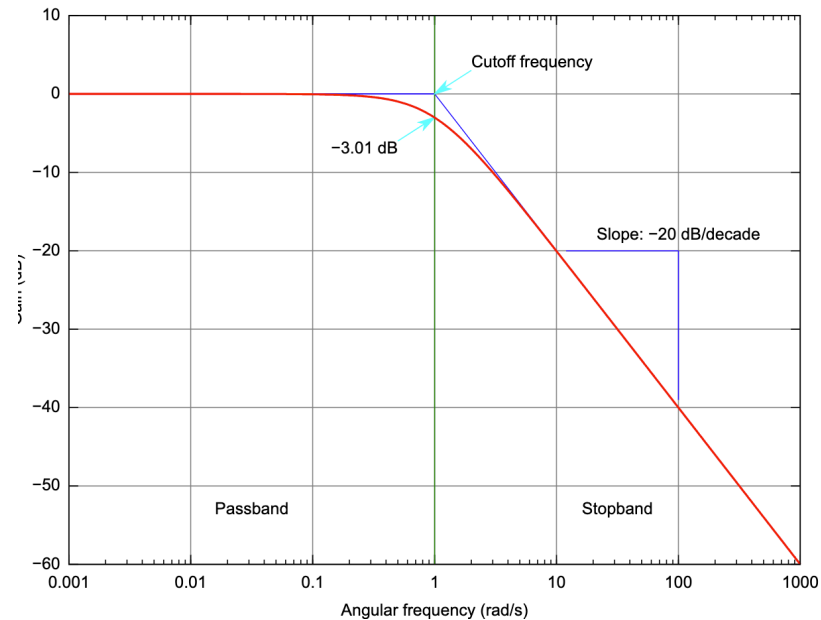
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- C. Modulation
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Practical Circuits-Filters

- G7C12
- What is the frequency above which a low-pass filter's output power is less than half the input power?
- A. Notch frequency
- B. Neper frequency
- C. Cutoff frequency
- D. Rolloff frequency

Practical Circuits-Filters

- G7C12 (C)
- What is the frequency above which a low-pass filter's output power is less than half the input power?
- A. Notch frequency
- B. Neper frequency
- **C. Cutoff frequency**
- D. Rolloff frequency

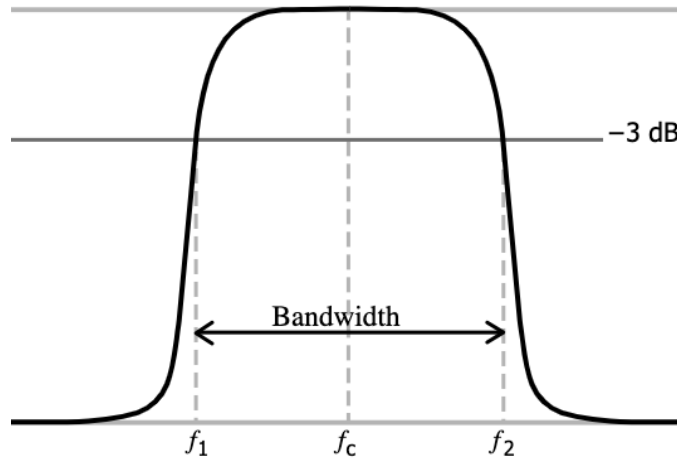


Practical Circuits-Filters

- G7C13
- What term specifies a filter's maximum ability to reject signals outside its passband?
- A. Notch depth
- B. Rolloff
- C. Insertion loss
- D. Ultimate rejection

Practical Circuits-Filters

- G7C13 (D)
- What term specifies a filter's maximum ability to reject signals outside its passband?
- A. Notch depth
- B. Rolloff
- C. Insertion loss
- D. **Ultimate rejection**



Practical Circuits-Filters

- G7C14
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