

General Class Review

G6 Circuit Components

Michael Carroll

KM6OTE

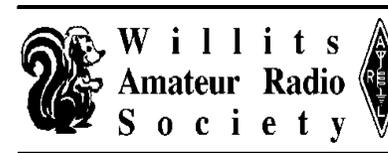
Amateur Radio General License Training

These presentations are sponsored by:

Mendocino Auxiliary Communications Service (MACS)

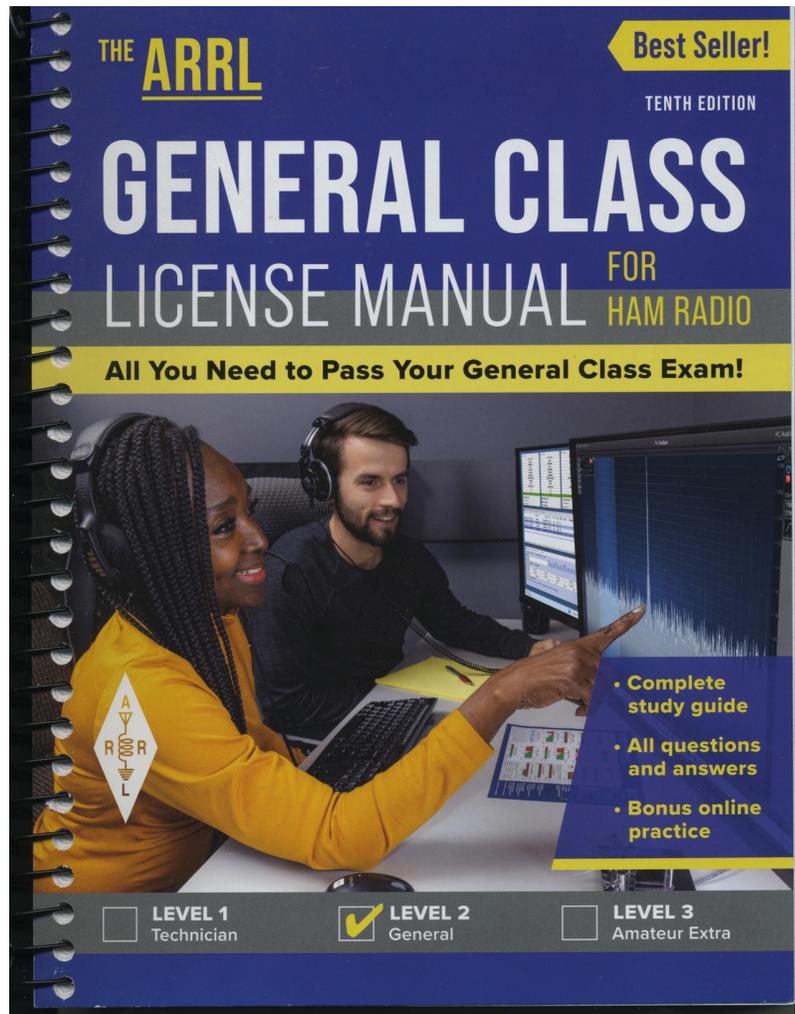
Mendocino County Amateur Radio Communications Service (McARCS)

Willits Amateur Radio Society (WARS)



Topics on Exam

Section	Contents	Questions on Exam	Questions in Pool	Covered in Session
G1	FCC Rules and Regulations	5	57	Session 5
G2	Operating Procedures	5	50	Session 4
G3	Radio Wave Propagation	3	37	Session 2
G4	Amateur Radio Practices	5	60	Session 3
G5	Electrical Principles	3	40	Session 1
G6	Electronic Components	2	24	Session 1
G7	Practical Circuits	3	38	Session 1
G8	Signals and Emissions	3	43	Session 3
G9	Antennas and Feedlines	4	46	Session 2
G0	Safety	2	25	Session 4



Review Manual
ARRL, 10th edition, Question pool
for 2023 - 2027

Review Software
hamstudy.org

<http://www.arrl.org/question-pools>

Wikipedia

Circuit Components

G6A01

What is the minimum allowable discharge voltage for maximum life of a standard 12-volt lead-acid battery?

- A. 6 volts
- B. 8.5 volts
- C. 10.5 volts
- D. 12 volts

Circuit Components

G6A01 (C)

What is the minimum allowable discharge voltage for maximum life of a standard 12-volt lead-acid battery?

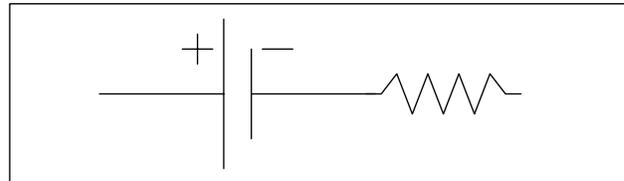
- A. 6 volts
- B. 8.5 volts
- **C. 10.5 volts**
- D. 12 volts

Circuit Components

- G6A02
- What is an advantage of batteries with low internal resistance?
 - A. Long life
 - B. High discharge current
 - C. High voltage
 - D. Rapid recharge

Circuit Components

- G6A02 (B)
- What is an advantage of batteries with low internal resistance?
- A. Long life
- **B. High discharge current**
- C. High voltage
- D. Rapid recharge



battery

Circuit Components

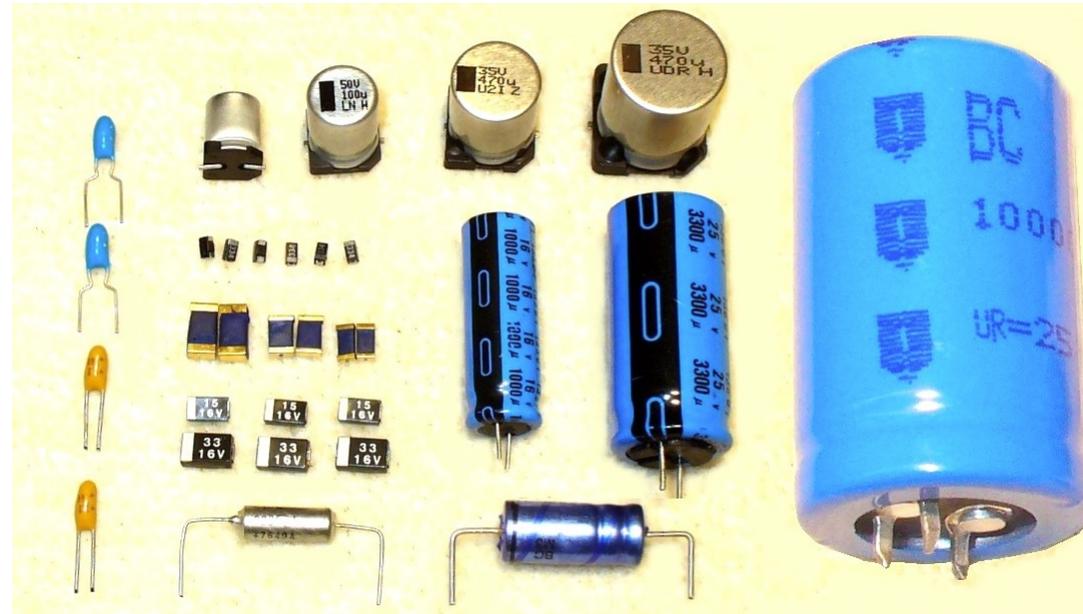
- G6A03
- What is the approximate forward threshold voltage of a germanium diode?
- A. 0.1 volt
- B. 0.3 volts
- C. 0.7 volts
- D. 1.0 volts

Circuit Components

- G6A03 (B)
- What is the approximate forward threshold voltage of a germanium diode?
- A. 0.1 volt
- **B. 0.3 volts**
- C. 0.7 volts
- D. 1.0 volts

Circuit Components

- G6A04 (C)
- Which of the following is characteristic of an electrolytic capacitor?
- A. Tight tolerance
- B. Much less leakage than any other type
- C. **High capacitance for a given volume**
- D. Inexpensive RF capacitor



Circuit Components

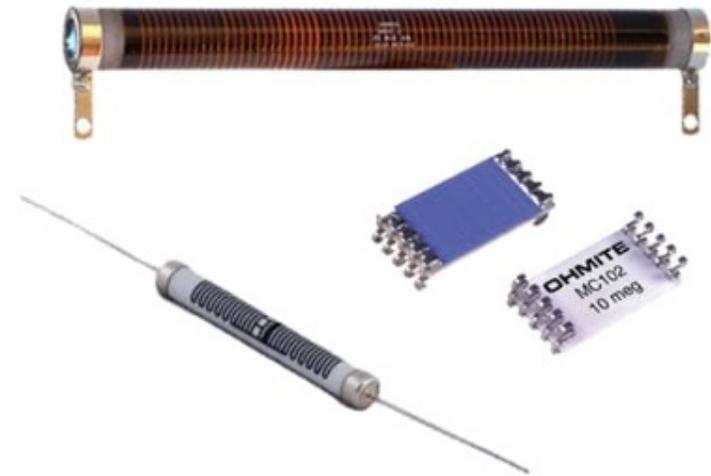
- G6A05
- What is the approximate forward threshold voltage of a silicon junction diode?
- A. 0.1 volt
- B. 0.3 volts
- C. 0.7 volts
- D. 1.0 volts

Circuit Components

- G6A05 (C)
- What is the approximate forward threshold voltage of a silicon junction diode?
- A. 0.1 volt
- B. 0.3 volts
- **C. 0.7 volts**
- D. 1.0 volts

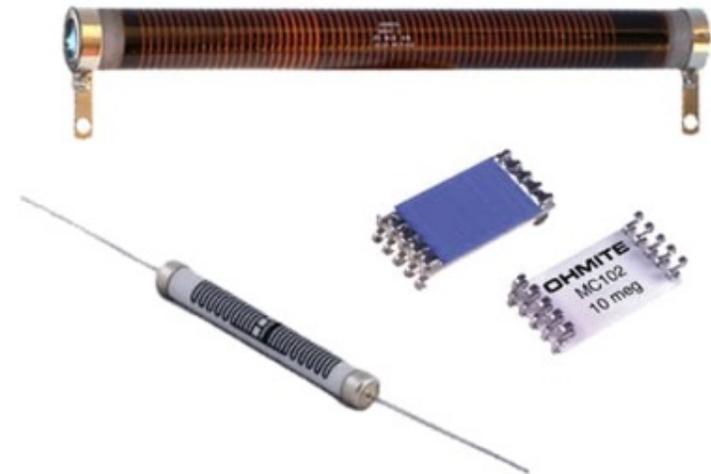
Circuit Components - Resistor

- G6A06
- Why should wire-wound resistors not be used in RF circuits?
 - A. The resistor's tolerance value would not be adequate
 - B. The resistor's inductance could make circuit performance unpredictable
 - C. The resistor could overheat
 - D. The resistor's internal capacitance would detune the circuit



Circuit Components - Resistor

- G6A06 (B)
- Why should wire-wound resistors not be used in RF circuits?
- A. The resistor's tolerance value would not be adequate
- **B. The resistor's inductance could make circuit performance unpredictable**
- C. The resistor could overheat
- D. The resistor's internal capacitance would detune the circuit



Circuit Components

- G6A07
- What are the operating points for a bipolar transistor used as a switch?
- A. Saturation and cutoff
- B. The active region (between cutoff and saturation)
- C. Peak and valley current points
- D. Enhancement and depletion modes

Circuit Components

- G6A07 (A)
- What are the operating points for a bipolar transistor used as a switch?
- A. **Saturation and cutoff**
- B. The active region (between cutoff and saturation)
- C. Peak and valley current points
- D. Enhancement and depletion modes

Circuit Components

- G6A08
- Which of the following is characteristic of low voltage ceramic capacitors?
 - A. Tight tolerance
 - B. High stability
 - C. High capacitance for given volume
 - D. Comparatively low cost



Circuit Components

- G6A08 (D)
- Which of the following is characteristic of low voltage ceramic capacitors?
- A. Tight tolerance
- B. High stability
- C. High capacitance for given volume
- D. **Comparatively low cost**

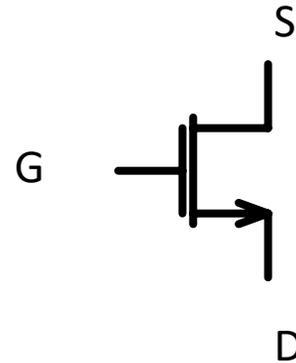


Circuit Components

- G6A09
- Which of the following describes MOSFET construction?
- A. The gate is formed by a back-biased junction
- B. The gate is separated from the channel by a thin insulating layer
- C. The source is separated from the drain by a thin insulating layer
- D. The source is formed by depositing metal on silicon

Circuit Components

- G6A09 (B)
- Which of the following describes MOSFET construction?
- A. The gate is formed by a back-biased junction
- **B. The gate is separated from the channel by a thin insulating layer**
- C. The source is separated from the drain by a thin insulating layer
- D. The source is formed by depositing metal on silicon

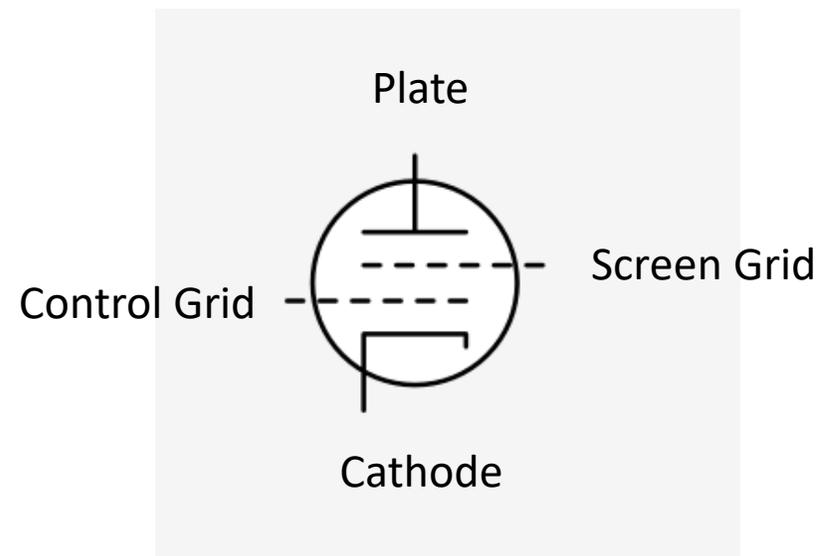


Circuit Components

- G6A10
- Which element of a vacuum tube regulates the flow of electrons between cathode and plate?
- A. Control grid
- B. Suppressor grid
- C. Screen grid
- D. Trigger electrode

Circuit Components

- G6A10 (A)
- Which element of a vacuum tube regulates the flow of electrons between cathode and plate?
- **A. Control grid**
- B. Suppressor grid
- C. Screen grid
- D. Trigger electrode



Circuit Components

- G6A11
- What happens when an inductor is operated above its self-resonant frequency?
 - A. Its reactance increases
 - B. Harmonics are generated
 - C. It becomes capacitive
 - D. Catastrophic failure is likely

Circuit Components

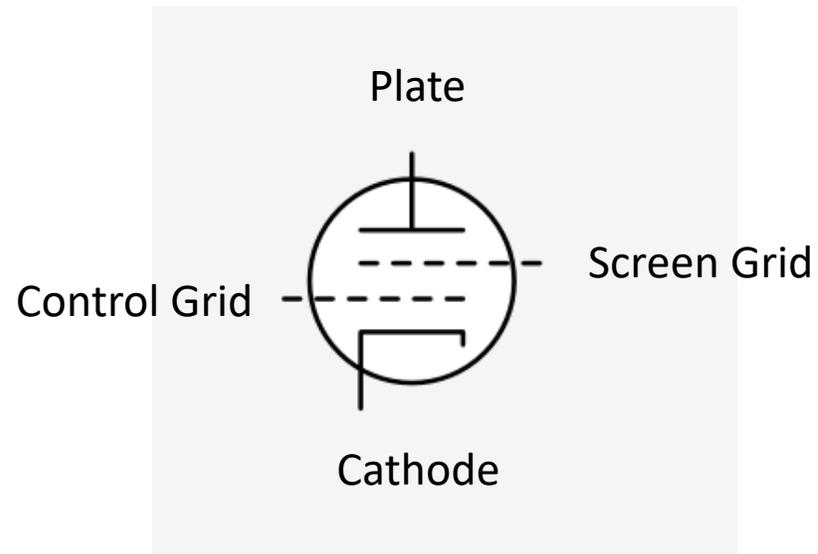
- G6A11 (C)
- What happens when an inductor is operated above its self-resonant frequency?
- A. Its reactance increases
- B. Harmonics are generated
- **C. It becomes capacitive**
- D. Catastrophic failure is likely

Circuit Components

- G6A12
- What is the primary purpose of a screen grid in a vacuum tube?
 - A. To reduce grid-to-plate capacitance
 - B. To increase efficiency
 - C. To increase the control grid resistance
 - D. To decrease plate resistance

Circuit Components

- G6A12 (A)
- What is the primary purpose of a screen grid in a vacuum tube?
- **A. To reduce grid-to-plate capacitance**
- B. To increase efficiency
- C. To increase the control grid resistance
- D. To decrease plate resistance



Circuit Components

- G6B01
- What determines the performance of a ferrite core at different frequencies?
 - A. Its conductivity
 - B. Its thickness
 - C. The composition, or “mix,” of materials used
 - D. The ratio of outer diameter to inner diameter

Circuit Components

- G6B01 (C)
- What determines the performance of a ferrite core at different frequencies?
- A. Its conductivity
- B. Its thickness
- **C. The composition, or “mix,” of materials used**
- D. The ratio of outer diameter to inner diameter

Circuit Components

- G6B02
- What is meant by the term MMIC?
 - A. Multi-Mode Integrated Circuit
 - B. Monolithic Microwave Integrated Circuit
 - C. Metal Monolayer Integrated Circuit
 - D. Mode Modulated Integrated Circuit

Circuit Components

- G6B02 (B)
- What is meant by the term MMIC?
- A. Multi-Mode Integrated Circuit
- **B. Monolithic Microwave Integrated Circuit**
- C. Metal Monolayer Integrated Circuit
- D. Mode Modulated Integrated Circuit

Circuit Components

- G6B03
- Which of the following is an advantage of CMOS integrated circuits compared to TTL integrated circuits?
- A. Low power consumption
- B. High power handling capability
- C. Better suited for RF amplification
- D. Better suited for power supply regulation

Circuit Components

- G6B03 (A)
- Which of the following is an advantage of CMOS integrated circuits compared to TTL integrated circuits?
- **A. Low power consumption**
- B. High power handling capability
- C. Better suited for RF amplification
- D. Better suited for power supply regulation

Circuit Components

- G6B04
- What is a typical upper frequency limit for low SWR operation of 50-ohm BNC connectors?
- A. 50 MHz
- B. 500 MHz
- C. 4 GHz
- D. 40 GHz

Circuit Components

- G6B04 (C)
- What is a typical upper frequency limit for low SWR operation of 50-ohm BNC connectors?
- A. 50 MHz
- B. 500 MHz
- **C. 4 GHz**
- D. 40 GHz



Circuit Components

- G6B05
- What is an advantage of using a ferrite core toroidal inductor?
 - A. Large values of inductance may be obtained
 - B. The magnetic properties of the core may be optimized for a specific range of frequencies
 - C. Most of the magnetic field is contained in the core
 - D. All these choices are correct

Circuit Components

- G6B05 (D)
- What is an advantage of using a ferrite core toroidal inductor?
- A. Large values of inductance may be obtained
- B. The magnetic properties of the core may be optimized for a specific range of frequencies
- C. Most of the magnetic field is contained in the core
- **D. All these choices are correct**

Circuit Components

- G6B06
- What kind of device is an integrated circuit operational amplifier?
- A. Digital
- B. MMIC
- C. Programmable Logic
- D. Analog

Circuit Components

- G6B06 (D)
- What kind of device is an integrated circuit operational amplifier?
- A. Digital
- B. MMIC
- C. Programmable Logic
- **D. Analog**

Circuit Components

- G6B07
- Which of the following describes a type N connector?
- A. A moisture-resistant RF connector useful to 10 GHz
- B. A small bayonet connector used for data circuits
- C. A low noise figure VHF connector
- D. A nickel plated version of the PL-259

Circuit Components

- G6B07 (A)
- Which of the following describes a type N connector?
- **A. A moisture-resistant RF connector useful to 10 GHz**
- B. A small bayonet connector used for data circuits
- C. A low noise figure VHF connector
- D. A nickel plated version of the PL-259



Circuit Components

- G6B08
- How is an LED biased when emitting light?
- A. In the tunnel-effect region
- B. At the Zener voltage
- C. Reverse biased
- D. Forward biased

Circuit Components

- G6B08 (D)
- How is an LED biased when emitting light?
- A. In the tunnel-effect region
- B. At the Zener voltage
- C. Reverse biased
- **D. Forward biased**

Circuit Components

- G6B10
- How does a ferrite bead or core reduce common-mode RF current on the shield of a coaxial cable?
 - A. By creating an impedance in the current's path
 - B. It converts common-mode current to differential mode current
 - C. By creating an out-of-phase current to cancel the common-mode current
 - D. Ferrites expel magnetic fields

Circuit Components

- G6B10 (A)
- How does a ferrite bead or core reduce common-mode RF current on the shield of a coaxial cable?
- **A. By creating an impedance in the current's path**
- B. It converts common-mode current to differential mode current
- C. By creating an out-of-phase current to cancel the common-mode current

- D. Ferrites expel magnetic fields

Circuit Components

- G6B11
- What is an SMA connector?
 - A. A type-S to type-M adaptor
 - B. A small threaded connector suitable for signals up to several GHz
 - C. A connector designed for serial multiple access signals
 - D. A type of push-on connector intended for high-voltage applications

Circuit Components

- G6B11 (B)
- What is an SMA connector?
 - A. A type-S to type-M adaptor
 - **B. A small threaded connector suitable for signals up to several GHz**
 - C. A connector designed for serial multiple access signals
 - D. A type of push-on connector intended for high-voltage applications



Circuit Components

- G6B12
- Which of these connector types is commonly used for low frequency or dc signal connections to a transceiver?
 - A. PL-259
 - B. BNC
 - C. RCA Phono
 - D. Type N

Circuit Components

- G6B12 (C)
- Which of these connector types is commonly used for low frequency or dc signal connections to a transceiver?
- A. PL-259
- B. BNC
- **C. RCA Phono**
- D. Type N

