FCC Exam Element 3 Question Pool for General Class
Effective 7/1/2019 – 6/30/2023

SUBELEMENT G6 – CIRCUIT COMPONENTS [2 Exam Questions – 2 Groups]

G6A – Resistors; capacitors; inductors; rectifiers; solid-state diodes and transistors; vacuum tubes; batteries

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
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G6A02
What is an advantage of the low internal resistance of nickel-cadmium batteries?
A. Long life
B. High discharge current
C. High voltage
D. Rapid recharge
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G6A03
What is the approximate junction threshold voltage of a germanium diode?
A. 0.1 volt
B. 0.3 volts
C. 0.7 volts
D. 1.0 volts
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G6A04
Which of the following is an advantage 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
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G6A05

What is the approximate junction threshold voltage of a conventional silicon diode?

A. 0.1 volt
B. 0.3 volts
C. 0.7 volts
D. 1.0 volts

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G6A06

Which of the following is a reason not to use wire-wound resistors in an RF circuit?

A. The resistor's tolerance value would not be adequate for such a circuit
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

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G6A07

What are the stable operating points for a bipolar transistor used as a switch in a logic circuit?

A. Its saturation and cutoff regions
B. Its active region (between the cutoff and saturation regions)
C. Its peak and valley current points
D. Its enhancement and depletion modes

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G6A08

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

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G6A09

Which of the following describes the construction of a MOSFET?

A. The gate is formed by a back-biased junction
B. The gate is separated from the channel with 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

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G6A10

Which element of a triode vacuum tube is used to regulate the flow of electrons between cathode and plate?

A. Control grid
B. Heater
C. Screen grid
D. Trigger electrode

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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

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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

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G6A13

Why is the polarity of applied voltages important for polarized capacitors?

A. Incorrect polarity can cause the capacitor to short-circuit
B. Reverse voltages can destroy the dielectric layer of an electrolytic capacitor
C. The capacitor could overheat and explode
D. All these choices are correct

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G6A14

Which of the following is an advantage of ceramic capacitors as compared to other types of capacitors?

A. Tight tolerance
B. High stability
C. High capacitance for given volume
D. Comparatively low cost

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G6B – Analog and digital integrated circuits (ICs); microprocessors; memory; I/O devices; microwave ICs (MMICs); display devices; connectors; ferrite cores

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

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G6B02

What is meant by the term MMIC?

A. Multi-Megabyte Integrated Circuit
B. Monolithic Microwave Integrated Circuit
C. Military Manufactured Integrated Circuit
D. Mode Modulated Integrated Circuit

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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

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G6B04

What is meant by the term ROM?

A. Resistor Operated Memory
B. Read Only Memory
C. Random Operational Memory
D. Resistant to Overload Memory

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G6B05

What is meant when memory is characterized as non-volatile?

A. It is resistant to radiation damage
B. It is resistant to high temperatures
C. The stored information is maintained even if power is removed
D. The stored information cannot be changed once written

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G6B06

What kind of device is an integrated circuit operational amplifier?

A. Digital
B. MMIC
C. Programmable Logic
D. Analog
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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 threaded connector used for hydraulic systems
D. An audio connector used in surround-sound installations
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G6B08

How is an LED biased when emitting light?

A. Beyond cutoff
B. At the Zener voltage
C. Reverse biased
D. Forward biased
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G6B09

Which of the following is a characteristic of a liquid crystal display?

A. It utilizes ambient or back lighting
B. It offers a wide dynamic range
C. It consumes relatively high power
D. It has relatively short lifetime
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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
C. By creating an out-of-phase current to cancel the common-mode current
D. Ferrites expel magnetic fields
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G6B11

What is a type SMA connector?

A. A large bayonet connector usable at power levels more than 1 KW
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
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G6B12

Which of these connector types is commonly used for audio signals in Amateur Radio stations?

A. PL-259
B. BNC
C. RCA Phono
D. Type N
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G6B13

Which of these connector types is commonly used for RF connections at frequencies up to 150 MHz?

A. Octal
B. RJ-11
C. PL-259
D. DB-25
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