A-001-005-006 **(A)**

What is the Q of a parallel RLC circuit, if it is resonant at 7.125 MHz, L is 10.1 microhenrys and R is 100 ohms?

A 0.221
B 22.1
C 0.00452
D 4.52

A-001-005-007 **(A)**

What is the Q of a parallel RLC circuit, if it is resonant at 7.125 MHz, L is 12.6 microhenrys and R is 22 kilohms?

A 39
B 22.1
C 0.0256
D 25.6

A-001-005-008 **(D)**

What is the Q of a parallel RLC circuit, if it is resonant at 3.625 MHz, L is 3 microhenrys and R is 2.2 kilohms?

A 25.6
B 31.1
C 0.031
D 32.2

A-001-005-009 **(C)**

What is the Q of a parallel RLC circuit, if it is resonant at 3.625 MHz, L is 42 microhenrys and R is 220 ohms?

A 4.35
B 0.00435
C 0.23
D 2.3

A-001-005-010 **(C)**

What is the Q of a parallel RLC circuit, if it is resonant at 3.625 MHz, L is 43 microhenrys and R is 1.8 kilohms?

A 54.3
B 23
C 1.84
D 0.543

A-001-005-011 **(A)**

Why is a resistor often included in a parallel resonant circuit ?

A To decrease the Q and increase the bandwidth
B To increase the Q and decrease the skin effect
C To decrease the Q and increase the resonant frequency
D To increase the Q and decrease bandwidth

A-002-001-001 **(D)**

What two elements widely used in semiconductor devices exhibit both metallic and non-metallic characteristics?

A Galena and germanium
B Galena and bismuth
C Silicon and gold
D Silicon and germanium

A-002-001-002 **(C)**

In what application is gallium-arsenide used as a semiconductor material in preference to germanium or silicon?

A At very low frequencies
B In bipolar transistors
C At microwave frequencies
D In high-power circuits

A-002-001-003 **(C)**

What type of semiconductor material contains fewer free electrons than pure germanium or silicon crystals?

A Bipolar type
B Superconductor type
C P-type
D N-type

A-002-001-004 **(A)**

What type of semiconductor material contains more free electrons than pure germanium or silicon crystals?

A N-type
B P-type
C Bipolar
D Superconductor

A-002-001-005 **(C)**

What are the majority charge carriers in P-type semiconductor material?

A Free protons
B Free neutrons
C Holes
D Free electrons

A-002-001-006 **(D)**

What are the majority charge carriers in N-type semiconductor material?

A Holes
B Free protons
C Free neutrons
D Free electrons

A-002-001-007 **(C)**

Silicon, in its pure form, is:

A a semiconductor
B a conductor
C an insulator
D a superconductor

A-002-001-008 **(C)**

An element which is sometimes an insulator and sometimes a conductor is called a:

A N-type conductor
B P-type conductor
C semiconductor
D intrinsic conductor

A-002-001-009 **(C)**

Which of the following materials is used to make a semiconductor?

A Copper
B Sulphur
C Silicon
D Tantalum

A-002-001-010 **(C)**

Substances such as silicon in a pure state are usually good:

A tuned circuits
B inductors
C insulators
D conductors

A-002-001-011 **(A)**

A semiconductor is said to be doped when it has added to it small quantities of:

A impurities
B protons
C ions
D electrons

A-002-002-001 **(B)**

What is the principal characteristic of a Zener diode?

A An internal capacitance that varies with the applied voltage
B A constant voltage under conditions of varying current
C A constant current under conditions of varying voltage
D A negative resistance region

A-002-002-002 **(B)**

What type of semiconductor diode varies its internal capacitance as the voltage applied to its terminals varies?

A Hot-carrier (Schottky)
B Varactor
C Zener
D Silicon-controlled rectifier

A-002-002-003 **(D)**

What is a common use for the hot-carrier (Schottky) diode?

A As balanced mixers in FM generation
B As a variable capacitance in an automatic frequency control (AFC) circuit
C As a constant voltage reference in a power supply
D As VHF and UHF mixers and detectors

A-002-002-004 **(B)**

What limits the maximum forward current in a junction diode?

A Peak inverse voltage
B Junction temperature
C Forward voltage
D Back EMF

A-002-002-005 **(C)**

What are the major ratings for junction diodes?

A Maximum forward current and capacitance
B Maximum reverse current and peak inverse voltage (PIV)
C Maximum forward current and peak inverse voltage (PIV)
D Maximum reverse current and capacitance

A-002-002-006 **(B)**

Structurally, what are the two main categories of semiconductor diodes?

A Electrolytic and junction
B Junction and point contact
C Vacuum and point contact
D Electrolytic and point contact

A-002-002-007 **(C)**

What is a common use for point contact diodes?

A As a constant voltage source
B As a high voltage rectifier
C As an RF detector
D As a constant current source

A-002-002-008 **(C)**

What is one common use for PIN diodes?

A As a high voltage rectifier
B As a constant voltage source
C As an RF switch
D As a constant current source

A-002-002-009 **(D)**

A Zener diode is a device used to:

A dissipate voltage
B decrease current
C increase current
D regulate voltage

A-002-002-010 **(D)**

If a Zener diode rated at 10 V and 50 watts was operated at maximum dissipation rating, it would conduct ____ amperes:

A 50
B 0.05
C 0.5
D 5

A-002-002-011 **(B)**

The power-handling capability of most Zener diodes is rated at 25 degrees C or approximately room temperature. If the temperature is increased, the power handling capability is:

A slightly greater
B less
C the same
D much greater

A-002-003-001 **(B)**

What is the alpha of a bipolar transistor?

A The change of collector current with respect to gate current
B The change of collector current with respect to emitter current
C The change of collector current with respect to base current
D The change of base current with respect to collector current

A-002-003-002 **(C)**

What is the beta of a bipolar transistor?

A The change of collector current with respect to emitter current
B The change of base current with respect to gate current
C The change of collector current with respect to base current
D The change of base current with respect to emitter current

A-002-003-003 **(C)**

Which component conducts electricity from a negative emitter to a positive collector when its base voltage is made positive?

A A triode vacuum tube
B A PNP transistor
C An NPN transistor
D A varactor

A-002-003-004 **(A)**

What is the alpha of a bipolar transistor in common base configuration?

A Forward current gain
B Forward voltage gain
C Reverse current gain
D Reverse voltage gain

A-002-003-005 **(A)**

In a bipolar transistor, the change of collector current with respect to base current is called:

A beta
B gamma
C delta
D alpha

A-002-003-006 **(A)**

The alpha of a bipolar transistor is specified for what configuration?

A Common base
B Common collector
C Common gate
D Common emitter

A-002-003-007 **(D)**

The beta of a bipolar transistor is specified for what configurations?

A Common emitter or common gate
B Common base or common collector
C Common base or common emitter
D Common emitter or common collector

A-002-003-008 **(C)**

Which component conducts electricity from a positive emitter to a negative collector when its base is made negative?

A A varactor
B An NPN transistor
C A PNP transistor
D A triode vacuum tube

A-002-003-009 **(D)**

Alpha of a bipolar transistor is equal to:

A beta x (1 + beta)
B beta x (1 - beta)
C beta / (1 - beta)
D beta / (1 + beta)

A-002-003-010 **(C)**

The current gain of a bipolar transistor in common emitter or common collector compared to common base configuration is:

A usually about double
B usually about half
C high to very high
D very low

A-002-003-011 **(A)**

Beta of a bipolar transistor is equal to:

A alpha / (1 - alpha)
B alpha / (1 + alpha)
C alpha x (1 - alpha)
D alpha x (1 + alpha)

A-002-004-001 **(A)**

What is an enhancement-mode FET?

A An FET without a channel; no current occurs with zero gate voltage
B An FET with a channel that blocks voltage through the gate
C An FET with a channel that allows current when the gate voltage is zero
D An FET without a channel to hinder current through the gate

A-002-004-002 **(C)**

What is a depletion-mode FET?

A An FET without a channel to hinder current through the gate
B An FET that has a channel that blocks current when the gate voltage is zero
C An FET that has a channel with no gate voltage applied; a current flows with zero gate voltage
D An FET without a channel; no current flows with zero gate voltage

A-002-004-003 **(A)**

Why do many MOSFET devices have built-in gate protective Zener diodes?

A The gate-protective Zener diode prevents the gate insulation from being punctured by small static charges or excessive voltages

B The gate-protective Zener diode keeps the gate voltage within specifications to prevent the device from overheating

C The gate-protective Zener diode protects the substrate from excessive voltages

D The gate-protective Zener diode provides a voltage reference to provide the correct amount of reverse-bias gate voltage

A-002-004-004 **(C)**

Why are special precautions necessary in handling FET and CMOS devices?

A They have micro-welded semiconductor junctions that are susceptible to breakage

B They have fragile leads that may break off

C They are susceptible to damage from static charges

D They are light-sensitive

A-002-004-005 **(D)**

How does the input impedance of a field-effect transistor (FET) compare with that of a bipolar transistor?

A One cannot compare input impedance without knowing supply voltage

B An FET has low input impedance; a bipolar transistor has high input impedance

C The input impedance of FETs and bipolar transistors is the same

D An FET has high input impedance; a bipolar transistor has low input impedance

A-002-004-006 **(D)**

What are the three terminals of a junction field-effect transistor (JFET)?

A Emitter, base 1, base 2

B Emitter, base, collector

C Gate 1, gate 2, drain

D Gate, drain, source

A-002-004-007 **(B)**

What are the two basic types of junction field-effect transistors (JFET)?

A Silicon and germanium

B N-channel and P-channel

C High power and low power

D MOSFET and GaAsFET

A-002-004-008 **(A)**

Electron conduction in an n-channel depletion type MOSFET is associated with:

A n-channel depletion

B p-channel depletion

C p-channel enhancement

D q-channel enhancement

A-002-004-009 **(C)**

Electron conduction in an n-channel enhancement MOSFET is associated with:

A p-channel enhancement

B p-channel depletion

C n-channel enhancement

D q-channel depletion

A-002-004-010 **(C)**

Hole conduction in a p-channel depletion type MOSFET is associated with:

A q-channel depletion

B n-channel depletion

C p-channel depletion

D n-channel enhancement

A-002-004-011 **(A)**

Hole conduction in a p-channel enhancement type MOSFET is associated with:

A p-channel enhancement

B n-channel depletion

C n-channel enhancement

D q-channel depletion

A-002-005-001 **(C)**

What are the three terminals of a silicon controlled rectifier (SCR)?

A Base, collector and emitter

B Gate, source and sink

C Anode, cathode and gate

D Gate, base 1 and base 2

A-002-005-002 **(C)**

What are the two stable operating conditions of a silicon controlled rectifier (SCR)?

A NPN conduction and PNP conduction
B Oscillating and quiescent
C Conducting and non-conducting
D Forward conducting and reverse conducting

A-002-005-003 **(B)**

When a silicon controlled rectifier (SCR) is triggered, to what other semiconductor diode are its electrical characteristics similar (as measured between its cathode and anode)?

A The varactor diode
B The junction diode
C The PIN diode
D The hot-carrier (Schottky) diode

A-002-005-004 **(A)**

Under what operating condition does a silicon controlled rectifier (SCR) exhibit electrical characteristics similar to a forward-biased silicon rectifier?

A When it is gated "on"
B When it is gated "off"
C When it is used as a detector
D During a switching transition

A-002-005-005 **(D)**

The silicon controlled rectifier (SCR) is what type of device?

A NPPN
B PNNP
C PPNN
D PNPN

A-002-005-006 **(D)**

The control element in the silicon controlled rectifier (SCR) is called the:

A anode
B cathode
C emitter
D gate

A-002-005-007 **(A)**

The silicon controlled rectifier (SCR) is a member of which family?

A Thyristors
B Phase locked loops
C Varactors
D Varistors

A-002-005-008 **(A)**

In amateur radio equipment, which is the major application for the silicon controlled rectifier (SCR)?

A Power supply overvoltage "crowbar" circuit
B Class C amplifier circuit
C Microphone preamplifier circuit
D SWR detector circuit

A-002-005-009 **(A)**

Which of the following devices has anode, cathode, and gate?

A The silicon controlled rectifier (SCR)
B The bipolar transistor
C The field effect transistor
D The triode vacuum tube

A-002-005-010 **(A)**

When it is gated "on", the silicon controlled rectifier (SCR) exhibits electrical characteristics similar to a:

A forward-biased silicon rectifier
B reverse-biased silicon rectifier
C forward-biased PIN diode
D reverse-biased hot-carrier (Schottky) diode

A-002-005-011 **(B)**

Which of the following is a PNPN device?

A Zener diode
B Silicon controlled rectifier (SCR)
C PIN diode
D Hot carrier (Schottky) diode