

Final Quiz

1. Complete the following statement with a single word that makes it true. "When you connect multiple inductors and/or capacitors in parallel, their _____ values all add up to give you the net _____."

- (a) reactance
- (b) impedance
- (c) resistance
- (d) susceptance
- (e) conductance

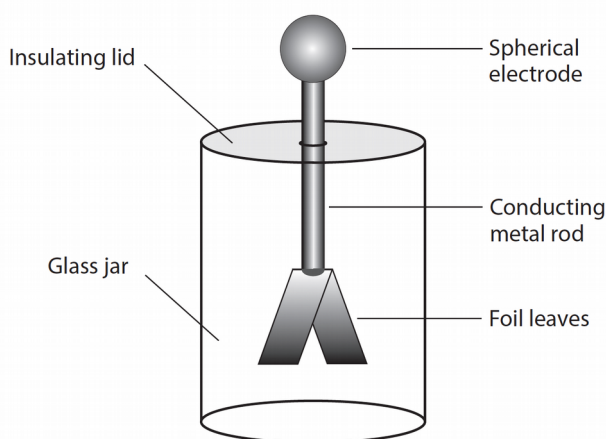
2. The atomic weight of an atom approximately equals the number of

- (a) neutrons in it.
- (b) protons in it.
- (c) neutrons plus the number of protons in it.
- (d) electrons in it.
- (e) neutrons plus the number of electrons in it.

3. What's the technical term for the length of time between a specific point in an AC cycle and the same point in the next cycle?

- (a) Frequency
- (b) Cycle time
- (c) Period
- (d) Duration
- (e) Wavelength

Figure Exam-1



4. Figure Exam-1 shows a device that detects the presence of electrical

- (a) current.
- (b) resistance.
- (c) power.
- (d) energy.
- (e) charge.

5. You should never expect to see an autotransformer used

- (a) as a loopstick antenna.
- (b) for RF impedance matching.
- (c) when isolation between windings is important.
- (d) to step an RF voltage down by a small factor.
- (e) to step an RF voltage up by a small factor.

6. When you express a point in the RX_L quarter-plane as a vector, you give that point a unique

- (a) magnitude and direction.
- (b) combination of resistance and inductance.
- (c) combination of resistance and frequency.
- (d) pure resistance.

(e) pure reactance.

7. You have a string of holiday ornament bulbs. They're all connected in series. One of the bulbs burns out. What happens?

- (a) The current in every other bulb increases.
- (b) The voltage across every other bulb increases.
- (c) The power consumed by every other bulb increases.
- (d) The current in, voltage across, and power consumed by every other bulb all increase.
- (e) All the other bulbs go out, leaving the whole string dark.

8. A complex number

- (a) is the same thing as an imaginary number.
- (b) comprises a real number plus or minus an imaginary number.
- (c) is a one-dimensional quantity.
- (d) quantifies the characteristic impedance of a transmission line.
- (e) can't quantify anything in the real world.

9. Power that exists only within the reactive part of an AC circuit is sometimes called

- (a) theoretical power.
- (b) apparent power.
- (c) true power.
- (d) false power.
- (e) imaginary power.

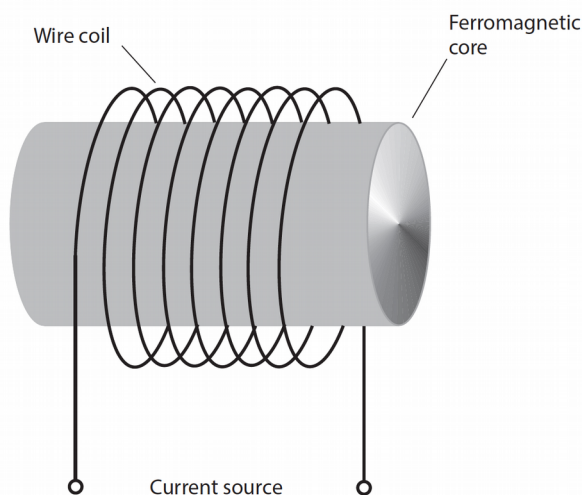
10. Roughly how much current, passing through your heart, does it take to kill you?

- (a) 0.1 mA
- (b) 1 mA
- (c) 10 mA
- (d) 100 mA
- (e) Any of the above

11. An inductor works by storing and releasing energy in the form of

- (a) an electric field.
- (b) a magnetic field.
- (c) electric charge.
- (d) pure reactance.
- (e) complex impedance.

Figure Exam-2



12. What will happen if you connect a battery to the "current source" terminals of the device shown in Figure Exam-2?

- (a) The battery voltage will increase.
- (b) The core will behave like a magnet (it normally doesn't).
- (c) The core will stop acting like a magnet (it normally does).
- (d) The polarity of the core's magnetic field will reverse.

(e) Current will flow in the coil, but nothing else will happen.

13. What happens to the reactance of a 100-pF capacitor as you lower the frequency of an AC signal through it?

- (a) It's always zero, because capacitors don't have any reactance.
- (b) It's negative, but it increases (gets closer to zero).
- (c) It's positive, and it increases.
- (d) It's negative, and it decreases (gets farther from zero).
- (e) It's positive, but it decreases.

14. The Arduino Pro Mini differs from the Arduino Uno in that

- (a) it has no analog inputs.
- (b) it has no built-in USB interface.
- (c) it is a larger board for professional use.
- (d) it costs more than the Arduino Uno.
- (e) None of the above

15. In a bipolar transistor, the term zero bias means that two of the three electrodes are at the same voltage. Which electrodes?

- (a) Emitter and base
- (b) Base and gate
- (c) Emitter and collector
- (d) Source and drain
- (e) Emitter and gate

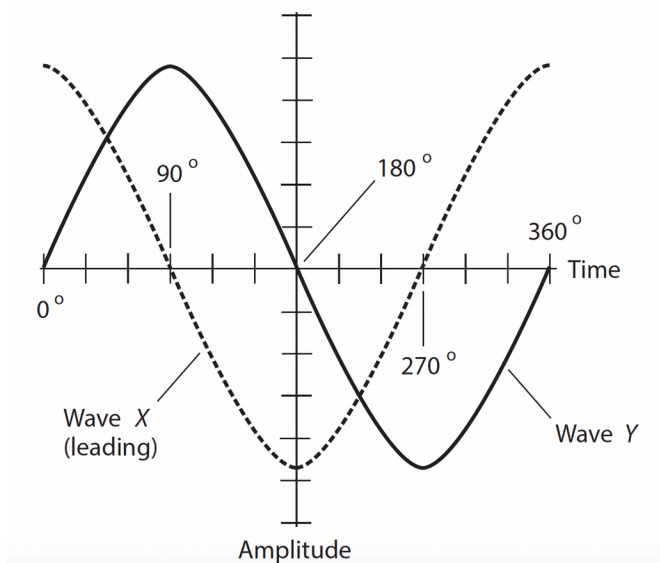
16. When used for audio peak clipping, a diode voltage limiter

- (a) has high gain and sensitivity.
- (b) often distorts the sound.
- (c) can break into oscillation.
- (d) needs a high-voltage battery.
- (e) drains a lot of current from the battery.

17. Bleeder resistors

- (a) should be connected in parallel with power-supply filter capacitors.
- (b) should be connected in series with power-supply filter capacitors.
- (c) can keep power-supply filter capacitors from burning out.
- (d) can be connected across batteries to smooth out the voltage.
- (e) can minimize the risk of electrocution from solar cells.

Figure Exam-3



18. Figure Exam-3 shows two sine waves in phase

- (a) quadrature.
- (b) dissonance.
- (c) coincidence.
- (d) opposition.

(e) offset.

19. Alkaline cells

- (a) cost less than zinc-carbon cells.
- (b) last longer than zinc-carbon cells in small electronic devices.
- (c) are constructed in a completely different way than zinc-carbon cells.
- (d) have shorter shelf lives than zinc-carbon cells.
- (e) need warmer temperatures than zinc-carbon cells.

20. Compared with circuits built up from discrete components, integrated circuits (ICs) offer all of the following advantages except one. Which one?

- (a) Better reliability
- (b) Reduced size
- (c) Lower current demand
- (d) Higher inductance values
- (e) Higher speed

21. Which of the following actions could damage a microcontroller?

- (a) Connecting a 5-V digital output to a 3.3-V input on a second microcontroller.
- (b) Connecting a 3.3-V digital output to a 5-V input on a second microcontroller.
- (c) Connecting a 1.5-V cell between GND and a digital input of a microcontroller.
- (d) Connecting a digital output pin through a 1000-ohm resistor to another digital output pin on the same microcontroller.
- (e) Connecting a digital output pin directly to a digital input pin on the same microcontroller.

22. What kind of waveform would you expect to see from the OUT pin of a 555 Timer IC configured as an oscillator?

- (a) A square wave
- (b) A sine wave
- (c) A triangular wave
- (d) A ramp
- (e) None of the above

23. A key advantage of JFETs over bipolar transistors is the fact that JFETs

- (a) last longer.
- (b) can handle more power.
- (c) generate less internal noise.
- (d) have lower input impedance.
- (e) can take more physical abuse.

24. The table below shows the digital inputs and output for

| Input X | Input Y | Output |
|---------|---------|--------|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

- (a) an OR gate.
- (b) a NOR gate.
- (c) an AND gate.
- (d) a NAND gate.
- (e) an XOR gate.

25. When you want to calculate a circuit's power gain (or loss) in decibels, the input and output impedances don't matter

- (a) if their reactance components are both inductive or both capacitive.
- (b) if both are purely reactive.
- (c) if both are purely resistive.
- (d) if the input has constant amplitude.
- (e) under any circumstances.

26. A well-designed power supply has rectifier diodes whose peak-inverse-voltage (PIV) ratings

- (a) equal the positive or negative peak AC input voltage.
- (b) significantly exceed the positive or negative peak AC input voltage.
- (c) equal the peak-to-peak AC voltage across the transformer primary.
- (d) ensure that they constantly remain in a state of avalanche breakdown.
- (e) are less than their own forward breakover voltages.

27. A 12-V battery drives 777 mA of current through a resistor. Remembering the rules of rounding and significant figures, how should you express the resistance?

- (a) 15
- (b) 15.4
- (c) 9.3
- (d) 9.32
- (e) 65

28. Which of the following things can a displacement transducer do?

- (a) Measure the peak-to-peak amplitude of an AC wave
- (b) Convert sound waves to radio signals
- (c) Convert infrared, visible, or ultraviolet radiation to DC
- (d) Convert an electrical signal to mechanical rotation
- (e) Measure the frequency of an irregular wave

29. In an amplitude-modulated (AM) signal, the carrier wave conveys no information itself, but it nevertheless consumes

- (a) 10 percent of the power.
- (b) 25 percent of the power.
- (c) 33 percent of the power.
- (d) 50 percent of the power.
- (e) more than 50 percent of the power.

30. The table below shows the digital inputs and output for

| Input X | Input Y | Output |
|---------|---------|--------|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

- (a) an OR gate.
- (b) a NOR gate.
- (c) an AND gate.
- (d) a NAND gate.
- (e) an XOR gate.

31. If 1 km of wire has a conductance of 0.6 S, then 3 km of the same wire has a conductance of

- (a) 1.8 S.
- (b) 1.2 S.
- (c) 0.2 S.
- (d) 0.3 S.
- (e) 0.6 S.

32. A half-wave, center-fed dipole antenna has gain over

- (a) an isotropic antenna.
- (b) a Yagi antenna.
- (c) a quad antenna.
- (d) a dish antenna.
- (e) a longwire antenna.

33.

The table below shows the digital inputs and output for

| Input X | Input Y | Output |
|---------|---------|--------|
| 0 | 0 | 0 |
| 0 | 1 | 1 |

| | | |
|---|---|---|
| 1 | 0 | 1 |
| 1 | 1 | 0 |

- (a) an OR gate.
- (b) a NOR gate.
- (c) an XOR gate.
- (d) a NAND gate.
- (e) an AND gate.

34. A capacitor works by storing and releasing energy in the form of

- (a) an electric field.
- (b) a magnetic field.
- (c) electric charge.
- (d) pure reactance.
- (e) complex impedance.

35. One gigabyte equals exactly

- (a) 10^3 bytes.
- (b) 10^6 bytes.
- (c) 10^9 bytes.
- (d) 10^{12} bytes.
- (e) None of the above

36. Suppose that a battery, connected to an unchanging load, delivers constant current for a while and then “dies fast.” In technical terms, that battery has a

- (a) flat ampere-hour characteristic.
- (b) flat energy-loss curve.
- (c) flat discharge curve.
- (d) nonlinear discharge contour.
- (e) linear discharge contour.

37. Which of the following antenna types is designed mainly for use at ultra-high and/or microwave frequencies?

- (a) Horn
- (b) Dish
- (c) Helical
- (d) Corner reflector
- (e) All of the above

38. If you want to build a bipolar-transistor RF power amplifier with the highest efficiency possible, and if you intend to use it for FM only, you should bias the transistor

- (a) beyond saturation.
- (b) at saturation.
- (c) midway between cutoff and saturation.
- (d) at cutoff.
- (e) beyond cutoff.

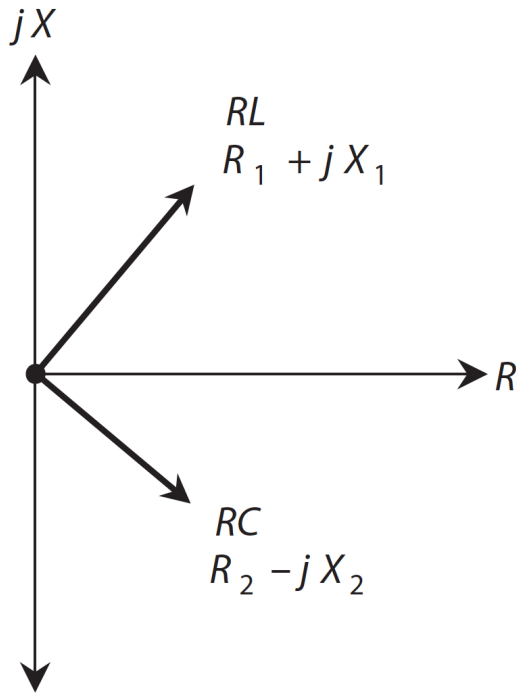
39. You connect a circuit whose output has a 1000- Ω reactance-free impedance to the primary of a transformer. As a result, the secondary exhibits a 10- Ω reactance-free impedance. What’s the transformer’s primary-to-secondary turns ratio?

- (a) 100:1
- (b) 10:1
- (c) 1:10
- (d) 1:100
- (e) You need more information to answer this question.

40. If you connect a 1.00 V DC electrochemical cell across a 2.00- Ω resistor, how much current will flow through the resistor?

- (a) 125 mA
- (b) 250 mA
- (c) 500 mA
- (c) 707 mA
- (d) 1.41 A
- (e) 2.00 A

Figure Exam-4



41. Refer to Fig. Exam-4, which shows the impedance vectors for two hypothetical circuits. The diagram suggests that if you connect these two circuits in series, you'll get a third, more complicated circuit that contains
- pure resistance without reactance.
 - some resistance with a little bit of capacitive reactance.
 - some resistance with a little bit of inductive reactance.
 - pure capacitive reactance.
 - pure inductive reactance.
42. Imagine a perfect sine wave without any DC component. You can shift the phase of that wave by a certain number of degrees and end up with the same wave "upside-down." How many degrees?
- 45
 - 90
 - 180
 - 270
 - 360
43. In a perfect sine wave with no DC component, the peak-to-peak amplitude is
- half the positive peak amplitude.
 - about 0.707 times the positive peak amplitude.
 - the same as the positive peak amplitude.
 - about 1.414 times the positive peak amplitude.
 - twice the positive peak amplitude.
44. If the inductive reactance and the resistance have the same ohmic value in an RL circuit, then the phase angle is how many degrees?
- 0
 - 45
 - 90
 - 30
 - 60
45. In a microcontroller, a 10-bit analog input gets digitized, changing it to a number in the range
- 0 to 256.
 - 0 to 1023.
 - 0 to 4096.
 - 0 to 255.
 - 0 to 100.

46. Why are switched-mode power supplies for providing low-voltage DC from 117V AC lighter than conventional 60Hz transformer power supplies?

- (a) They can use smaller inductors, because they operate at high frequencies
- (b) They avoid the use of transformers at all
- (c) They fail to provide electrical isolation from the AC side to the DC side
- (d) They use aluminum transformers
- (e) None of the above

47. How many diodes are used in a two-phase bridge rectifier?

- (a) 1
- (b) 2
- (c) 4
- (d) 8
- (e) None of the above

48. Which of the following has the shortest wavelength?

- (a) Microwave
- (b) Infrared
- (c) X-rays
- (d) Visible light
- (e) Shortwave radio

49. In a PNP transistor, you'd normally set the DC collector voltage

- (a) the same as the base voltage.
- (b) more positive than the emitter voltage.
- (c) more negative than the emitter voltage.
- (d) the same as the emitter voltage.
- (e) at zero (ground potential).

50. If you want an electric power delivery system to work its best, then

- (a) the transmission line's characteristic impedance must be as low as possible.
- (b) the transmission line's characteristic impedance must be as high as possible.
- (c) the load impedance must comprise a pure reactance equal to the characteristic impedance of the transmission line.
- (d) the load impedance must comprise a pure resistance equal to the characteristic impedance of the transmission line.
- (e) the ground system must have as little reactance as possible.

51. With a permeability-tuned solenoid-coil inductor, moving more of the core into the coil

- (a) increases the inductance.
- (b) does not change the inductance.
- (c) reduces the inductance.
- (d) increases the frequency.
- (e) reduces the reactance.

52. Arduino shields are

- (a) protective devices that prevent damage to GPIO pins.
- (b) programs for the device.
- (c) a collection of Arduino software.
- (d) boards that you can add to the Arduino to provide extra hardware features.
- (e) None of the above

53. A power supply can incorporate a circuit that applies a reduced AC voltage to the transformer for a couple of seconds immediately after power-up, and then delivers the full voltage once the filter capacitors have charged completely. This precaution minimizes the risk of damage to the

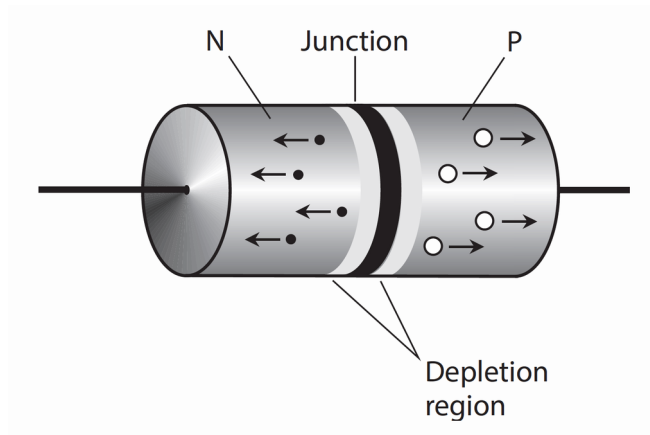
- (a) transformer core.
- (b) filter capacitors.
- (c) rectifier diodes.
- (d) voltage regulator.
- (e) bleeder resistors.

54. If the real-number part of a complex-number impedance is zero and the imaginary part is

nonzero (positive or negative), then the number denotes

- (a) pure reactance.
- (b) pure capacitance but not inductance.
- (c) pure inductance but not capacitance.
- (d) a short circuit.
- (e) an open circuit.

Figure Exam-5



55. In Fig. Exam-5, the small black dots represent electrons and the larger white dots represent holes. This drawing portrays a semiconductor diode in a state of

- (a) forward bias below the forward breakover voltage.
- (b) forward bias at or beyond the forward breakover voltage.
- (c) reverse bias below the avalanche voltage.
- (d) reverse bias at or beyond the avalanche voltage.
- (e) zero bias.

56. Imagine a circuit that has finite, nonzero resistance but no reactance. You send an AC signal through it. What's the phase angle in degrees?

- (a) It depends on the signal frequency
- (b) 0
- (c) 45
- (d) 90
- (e) 180

57. What is the decimal value of the hex number FE

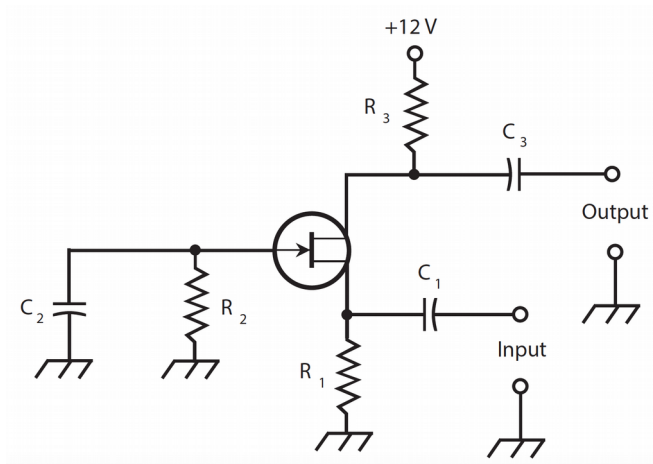
- (a) 110
- (b) 200
- (c) 254
- (d) 255
- (e) None of the above

58. Fill in the blanks in the following statement with a single word that makes it true. "In either a series circuit or a parallel circuit that operates from a battery, the sum of the _____s in each component always equals the total _____ that the circuit demands from the battery."

- (a) amperage
- (b) voltage
- (c) wattage
- (d) charge
- (e) Any of the above

59. DEL a

Figure Exam-6



60. Figure Exam-6 shows a common-gate amplifier that uses a JFET. A circuit of this type usually
- has less gain than a common-source amplifier.
 - is less likely to break into oscillation than a common-source amplifier.
 - works well as an RF power amplifier (if the JFET is designed to handle moderate or high power).
 - has an output signal that coincides in phase with the input signal.
 - All of the above
61. At very high frequencies (VHF), tropospheric bending occurs
- except in intense low-pressure systems such as hurricanes.
 - because for radio waves, the refractive index of air decreases with altitude.
 - only during geomagnetic storms caused by unusual activity on the sun.
 - because air gets more prone to ionization as the altitude increases.
 - at no time; it's a widespread misconception.
62. In general, a voltmeter should have
- the highest possible internal resistance.
 - the lowest possible internal resistance.
 - the highest possible sensitivity.
 - the ability to withstand the highest possible current.
 - the ability to dissipate the highest possible amount of power.
63. In a phase-locked loop (PLL) circuit, the output stays at the same frequency as the reference oscillator frequency thanks to a phase
- divider.
 - comparator.
 - multiplier.
 - stabilizer.
 - splitter.
64. Which of the following types of diode might you use in a power-supply voltage regulator?
- Rectifier
 - PIN
 - Zener
 - Varactor
 - Gunn
65. If you connect five 50-pF capacitors in parallel, you get a net capacitance of
- 250 pF.
 - 125 pF.
 - 50 pF.
 - 25 pF.
 - 10 pF.
66. Which of the following is not a type of flip-flop?
- J-K

- (b) R-S
- (c) Rowling
- (d) master-slave
- (e) T

67. What's the technical term for the number of times per second that a digital signal changes state (from low to high or vice-versa)?

- (a) Bits per second
- (b) Digital frequency
- (c) Baud rate
- (d) Signal shift rate
- (e) Triggering rate

68. Doppler radar can measure or estimate the

- (a) frequency of a radio signal.
- (b) wind speed in a tornado.
- (c) distance between two ships at sea.
- (d) depth of the ocean at a specific location.
- (e) intensity of the lightning in a thundershower.

69. A ferromagnetic material

- (a) concentrates magnetic lines of flux that pass through it.
- (b) increases the magnetomotive force around a current-carrying wire.
- (c) causes the current in a wire to increase.
- (d) causes the current in a wire to decrease.
- (e) increases the number of ampere-turns in a coil of wire.

70. Which of these statements about an op-amp configured as a unity gain buffer is true

- (a) The input impedance is high and the output impedance is high.
- (b) The input impedance is low and the output impedance is low.
- (c) The input impedance is high and the output impedance is low.
- (d) The input impedance is low and the output impedance is high.
- (e) None of the above

71. Sixty degrees of phase represents

- (a) 1/6 of a cycle.
- (b) 1/4 of a cycle.
- (c) 1/3 of a cycle.
- (d) 1/2 of a cycle.
- (e) 2/3 of a cycle.

72. Which of the following components is the most sensitive to damage by static electricity discharge through its pins?

- (a) Bipolar transistors
- (b) MOSFET transistors
- (c) J-FET transistors
- (d) Mylar capacitors
- (e) Zener diodes

73. The Arduino Uno has two microcontroller chips because

- (a) that way, it can perform twice as fast.
- (b) one of the microcontrollers is dedicated to providing a USB interface.
- (c) one of the microcontrollers provides a video interface.
- (d) one microcontroller provides access to the GPIO pins and the other one performs the processing.
- (e) that way, if one processor fails the other one can take over.

74. What type of 100-nF, 16V capacitor would you select for an undemanding application?

- (a) Multi-layer ceramic
- (b) Aluminum electrolytic
- (c) Tantalum
- (d) Paper

(e) Mica

75. In a certain advanced form of radio communication, the transmitter carrier frequency varies in a controlled manner, independent of the signal modulation. The receiver is programmed to follow the transmitter frequency from instant to instant, so it “thinks” that the signal frequency remains constant. What’s the technical name for this mode?

- (a) Spread spectrum
- (b) Variable frequency
- (c) Synchronized frequency
- (d) Coherent carrier
- (e) Fluctuating carrier

76. What happens to the reactance of a 10-mH inductor as you lower the frequency of an AC signal through it?

- (a) It’s always zero, because inductors don’t have any reactance.
- (b) It’s negative, but it increases (gets closer to zero).
- (c) It’s positive, and it increases.
- (d) It’s negative, and it decreases (gets farther from zero).
- (e) It’s positive, but it decreases.

77. You have a package of fixed resistors. The manufacturer quotes their value as 56.0 Ω , plus or minus 10.0 percent. You measure the resistance of each component with an ohmmeter. Which of the following readings indicates a reject?

- (a) 50.0
- (b) 51.0
- (c) 52.0
- (d) 59.7
- (e) 61.1

78. You might use a tunnel diode as a

- (a) high-speed switch.
- (b) voltage limiter.
- (c) variable capacitor.
- (d) high-voltage rectifier.
- (e) low-power oscillator.

79. Which of the following things can have resonant properties?

- (a) Piezoelectric crystals
- (b) Antennas
- (c) Sections of transmission line
- (d) LC circuits
- (e) All of the above

80. The characteristic impedance of a parallel-wire RF transmission line depends on the

- (a) standing-wave ratio (SWR).
- (b) length of the line.
- (c) voltage between the wires.
- (d) frequency of the signal.
- (e) spacing between the wires.

81. If you want to exercise good engineering practice, you should make a series-parallel network of resistors using

- (a) the highest-wattage resistors you have on hand at the moment.
- (b) resistors that are all as nearly identical as possible.
- (c) a series combination of parallel-connected resistors.
- (d) a parallel combination of series-connected resistors.
- (e) whatever you have on hand at the moment, as long as it works.

82. If two AC sine waves have identical frequency and phase, and if both of them lack DC components, then when you combine them you get

- (a) a sine wave whose amplitude equals the difference between the amplitudes of the original waves.
- (b) a sine wave whose amplitude equals the sum of the amplitudes of the original waves.
- (c) a square wave whose amplitude equals the difference between the amplitudes of the original waves.
- (d) a square wave whose amplitude equals the sum of the amplitudes of the original waves.

(e) no wave at all, because the original waves cancel each other out.

83. Which of the following statements about a microcontroller's GPIO pins is false?

- (a) A GPIO pin can change mode from an input to an output while a program is running.
- (b) A GPIO pin, when used as an output, can directly drive an LED with a suitable current-limiting resistor.
- (c) GPIO pins often have a second function, such as a serial interface pin.
- (d) GPIO pins normally operate at 3.3 V or 5 V.
- (e) GPIO pins are fixed as either inputs or outputs during manufacture.

84. Which of the following statements applies to an emitter-follower circuit?

- (a) The output signal is in phase opposition relative to the input signal.
- (b) You apply the input signal between the emitter and ground.
- (c) It can operate as a stable RF oscillator.
- (d) The gain increases as the frequency increases.
- (e) It can match a high impedance to a low impedance.

85. If you connect five 50-pF capacitors in series, you get a net capacitance of

- (a) 250 pF.
- (b) 125 pF.
- (c) 50 pF.
- (d) 25 pF.
- (e) 10 pF.

86. You can increase the current-delivering capacity of a solar panel by

- (a) connecting multiple solar cells in series when you build it.
- (b) connecting an alkaline battery in series with it.
- (c) connecting multiple solar cells in parallel when you build it.
- (d) connecting a lead-acid battery in series with it.
- (e) charging it from a wall outlet before using it.

87. The minority carriers in P type semiconductor material are

- (a) atomic nuclei.
- (b) protons.
- (c) neutrons.
- (d) electrons.
- (e) holes.

88. A coil wound inside a pot-core shell

- (a) can carry more current than it could without the shell.
- (b) allows you to get a large inductance in a small space.
- (c) gets more efficient as you increase the frequency.
- (d) can be easily adjusted to vary the inductance.
- (e) has no reactance, unlike other coil types.

89. Movement of holes in a semiconductor material

- (a) is the same thing as electron movement in the same direction.
- (b) can occur only if the current is high enough.
- (c) constitutes an electric current.
- (d) prevents the material from conducting current.
- (e) makes the material act like a perfect conductor.

90. You're building a low-power transformer and you need a winding inductance of 7 H. Interwinding capacitance does not concern you. For best results, you should use

- (a) an air core.
- (b) a solenoid core.
- (c) a toroid core.
- (d) a pot core.
- (e) an E core.

91. The table below shows the digital inputs and output for

| Input X | Input Y | Output |
|---------|---------|--------|
| 0 | 0 | 1 |

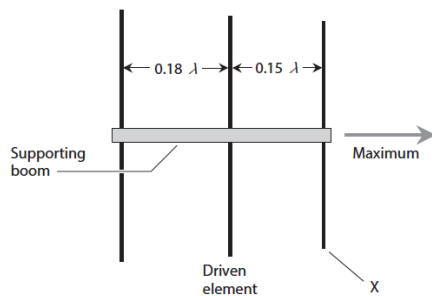
| | | |
|---|---|---|
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |

- (a) an OR gate.
- (b) a NAND gate.
- (c) an XOR gate.
- (d) a NOR gate.
- (e) an AND gate.

92. Which of the following units expresses magnetic field strength at a specific location?

- (a) Gilbert
- (b) Ampere-turn
- (c) Weber
- (d) Maxwell
- (e) Gauss

Figure Exam-7



93. In the antenna shown in Fig. Exam-7, the object marked X is a

- (a) phase coordinator.
- (b) synchronizer.
- (c) parasitic element.
- (d) reflector.
- (e) signal coupler.

94. Each point in the RX_c quarter-plane corresponds to a unique

- (a) resistance.
- (b) capacitance.
- (c) frequency.
- (d) combination of resistance and capacitance.
- (e) combination of resistance and capacitive reactance.

95. Which of the following circuits produces an AC output signal that opposes the input signal in phase?

- (a) Common-gate
- (b) Common-drain
- (c) Common-source
- (d) Common-base
- (e) Common-collector

96. A vector pointing downward and toward the right (“southeast”) in the resistance-reactance (RX) half-plane portrays

- (a) pure resistance.
- (b) resistance and inductive reactance.
- (c) resistance and capacitive reactance.
- (d) pure inductive reactance.
- (e) pure capacitive reactance.

97. In voltage gain, a figure of +20 dB represents a ratio of output voltage to input of:

- (a) Output 1/10 the input
- (b) Output 10 times the input
- (c) The Output and input are qual
- (d) Output is twice the input
- (e) The output is half the input

98. You connect a voltage divider across a battery. The circuit comprises several resistors in series. What is the highest voltage output you can get from it?

- (a) A small fraction of the battery voltage
- (b) About half the battery voltage
- (c) The battery voltage exactly
- (d) The battery voltage divided by the number of resistors
- (e) The battery voltage times the number of resistors

99. If a power-supply fuse has a spring inside along with a short wire or strip, it's probably a

- (a) quick-break fuse.
- (b) high-current fuse.
- (c) low-voltage fuse.
- (d) DC fuse.
- (e) slow-blow fuse.

100. What type of IC combines many signals into one?

- (a) Differentiator
- (b) Multiplexer
- (c) Integrator
- (d) Comparator
- (e) Operational ampli fier

Answers:

1. d, 2. c, 3. c, 4. e, 5. c, 6. a, 7. e, 8. b, 9. e, 10. d, 11. b, 12. b, 13. d, 14. b, 15. a, 16. b, 17. a, 18. a, 19. b, 20. d, 21. a, 22. a, 23. c, 24. d, 25. c, 26. b, 27. a, 28. d, 29. e, 30. c, 31. c, 32. a, 33. c, 34. a, 35. e, 36. c, 37. e, 38. e, 39. b, 40. c, 41. c, 42. c, 43. e, 44. b, 45. b, 46. a, 47. c, 48. c, 49. c, 50. d, 51. a, 52. d, 53. c, 54. a, 55. c, 56. b, 57. e, 58. c, 59. a, 60. e, 61. b, 62. a, 63. b, 64. c, 65. a, 66. e, 67. c, 68. b, 69. a, 70. e, 71. a, 72. b, 73. b, 74. a, 75. a, 76. e, 77. a, 78. e, 79. e, 80. e, 81. b, 82. b, 83. e, 84. e, 85. e, 86. c, 87. d, 88. b, 89. c, 90. d, 91. d, 92. e, 93. c, 94. e, 95. c, 96. c, 97. b, 98. c, 99. e, 100. b