

## GenTech Practice Questions

### **Basic Electronics Test:**

This test will assess your knowledge of and ability to apply the principles of Basic Electronics. This test is comprised of 90 questions in the following areas:

AC Circuits  
DC Circuits  
Discrete Components  
Digital Circuits

General Example Question:

A path between two or more points along which an electrical current can be carried is called a:

- A. network.
- B. relay.
- C. circuit.
- D. loop.

The correct answer to the example question is "C"(circuit).

Candidates are asked to complete as many questions as possible in the time allotted. There is only one correct answer for each question. Scores will be based on the number of questions answered correctly.

### AC Circuits

Which of the following is NOT an effect of reflective radio frequency (RF) power?

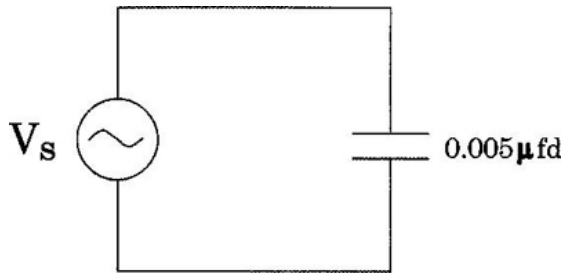
- A. Frequency shift
- B. Poor power transfer
- C. Radiation of noise
- D. Increased heat in the source

Answer: A

*Reflected RF power works to partially negate the Forward power resulting in poor power transfer and potential radiation of RF noise. The reflected power typically is dissipated in the RF source as heat but there is no shift in the RF frequency.*

---

The following resource is associated with the next question.



$$X_c = \frac{1}{2\pi fC}$$

$$X_c = 31.83 \text{K} \Omega$$

$$\text{When } C = 0.005 \mu\text{fd}$$

If the frequency of the source is 1 kHz, what is the value of the capacitive reactance ( $X_C$ ) of the circuit if the capacitor value is changed to 0.01  $\mu\text{fd}$ ?

- A.  $X_C = 63.6 \text{ k}\Omega$
- B.  $X_C = 31.8 \text{ k}\Omega$
- C.  $X_C = 15.9 \text{ k}\Omega$
- D.  $X_C = 5.0 \text{ k}\Omega$

Answer: C

$$1/(2 * 3.14 * 1\text{kHz} * 0.01\mu\text{fd}) = 1/(2 * 3.14 * 1000 * 0.00000001) = 15923 \text{ or } 15.9\text{k}$$


---

The frequency of the second harmonic of 60 Hz is:

- A. 30 Hz
- B. 60 Hz
- C. 120 Hz
- D. 180 Hz

Answer: C

*Exact multiples of the fundamental frequency are called harmonics.  
The SECOND harmonic is 2 times the fundamental frequency.  
60Hz \* 2 = 120Hz.*

---

What is the approximate peak-to-peak voltage of a 2  $V_{\text{RMS}}$  sine wave?

- A. 2.0  $V_{\text{p-p}}$

- B. 2.8 V<sub>p-p</sub>
- C. 4.0 V<sub>p-p</sub>
- D. 5.6 V<sub>p-p</sub>

Answer: D

*Peak-to-Peak value = 2.828 \* rms value*  
*2.828 \* 2V<sub>rms</sub> = 5.6V<sub>p-p</sub>*

---

### DC Circuits

The formula for electrical current is:

- A. Voltage / Resistance.
- B. Resistance \* Voltage.
- C. Voltage + Resistance.
- D. Resistance / Voltage.

Answer: A

*Per Ohm's Law Current = Voltage/Resistance*

---

Electric current is the flow of which of the following?

- A. Neutrons
- B. Photons
- C. Electrons
- D. Quarks

Answer: C

*Electric current is the flow of Electrons from a negative polarity to a more positive polarity.*

---

Which of the following is a unit of electrical resistance?

- A. Volt
- B. Amp
- C. Ohm
- D. Coulomb

Answer: C

*Coulomb is a unit of charge, Amp is a unit of current flow, Volt is a unit of electrical potential, Ohm is a unit of resistance to current flow.*

---

In a simple DC circuit with a constant voltage, where the resistance increases current will:

- A. decrease.
- B. stop.
- C. increase.
- D. remain constant.

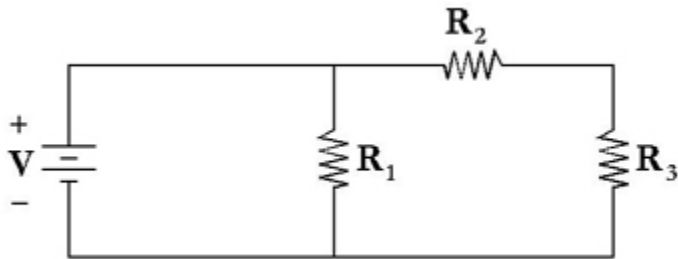
Answer: A

*Per Ohm's law:  $current = voltage / resistance$ . Thus as resistance increases the current in the circuit will decrease.*

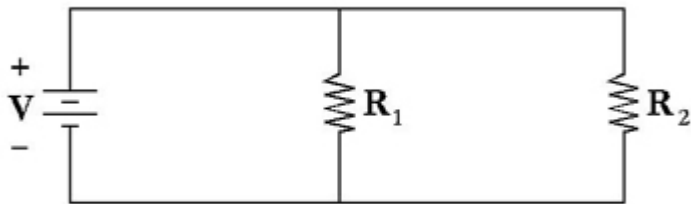
---

The following is an example of a series-parallel circuit.

A.



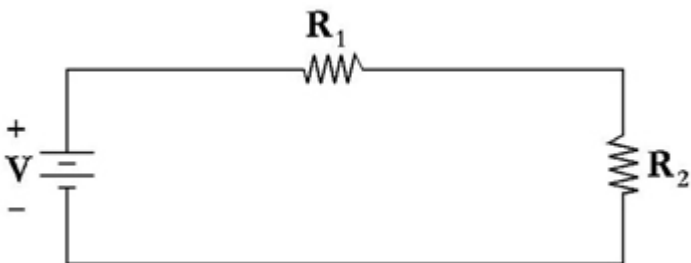
B.



C.



D.

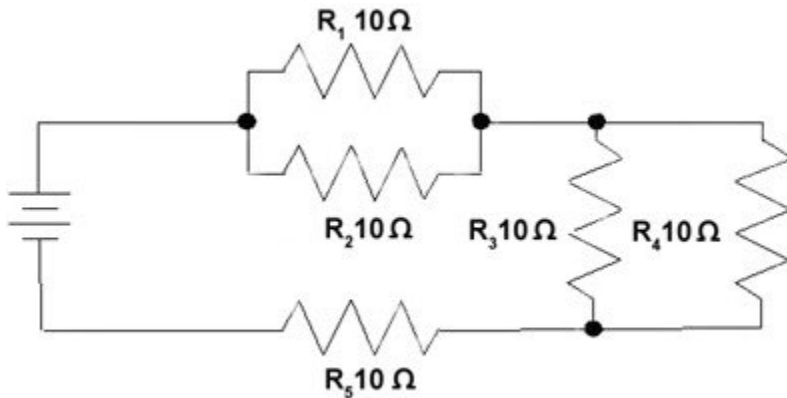


Answer: A

*Series-Parallel circuit is a circuit with some load elements in series in addition to elements in parallel.*

---

The following resource is associated with the next question.



What type of circuit is shown in the diagram?

- A. Parallel Circuit
- B. Series-Parallel
- C. Wye-series Circuit
- D. Series Circuit

Answer: B

*Series-Parallel circuit is a circuit with some load elements in series in addition to elements in parallel. Parallel circuits only have elements in parallel as series circuits only have elements in series. Wye circuits contain elements which come to a common point with unique connections to the opposite element terminals.*

---

### Discrete Components

Zener diodes are most commonly used in:

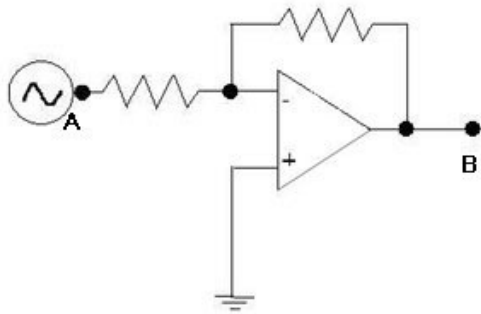
- A. voltage amplifier circuits.
- B. oscillator circuits.
- C. power supply circuits.
- D. current limiting circuits.

Answer: C

*Zener diodes are designed for a specific reverse breakdown voltage. When reverse biased the voltage across a zener diode remains constant.*

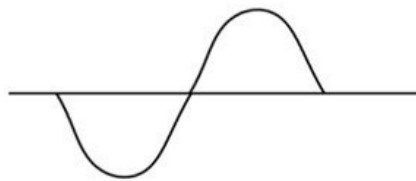
---

The following resource is associated with the next question.

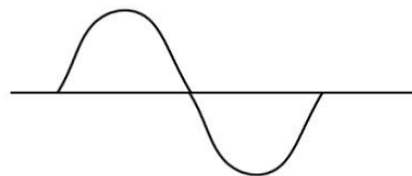


In the circuit shown, the output at B is:

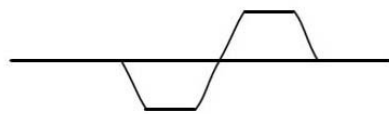
A.



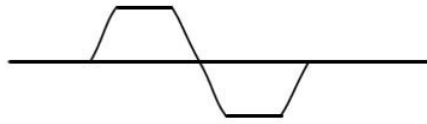
B.



C.



D.



Answer: C

*The circuit is an inverting amplifier. The output will be in the same form but inverted from the input.*

---

Compared to bipolar transistors, field effect transistors are NOT normally characterized by:

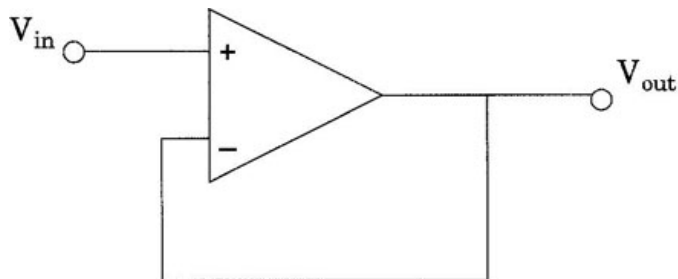
- A. high input impedance.
- B. a reverse-biased PN junction.
- C. low input impedance.
- D. low power consumption.

Answer: C

*High input impedance, low power consumption, and a reverse-biased PN junction are key characteristics of a field effect transistors.*

---

The following resource is associated with the next question.



This figure is a schematic representation of a/an:

- A. differential amplifier.
- B. inverting amplifier.
- C. noninverting amplifier.
- D. voltage follower.

Answer: D

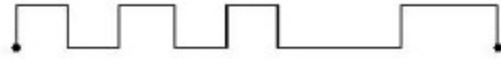


*With 100% feedback from the output back to the inverting input of the amplifier the resultant gain is 1. Thus the output voltage will “follow” the input. This circuit is commonly name “voltage follower” for this reason.*

---

## Digital Circuits

The following resource is associated with the next question.



For the signal shown, which of the following represents its inverted waveform?

A.



B.



C.



D.



Answer: C

*The inverted waveform will be exactly the same shape but of opposite polarity or direction about a reference line.*

---

Express  $1/5$  as a decimal number.

- A. 0.15
- B. 0.2
- C. 0.25
- D. 0.5

Answer: B

*1 divided by 5 = 0.2*

---

## Technical Science Test:

This test will assess your knowledge of and ability to apply the principles of Technical Science. The test is comprised of 75 questions in the following areas:

Chemical Concepts

Physical Concepts

General Example Question:

Time is the:

- A. duration between two well-defined events.
- B. ratio between velocity and acceleration.
- C. product of energy and power.
- D. distance light travels in one second.

The correct answer to the example question is "A" (duration between two well-defined events).

Candidates are asked to complete as many questions as possible in the time allotted. There is only one correct answer for each question. Scores will be based on the number of questions answered correctly.

### Chemical Concepts

The positively charged particle associated with the structure of an atom is called a/an:

- A. ion.
- B. neutrino.
- C. positron.
- D. proton.

Answer: D

*The proton is the positively charged particle in the nucleus of the atom.*

---

If a gas in a fixed volume container is heated, the resultant pressure on the gas:

- A. remains the same.
- B. increases.
- C. decreases.
- D. is inversely proportional to the heat.

Answer: B

*The pressure of a gas in a closed container increases as it is heated.*

---

It takes 30 minutes to complete a reaction at 150 K. Which of the following is an estimate of the time required to complete the same reaction at 300K?

- A. Less than 15 minutes
- B. 15 Minutes
- C. 60 Minutes
- D. More than 60 minutes

Answer: A

*A chemical reaction occurs at a faster rate at higher temperatures.*

---

Vaporization refers to the change in state of matter from:

- A. solid to gas.
- B. solid to liquid.
- C. liquid to gas.
- D. gas to liquid.

Answer: C

*A matter state change from liquid to gas is vaporization (solid to gas is sublimation, solid to liquid is melting, gas to liquid is condensation).*

---

### Physical Concepts

Energy is the capability or ability to:

- A. do work.
- B. cause gravity.
- C. destroy charge.
- D. increase time.

Answer: A

*By definition, energy is the ability to do work.*

---

What will be the momentum of a 100 gm ball traveling with a velocity 10 cm/s?

- A. 1 gm·cm/s
- B. 10 gm·cm/s
- C. 100 gm·cm/s
- D. 1000 gm·cm/s

Answer: D

*M=mV (we should have the text reference that the SMEs supplied with each question)*

---

A basic unit of resistance is:

- A. Volt.
- B. Ohm.
- C. Henry.
- D. Farad.

Answer: B

*Volt is a unit of electrical potential, Henry is a unit of inductance, Farad is a unit of capacitance, Ohm is a unit of resistance.*

---

## Applied Electrical Test:

This test will assess your knowledge and ability to apply the principles of Applied Electrical concepts. The test is comprised of 27 questions in the following areas:

Industrial Controls

Power Supply Concepts

Mechanics & Electrical/Mechanical Shop

General Example question:

A measure of how much a force acting on an object causes that object to rotate is called:

- A. resistance.
- B. compression.
- C. tightness.
- D. torque.

The correct answer to the example question is "D" (torque).

Candidates are asked to complete as many questions as possible in the time allotted. There is only one correct answer for each question. Scores will be based on the number of questions answered correctly.

### Industrial Controls

The following resource is associated with the next question.



The relay contacts shown are:

- A. Single – pole, double – throw
- B. Single – pole, single – throw
- C. Double – pole, double – throw
- D. Double – pole, single – throw

Answer: B

*A single set of contacts (single pole) which provide electrical connection in only 1 position (or throw) is called single-pole, single-throw.*

---

Compared to an effective voltage of 120 VAC, the average heat energy out of a resistor is \_\_\_\_\_ for a voltage of 120 VDC.

- A. the same
- B. higher
- C. lower
- D. nonexistent

Answer: A

*The “effective voltage” is commonly referred to as “rms value”. The rms value of an alternating sine wave corresponds to the same amount of direct current or voltage in heating power.*

---

If the output filter capacitor in a power supply actually had a value twice its stated value, which of the following symptoms would be found?

- A. The output voltage would be doubled and a small improvement in the ripple voltage would be detected.
- B. The ripple voltage would be half of what is expected and a small increase in the output voltage would be detected.
- C. The output and ripple voltage would be greater than expected.
- D. The output and ripple voltage would be less than expected.

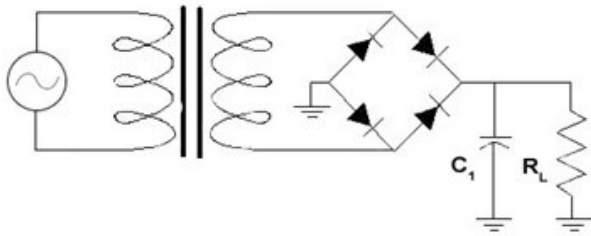
Answer: B

*The output filter capacitor functions to “level” the voltage output of the power supply. A higher value capacitor would be more effective in filtering, or leveling the output which would result in a slight increase in the voltage present across the capacitor.*

---

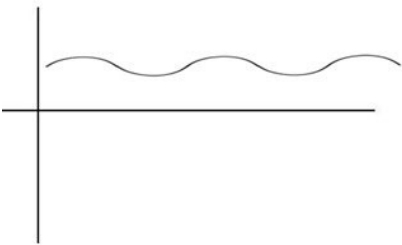
## Power Supply Concepts

The following resource is associated with the next question.

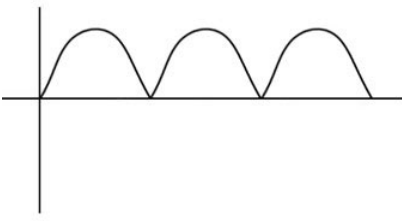


In the power supply shown, the wave form of the output across  $R_L$  is:

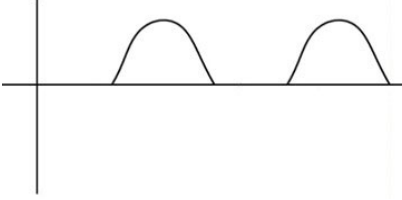
A



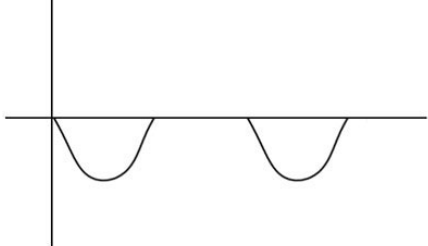
B



C



D



Answer: A

---



The frequency of the bridge rectifier output will be 2x the input frequency with all points of the waveform being above the "0" zero line. Capacity C1 provides filtering to smooth the waveform across the load.

---

## Mechanics & Electrical/Mechanical Shop

What are the characteristics of a coaxial cable?

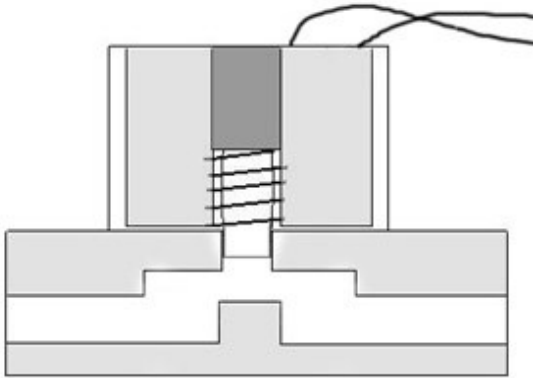
- A. It has twisted pairs with a shield.
- B. It has a center conductor covered with an insulator, then braided or solid outer conductor and then insulation.
- C. It has heavier insulation than most cables.
- D. It is vulnerable to high frequency interference.

Answer: B

*The insulated braided or solid outer conductor of Coaxial cable covering a single insulated center conductor provides excellent high frequency interference protection.*

---

The following resource is associated with the next question.



The type of spring used in this solenoid is:

- A. expansion.
- B. torsion.
- C. tension.
- D. compression.

Answer: D

*When the solenoid is energized, the plunger is drawn upwards towards the electrical coil and compressing the spring. When the solenoid is de-energized the spring relaxes to its natural position pushing the plunger down.*

---