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عنـــوان درس: زبان تخصصی

رشته تحصیلی/کد درس: مهندسی رباتیک۱۵۱۱۰۶۷

1- **The best appropriate equivalent meaning for inductor is:**

1. a device which consists essentially of two conductors
2. a device that provide a path for current flow
3. a device that makes or breaks connections
4. a number of turns of wire used to introduce inductance into an electric circuit

2- **Rectifier is**

1. an electrical device that converts direct current (DC), which flows in only one direction, to alternating current (AC), which periodically reverses direction
2. an electrical device that converts alternating current (AC), which periodically reverses direction, to direct current (DC), which flows in only one direction
3. a test instrument that uses a cathode ray tube to make visible on a fluorescent tube
4. a desired or undesired amplitude limiting action

3- **The best appropriate meaning for amplifier is**

1. an electronic device that increases the power of a signal
2. an electrical device that converts alternating current (AC), which periodically reverses direction, to direct current (DC), which flows in only one direction
3. an electrical device that converts direct current (DC), which flows in only one direction, to alternating current (AC), which periodically reverses direction
4. a device that provide a path for current flow

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There are three basic types of circuits: series, parallel, and series-parallel. The type of circuit is determined by how the power source, conductors, loads, and control or protective devices are connected.

A series circuit is the simplest circuit. The conductors, control and protection devices, loads, and power source are connected with only one path for current. The resistance of each device can be different. The same amount of current will flow through each. The voltage across each will be different. If the path is broken, no current flows.

A parallel circuit has more than one path for current flow. The same voltage is applied across each **branch**. If the load resistance in each branch is the same, the current in each branch will be the same. If the load resistance in each branch is different, the current in each branch will be different. If one branch is broken, current will continue flowing to the other branches.

A series-parallel circuit has some components in series and others in parallel. The power source and control or protection devices are usually in series; the loads are usually in parallel. The same current flows in the series portion, different currents in the parallel portion. The same voltage is applied to parallel devices, different voltages to series devices. If the series portion is broken, current stops flowing in the entire circuit. If a parallel branch is broken, current continues flowing in the series portion and the remaining branches.

4- **Which kind of circuit has just one path for current**

1. Parallel circuit
2. Series circuit
3. Series-parallel circuit
4. Parallel-parallel circuit

5- **In a series-parallel circuit, if a parallel branch is broken,…**

1. a different voltages are applied to parallel devices
2. the same current flows in the parallel portion
3. the current flow will be stopped in the entire circuits
4. the current flow is still existent in the remaining branches

6- **The word branch in paragraph 3 is closest in meaning to**

1. tree
2. division
3. specification
4. diversion

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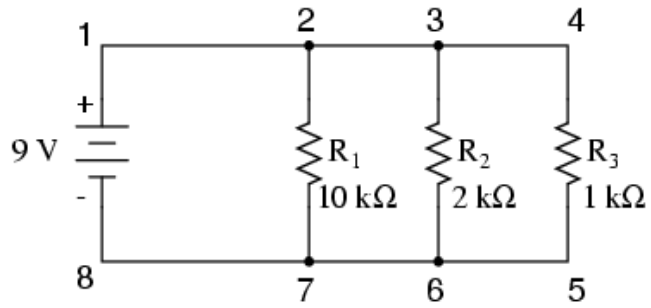
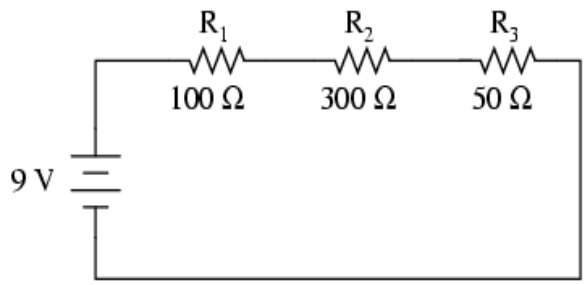
7- **Which figure shows a parallel circuit?**

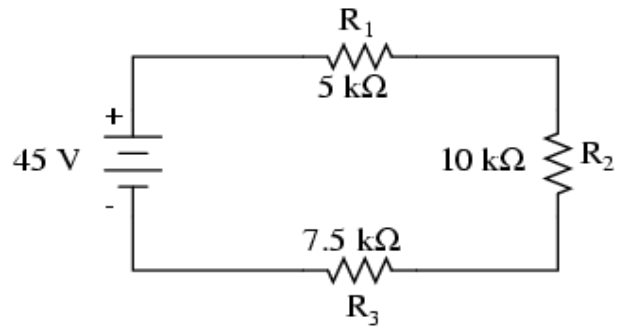
1.



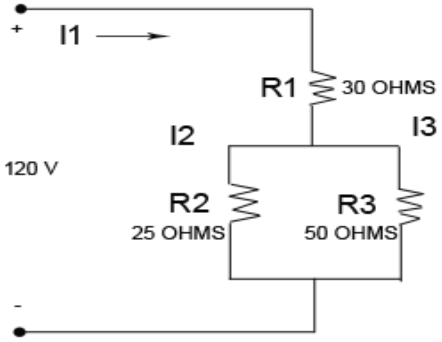
2.



3.



4.



8- **According to the passage, which sentence is true?**

1. In a parallel circuit the voltage is the same in all branches.
2. In a parallel circuit the current is the same in all branches.
3. In a series-parallel circuit, power source device is usually in parallel branches.
4. In a series-parallel circuit, control device is usually in parallel branches.

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An integrated circuit (IC) is a group of transistors, diodes, resistors, and sometimes capacitors wired together on a very small substrate (or wafer). Tens of thousands of components can be contained in a single integrated circuit. Functions as simple as single-stage amplifiers to those as complex as complete computers have been built in a single integrated circuit. This **drastic** decrease in size has also yielded a similar reduction in weight, power consumption, and production cost, while giving a proportional increase reliability. Integrated circuits have swept every field of electronics and are strongly altering the automotive, medical, entertainment, and business industries.

Integrated circuits are divided into two mail groups according to the way they are built (monolithic or hybrid). Two divisions may also be made according to the function of the integrated circuit (analog and digital). The output of an analog IC may be any value whatever, and may change continuously from one value to another. The output of a digital IC will be recognized only as either a logical low level, or a logical high level. Only two output values are accepted. Furthermore, in many digital systems, changes from one level to the other can occur only at specific times.

Computers, calculators, digital watches, communication switching, digital instruments, and some industrial control systems use digital ICs. Analog ICs are used in radios, televisions, stereo amplifiers, voltage regulators, signal generators, filter, test instruments, and **extensively** in industrial measurement and control.

There are two main IC fabrication technique, monolithic and hybrid. Monolithic integrated circuits are built in a wafer of silicon. Transistors and resistors (rarely capacitors) are produced by diffusion processes, just as discrete transistors are. However, instead of individual transistors being cut apart, they are interconnected by very thin metal runs. Isolation between transistors relies on reverse-biased junctions between the transistors and the silicon substrate (wafer).

9- **The main idea of the first paragraph is concerned with the…**

1. components of an integrated circuits
2. application of ICs in amplifiers and computers
3. usage of components on a wafer
4. outstanding role of ICs in electronics field

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10- **Which of the following devices doesn't make use of analog ICs?**

1. Signal generator
2. Test instrument
3. Voltage regulator
4. Communication switching

11- **Which one is true about digital circuits?**

1. Only two output values are accepted
2. The output of a Digital IC may have any value
3. The output of a Digital IC may have two or several discrete values
4. Changes from one level to the other can occur at any times

12- **In the 3rd paragraph the word "extensively" is closest in meaning to**

1. Finally
2. Extremely
3. Undoubtedly
4. Widely

13- **Two main IC fabrication techniques are**

1. digital and hybrid
2. analog and monolithic
3. analog and digital
4. monolithic and hybrid

14- **The word drastic in pargraph 1 is closest in meaning to**

1. extreme and sudden
2. huge
3. large
4. fascinating

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عنوان درس : زبان تخصصی

رشته تحصیلی/کد درس : مهندسی رباتیک ۱۵۱۱۰۶۷

Two basic types of transistors are the bipolar junction transistor (BJT), and the field-effect transistor (FET). The BJT is used in two broad areas-as a linear amplifier to **boost** or amplify an electrical signal and as an electronic switch.

The BJT (bipolar junction transistor) is constructed with three doped semiconductor regions separated by two pn junctions. The three regions are called emitter, base, and collector. Physical representations of the two types of BJTs are npn and pnp transistors. One type consists of two n regions separated by a p region in base (npn), and the other type consists of two p regions separated by an n region in base (pnp).

The pn junction joining the base region and the emitter region is called the base-emitter junction. The pn junction joining the base region and the collector region is called the base-collector junction. These leads are labeled E, B. and C for emitter, base, and collector. **Respectively**. The base region is lightly doped and very thin compared to the heavily doped emitter and the moderately doped collector regions.

In order for the transistor to operate properly as an amplifier, the pnp junctions must be correctly biased external dc voltage. We use npn transistor for illustration. The operation of pnp is the same as the npn except that the roles of the electrons and holes, the bias voltage polarities, and the current directions are all reversed. Notice that in both cases the base-emitter (BE) junction is forward-biased and the base-collector (Be) junction is

15- **The basic structure of bipolar junction transistor consists of an emitter, base and a collector which…**

1. form the base-emitter junction
2. form the base collector junction
3. are separated by two pn junctions
4. are doped with npn and pnp

16- **The two pn junctions should be correctly biased with external dc voltage if we …**

1. want to distinguish difference between the structure of a pnp and npn
2. expect to have a transistor functioning as an amplifier
3. tend to combine BE junction with the available holes in the base
4. plan to state the formula relating to the collector, emitter, and base currents in a transistor

17- **Which region in a transistor is thin compared to the other regions?**

1. Base
2. Emitter
3. Collector
4. All regions are the same in thickness

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18- **The word boost in paragraph 1 is closest in meaning to**

1. decrease the power
2. increase the power
3. amplitude
4. measure

19- **The word respectively in paragraph 3 is closest in meaning to**

1. representatively
2. properly
3. In the same order
4. finally

20- **In an npn transistor, which region is p?**

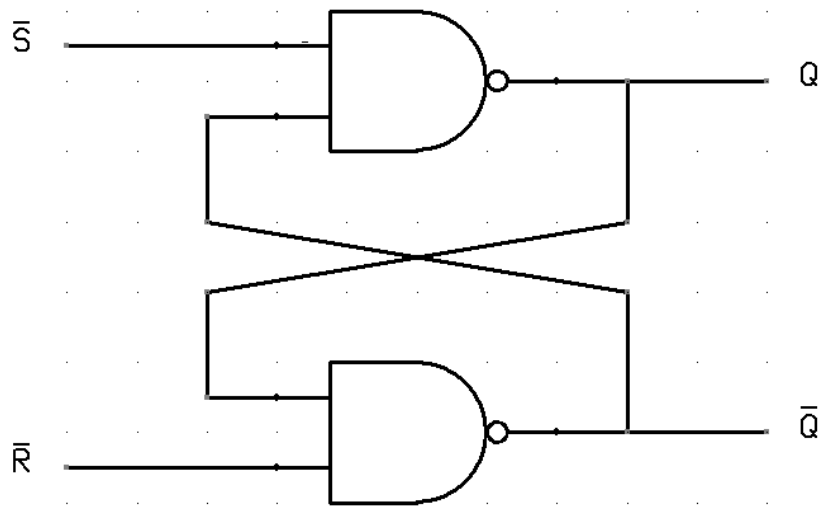
1. Base
2. Emitter
3. collector
4. Drain

سوالات تشریحی

21- **Explain Kirchhoff's Voltage Law (KVL). Prove it in a simple circuit.** نمره ۱،۰۰

22- **Explain Kirchhoff's Current Law (KCL). Prove it in a simple circuit.** نمره ۱،۰۰

23- **The figure blow is a FLIP-FLOP circuit. Please explain how does it work?** نمره ۲،۰۰



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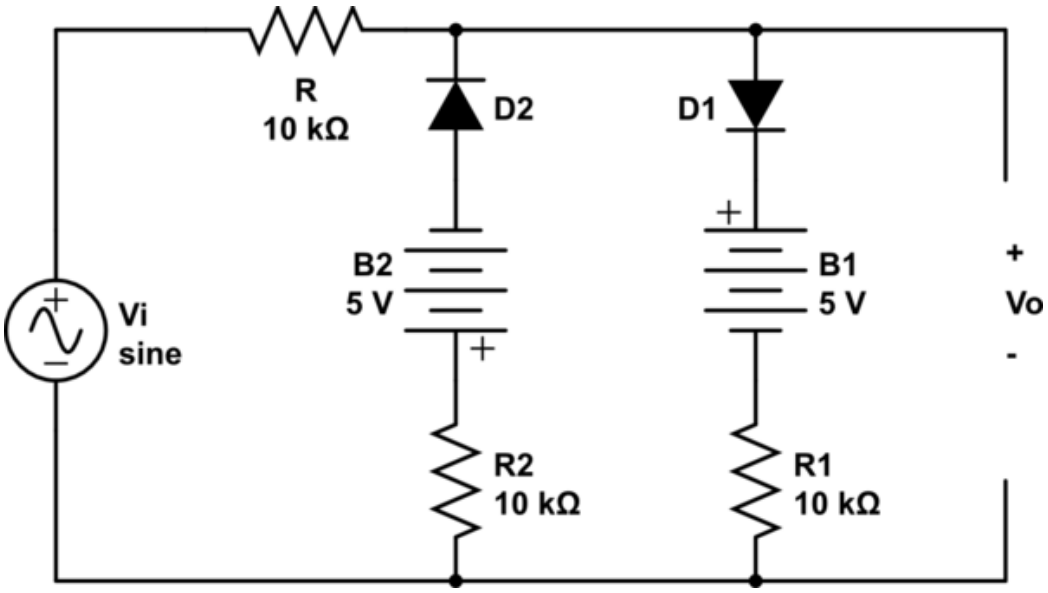
24- **In the following circuit, if the input be a sinusoid wave with a 50-V peak value, determaine the output wave(draw it).** نمره ۲،۰۰



25- نمره ۱،۰۰

Draw (depict) trust table of a 2-input EX-OR gate ( **)**