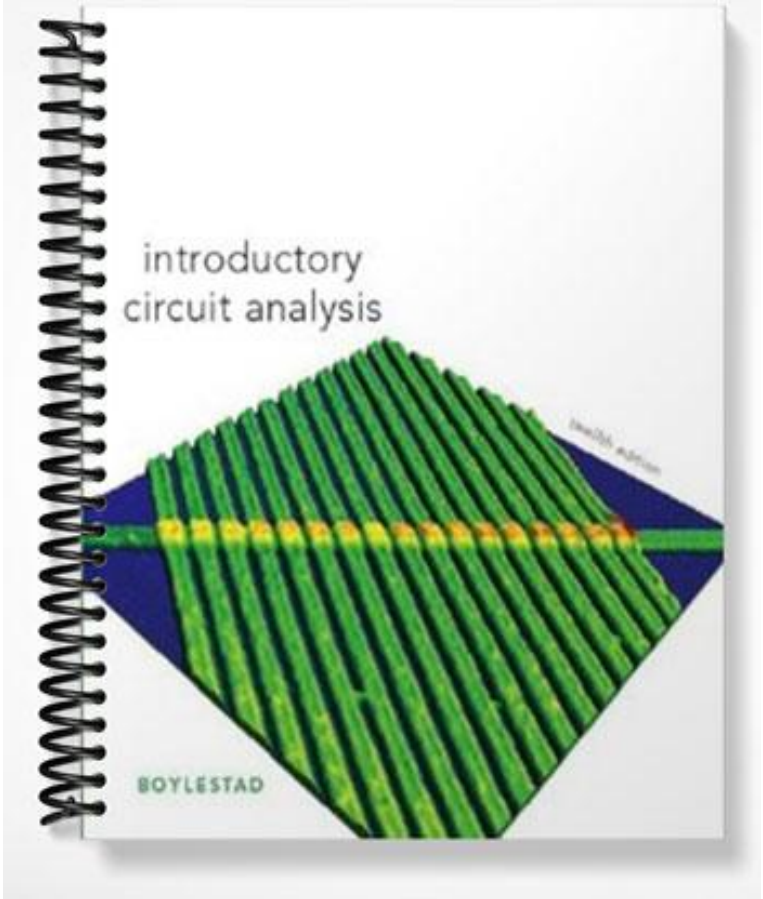
TEST BANK



TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

1) The free proton is the positive charge carrier in a solid conductor. 1) _____

2) Elements that are good conductors usually have only one electron in the valence ring. 2) _____

3) One ampere of current is present when one coulomb of charge passes through a conductor in one second. 3) _____

4) Copper has the highest conductivity of any metal used in electronics. 4) _____

5) Current flowing from a battery is measured by placing an ammeter across the battery terminals. 5) _____

6) An instrument designed to read current is called an voltmeter. 6) _____

7) A dc generator is a source of AC voltage through the turning of the shaft of the device by external means. 7) _____

8) A neutron is a particle having no electrical charge. 8) _____

9) A battery with an ampere-hour rating of 100 will theoretically provide a steady current of 100 mA for one hour and 50 mA for two hours. 9) _____

10) The terminal voltage of a battery is proportional to the length of the discharge time at a particular drain current. 10) _____

11) Under normal operating conditions a 1.5 volt battery is considered to be in good condition if the loaded terminal voltage drops by .2 volts. 11) _____

12) A voltage source that cannot be recharged is called a primary cell. 12) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

13) What is the current (in amperes) if 10.0 coulombs of charge pass through a wire in 2.0 seconds? 13) _____

A) 10 amperes B) 20 amperes C) 0.2 amperes D) 5 amperes

14) How much energy is expended in moving a 20 coulomb charge through a potential difference of 0.5 volts? 14) _____

A) 10 joules B) 0.025 joules C) 20 joules D) 40 joules

15) A 9-volt battery with a 500 mAh capacity is connected to a circuit which draws 100 mA. How long will the battery be able to power this circuit in theory? 15) _____

A) 0.5 hours B) 0.2 hours C) 0.05 hours D) 5 hours

16) Which one of these statements is true? 16) _____

A) The current capacity of a battery increases at relatively high temperatures.
B) The current capacity of a battery increases with an increase in current demand.
C) The current capacity of a battery decreases with an increase in current demand.
D) The current capacity of a battery increases at relatively low temperatures.

17) Which one of these statements is true? 17) _____

A) Air provides better insulation qualities than do solid materials such as glass or mica.
B) An insulator has very few free electrons in the valence ring.

C) Insulator materials typically have four electrons in the outermost valence ring.
D) An insulator allows no current to pass, regardless of the magnitude of the applied voltage.

18) A semiconductor with a negative temperature coefficient 18) _____
A) exhibits a decrease in resistance as temperature increases.
B) exhibits a large resistance change at temperatures below 0°C.
C) exhibits a negative resistance at temperatures below 0°C.
D) exhibits an increase in resistance as temperature increases.

19) Reverse connection of a voltmeter in a dc circuit will cause 19) _____
A) the meter to display current in amperes.
B) the same reading as the normal connection, since meters are polarity insensitive.
C) a reading that is below scale or negative.
D) a reading equal to the reciprocal of the applied voltage.

20) If an electrical circuit can operate for 10.0 hours with a 2-Ah battery, what is the average current that the circuit demands? 20) _____
A) 20 amperes B) 2 amperes C) 5 amperes D) 0.2 amperes

21) A common *primary* battery is the 21) _____
A) carbon-zinc type. B) nickel-cadmium type.
C) lead-acid type. D) silicon-germanium type.

22) How many electrons are contained in the third shell of a copper atom? (Note that the copper atom contains 29 electrons.) 22) _____
A) 18 B) 1 C) 29 D) 8

23) What potential (voltage) exists between two power supply terminals if 5 joules of energy are required to move 10 coulombs of charge between the two terminals? 23) _____
A) 2 V B) 10 V C) 5 V D) 0.5 V

24) How long will a 50 Ah automobile battery power headlights that draw 20 amperes of current? 24) _____
A) 2.5 hours B) 50 hours C) 0.4 hours D) 1000 hours

25) Germanium and silicon are examples of 25) _____
A) battery electrolytes B) conductors
C) insulators D) semiconductors

26) In a neutral atom, 26) _____
A) the number of electrons is equal to the number of neutrons.
B) the number of electrons is equal to the number of protons.
C) electrons all reside in the first (innermost) shell.
D) the combined mass of all electrons equals the mass of all protons.

27) Negative dc voltage sources can be created in the Windows version of PSpice by 27) _____
A) rotating the source using the menu Edit-Rotate selection.
B) selecting an ac (alternating current) source.
C) pressing the INVERT icon on the menu bar.
D) double-clicking on the voltage source symbol.

28) What is the current in amperes if 0.71 coulomb of charge passes by a point every 8.9 ms? 28) _____
A) 8.0 amps B) 80 amps C) 0.8 amps D) 800 amps

29) Determine the potential difference if it takes 300 mJ of energy to move a charge of 67 microcoulombs. 29) _____

A) 450 kilovolts B) 0.45 kilovolts C) 4.5 kilovolts D) 45 kilovolts

30) What is the charge in coulombs if 8.5 mA of current flow through a surface every 90 ms? 30) _____

A) 770 coulombs B) 770 millicoulombs
C) 770 microcoulombs D) 770 nanocoulombs

31) An electron that gains sufficient energy from the surrounding medium to leave its parent atom, is called a _____ electron. 31) _____

A) Harmless B) Free C) Nuclear D) Shell

32) In a battery there is an accumulation of electrons on one terminal of the battery and an accumulation of positive ions on the other terminal. This will result in a(n) _____. 32) _____

A) decrease in battery current B) potential difference
C) weak battery D) increase in battery deterioration

33) How must ammeters be connected in a circuit when used to measure current? 33) _____

A) Varies with the component being measured
B) Varies with circuit construction
C) In series with the component being measured
D) Directly across the component

34) Four 12-volt batteries connected together by a conductor, positive terminal to negative terminal will result in which of the following voltage? 34) _____

A) 12 volts B) 48 volts C) 6 volts D) 3 volts

35) If 40 joules of energy are required to move 25 coulombs of charge, what would the voltage be? 35) _____

A) .6 volts B) 1000 volts C) 1.6 volts D) 16 volts

36) How many joules would be required to create a voltage of 25 volts if 80 coulombs of charge were transferred? 36) _____

A) 32 B) 3.2 C) 2000 D) 200

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

37) An electrical circuit consists of a battery and a single load. Draw a sketch to show how to connect a voltmeter and an ammeter to the circuit. Show meter polarity on your diagram. 37) _____

38) One coulomb is the total charge associated with 6.242×10^{18} electrons. How many electrons will pass through a conductor if 50 μA of current flows for 5 seconds? 38) _____

39) Sketch the shell structure of the copper atom. (A copper atom contains 29 electrons). 39) _____

40) Name five good conductors of electricity. 40) _____

41) Name five good insulating materials. 41) _____

42) The PSpice (Windows) program has what advantage over the DOS version of the program? 42) _____

43) VOM stands for _____. 43) _____

44) DMM stands for _____. 44) _____

45) A Voltmeter is designed to measure _____. 45) _____

46) A Proton is a particle whose charge is _____. 46) _____

1) FALSE
2) TRUE
3) TRUE
4) FALSE
5) FALSE
6) FALSE
7) FALSE
8) TRUE
9) FALSE
10) TRUE
11) TRUE
12) TRUE
13) D
14) A
15) D
16) C
17) B
18) A
19) C
20) D
21) A
22) A
23) D
24) A
25) D
26) B
27) A
28) B
29) C
30) C
31) B
32) B
33) C
34) B
35) C
36) C
37) Sketch should show the voltmeter across (in parallel with) battery terminals with the + voltmeter terminal connected to the + battery terminal. The ammeter should be in the current path (in series), with the + ammeter terminal nearest the + battery terminal.
38) 1.6×10^{15} electrons
39) first ring: 2 electrons, second ring: 8, third ring: 18, fourth ring: 1
40) copper, gold, silver, aluminum, tungsten, etc.
41) air, mica, rubber, teflon, glass, etc.
42) The Windows approach allows the user to see a complete schematic for the circuit, rather than just a list of nodes.
43) Volt-Ohm-Milliammeter
44) Digital Multimeter
45) Voltage
46) Positive