

ENGG104 Tutorial 1 extra Problems (revision)

Name _____

Student Number _____

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

- 1) 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? 1) _____
A) 0.2 hours B) 0.05 hours C) 0.5 hours D) 5 hours

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

- 2) The free proton is the positive charge carrier in a solid conductor. 2) _____

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

- 3) How many joules would be required to create a voltage of 25 volts if 80 coulombs of charge were transferred? 3) _____
A) 2000 B) 3.2 C) 32 D) 200

- 4) What is the current (in amperes) if 10.0 coulombs of charge pass through a wire in 2.0 seconds? 4) _____
A) 10 amperes B) 20 amperes C) 5 amperes D) 0.2 amperes

- 5) 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) _____. 5) _____
A) weak battery B) increase in battery deterioration
C) potential difference D) decrease in battery current

- 6) Germanium and silicon are examples of _____ 6) _____
A) conductors B) insulators
C) battery electrolytes D) semiconductors

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

- 7) 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. 7) _____

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

- 8) Current flowing from a battery is measured by placing an ammeter across the battery terminals. 8) _____

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

- 9) 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? 9) _____

- 10) Name five good conductors of electricity. 10) _____

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

- 11) A common *primary* battery is the _____
A) silicon-germanium type. B) carbon-zinc type.
C) lead-acid type. D) nickel-cadmium type.
- 12) 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? _____
A) 10 V B) 0.5 V C) 5 V D) 2 V

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

- 13) VOM stands for _____. 13) _____
- 14) DMM stands for _____. 14) _____

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

- 15) If 40 joules of energy are required to move 25 coulombs of charge, what would the voltage be? _____
A) 1.6 volts B) .6 volts C) 16 volts D) 1000 volts

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

- 16) What resistance reading would result across a fuse if the fuse were "blown"? 16) _____

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

- 17) When selecting a conductor, malleability and ductility do not have to be considerations in the selection process. 17) _____

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

- 18) The color bands blue, gray, brown, gold describe which one of these resistors? _____
A) $68\ \Omega \pm 10\%$ B) $680\ \Omega \pm 10\%$ C) $680\ \Omega \pm 5\%$ D) $68\ \Omega \pm 5\%$

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

- 19) The unit for resistance is called _____. 19) _____

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

- 20) Semiconductors are known to have a negative temperature coefficient because an increase in temperature will result in which of the following? _____
A) An increase in resistance only at room temperature
B) A decrease in resistance only at room temperature
C) A decrease in the resistance level
D) An increase in the resistance level

- 21) Which *one* of these statements is true? 21) _____
- A) As conductor length increases, conductance increases proportionally.
 - B) As resistance increases, conductance increases proportionally.
 - C) As conductor area decreases, conductance increases proportionally.
 - D) As conductor area increases, conductance increases proportionally.

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

- 22) An element whose terminal resistance can be varied in a linear or nonlinear manner is called _____. 22) _____

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

- 23) What is the color code for a resistor whose value is 650 ohms? 23) _____
- A) Green, Blue, Brown
 - B) Blue, Green, Brown
 - C) Green, Black, Brown
 - D) Brown, Black, Green

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

- 24) What safety precaution must be observed when using an ohmmeter? 24) _____

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

- 25) Which *one* of these statements is true of the ohmmeter? 25) _____
- A) It displays a resistance of zero if the leads touch each other, and an infinite reading if there is no connection at all.
 - B) It is used to measure resistance in a circuit only if the circuit is powered by low-voltage batteries.
 - C) It is used to measure resistance of a single resistor in a network without removing the resistor from the circuit.
 - D) It should be stored with the selector switch in the resistance mode.

- 26) The resistance between the two outside terminals of a potentiometer is 100 k Ω . If the resistance between the wiper and one outside terminal is 20 k Ω , what is the resistance between the wiper and the other outside terminal? 26) _____
- A) 80 k Ω B) 20 k Ω C) 16 k Ω D) 100 k Ω

- 27) The fifth color band found on some resistors denotes 27) _____
- A) manufacturer's resistance tolerance, which indicates the precision with which the resistor was made.
 - B) power rating, in tenth-watt increments.
 - C) reliability, in percentage of failures per 1000 hours of use.
 - D) temperature coefficient, in ohmic percentage change per $^{\circ}\text{C}$.

- 28) The current consumed by a digital wristwatch is 20 μA . What is the equivalent resistance of the watch if it is powered by a 1.5 V battery? 28) _____
- A) 30 $\mu\Omega$ B) 75 k Ω C) 75 Ω D) 33.3 k Ω

- 29) A series circuit with a resistor has a voltage drop of 10 volts and a current of 5 mA. If the resistance and voltage are doubled, what is the value of the current through the circuit? 29) _____
- A) 2.5 mA B) 20 mA C) 5 mA D) 10 mA

- 30) A 12 volt automobile taillight bulb draws 6 amperes from the battery. What is the "hot" resistance of this lamp? 30) _____
- A) $24\ \Omega$ B) $72\ \Omega$ C) $2\ \Omega$ D) $3\ \Omega$

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

- 31) A solar cell with an efficiency of 12% drives a small motor with an efficiency of 85%. What is the overall efficiency of the system? 31) _____

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

- 32) In which of the following does the current in an electrical circuit equal the electromotive force divided by the resistance? 32) _____
- A) Watt's Law B) Ohm's Law
C) Coulomb's Law D) Kirchhoff's Law