

**A. MULTIPLE CHOICE:** Enter your answer on the Scantron Card provided [50 Marks]

1. A substance which can be easily bent or molded into any shape is called  
a) Stretchy      b) opaque      c) conductive      d) ductile      e) malleable
2. Which of the following is **NOT** an example of chemical change  
a) A reddish precipitate forms when electric current is passed through a copper chloride solution.  
b) Tires burn, producing black smoke.  
c) Water changes colour when food colouring is dropped into it.  
d) Glucose is digested in the body to produce waste products and energy.  
e) A tarnished penny, together with vinegar and salt, becomes shiny again.

EXAMINE THE FOLLOWING: *hydrocarbon + oxygen → carbon dioxide + water*

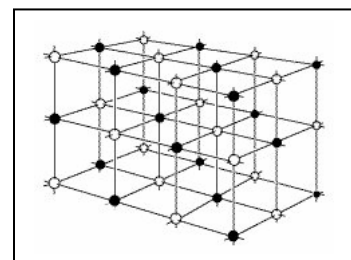
3. The elements on the LEFT are \_\_\_\_\_ of this chemical reaction.  
a) Products      b) reactants      c) solutions      d) producers      e) finalities
4. Which of the following is **not** an example of a solution?  
a) sugar in water      b) air      c) Coke (pop)      d) salad dressing      e) 18 carat gold
5. Hydrogen is in group 1, while Sulfur is in group 6 (or 16) what is the chemical formula for the product when hydrogen and sulfur react?  
a)  $HS_2$   
b)  $H_2S$   
c)  $HS$   
d)  $H_2S_2$   
e)  $(HS)_2$
6. A substance made of two or more elements in definite proportions is called a ....  
a) Mineral      b) compound      c) atom      d) solution      e) salt
7. The following is the STANDARD ATOMIC NOTATION for **nitrogen**:  ${}^{15}_7N$   
How many neutrons does the nitrogen atom have?  
a) 15      b) 7      c) 8      d) 22      e)  $15 \div 7$
8. Which of the following is a property of **all** NOBLE GASES?  
a) non-reactive      b) highly combustible      c) almost always found in compounds  
d) form ions readily      e) conduct electricity
9. Which of the following is used to organize the **modern** periodic table?  
a) atomic size  
b) atomic mass  
c) number of neutrons  
d) state at room temperature  
e) atomic number
10. Which statement below is **true**?  
a) elements in the same period have similar properties  
b) the atomic number decreases from left to right across a row of the periodic tables  
c) metalloids are elements that have both metallic and non-metallic properties  
d) halogens include fluorine, bromine and argon  
e) alkali metals include sodium, potassium and chlorine

11. When mercuric oxide is heated in a hard glass test tube and the gas produced is tested with a glowing splint, the splint promptly bursts into flame, indicating that the gas produced was:
- hydrogen
  - air
  - nitrogen
  - carbon dioxide
  - oxygen
12. Some examples of physical properties are:
- mass and weight
  - volume and density
  - colour and texture
  - none of the above
  - all of the above

13. Which of the compounds given below could be the compound shown to the right?

a) LiNe      b) SO<sub>2</sub>      c) N<sub>2</sub>      d) NaF      e) NaCa

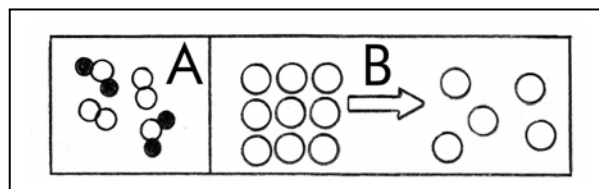
#13



14. According to the Particle Theory, Diagram A shows #14

a \_\_\_ substance, and B shows a \_\_\_ change.

- pure, chemical
- mixture, chemical
- solid, chemical
- pure, physical
- mixture, physical



A planet has different elements arranged in a periodic table similar to the table on Earth.

#15-18

Use the diagram to the right for questions 17-20

15. Elements A, C, G, and K are said to be in the same \_\_\_\_\_
- Group
  - Period
  - Section
  - Series

16. Which of the following elements would be the most UNREACTIVE?

a) C      b) D      c) K      d) E      e) F

17. Which element would be the least dense?

a) A      b) K      c) B      d) N      e) H

|   |   |   |   |
|---|---|---|---|
| A |   |   | B |
| C | D | E | F |
| G | H | I | J |
| K | L | M | N |

18. Element E is malleable, and a good conductor of heat and forms a compound G<sub>2</sub>E.

Which of the following is **LEAST LIKELY** to be a property of element M?

- Forms a compound C<sub>2</sub>M
- Is a solid
- Is good conductor of electricity
- Is highly ductile
- Forms a compound AM<sub>2</sub>

For questions 19 and 20 use the diagram below

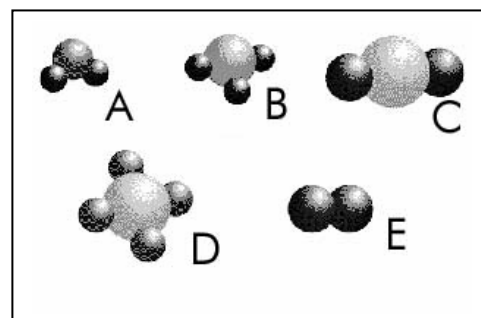
19. In the diagram shown to the right, which model would correctly show  $\text{NH}_3$ ?

- a) A    b) B    c) C    d) D    e) E

20. Which diagram shows the model for oxygen in its naturally occurring state?

- a) A    b) B    c) C    d) D    e) E

#19 &amp; 20



For question 21 and 22 use the diagram below

21. What is the density of ethanol? (in  $\text{g/mL}$ )

- a) 0.70  
b) 0.80  
c) 0.83  
d) 1.00  
e) impossible to calculate since the line does not pass through the bottom left corner

22. The mass and volume of 5 substances were measured and plotted on the graph. Which of the substances is Ethanol?

- a) A    b) B    c) C    d) D    e) E

23. If an object is repelled by a negatively charged substance, the object has/is

- a) positive charge  
b) opposite charge  
c) neutral  
d) negative charge  
e) impossible to say what charge is on the object

24. Which statement correctly describes an atom?

- a) electrons orbit around the protons and neutrons  
b) protons orbit around the electrons and neutrons  
c) neutrons orbit around the protons and electrons  
d) electrons, neutrons and protons are mixed together  
e) protons occupy energy levels around a negative nucleus

25. An object that does not conduct electric charges is called a

- a) Conductor    b) electrolyte    c) semiconductor    d) electrode    e) insulator

26. In the diagram to the right, which circuit symbol shows a resistor?

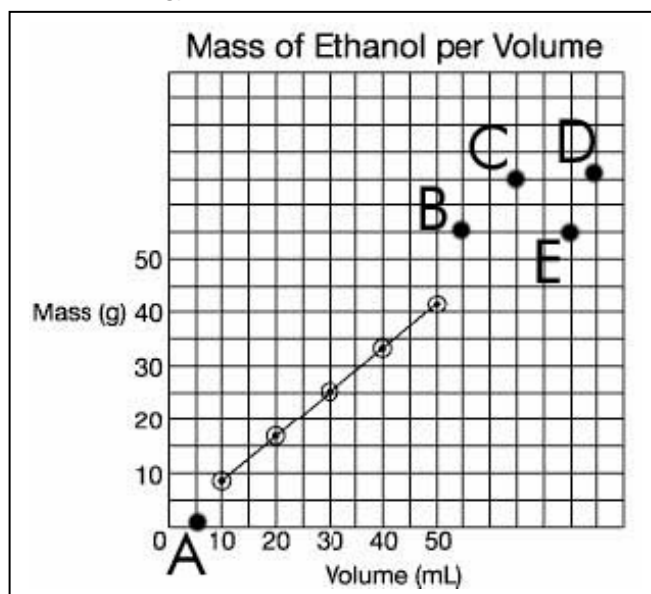
- a) A    b) B    c) C    d) D    e) E

27. The amount of current flowing through a circuit is measured in:

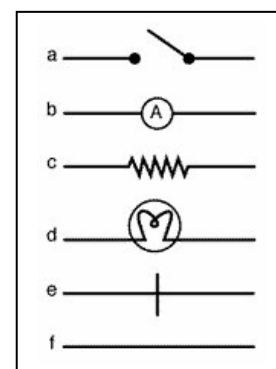
- a) Volts    b) watts    c) ohms    d) amps    e) electrons

28. What type of meter measures potential difference?

#21 &amp; 22



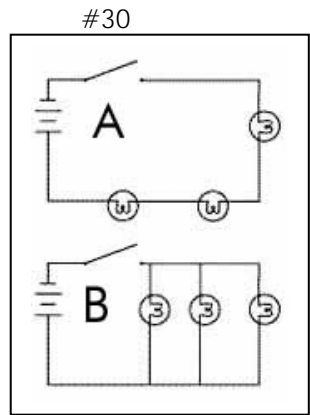
#26



- a) Voltmeter      b) ammeter      c) galvanometer      d) multimeter      e) ohmmeter

29. A toaster is an example of a \_\_\_\_\_ in a simple circuit.  
 a) Conductor      b) switch      c) load      d) source      e) dry cell

30. Examine the following statements concerning the circuits shown to the right:

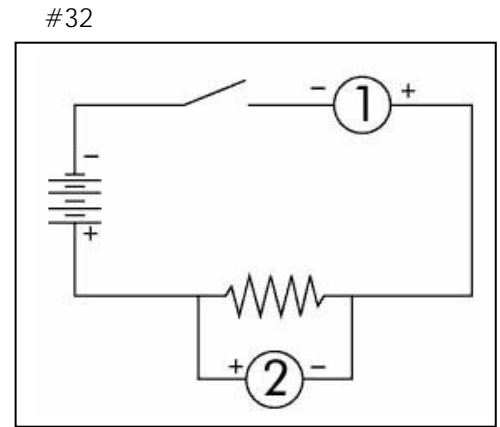


- I. Circuit **A** is a parallel circuit
- II. Circuit **B** is a series circuit
- III. Disconnecting one bulb in **A** will force all light bulbs to go dark
- IV. If the battery in **B** has a potential difference of 9 volts, all bulbs also have a potential difference of 9 volts.

Which of the following are true?

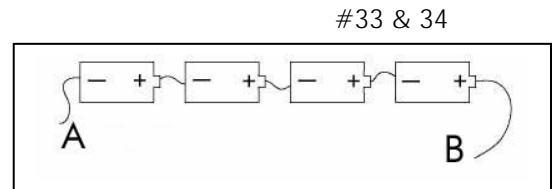
- a) I only      b) III, IV only      c) I, II only      d) None of them      e) All of them
31. An insulator of electricity is a material  
 a) which cannot be melted  
 b) which always has more electrons than protons on its surface  
 c) which contain no electrons  
 d) through which electrons do not flow freely  
 e) whose atoms hold their outer electrons very loosely

32. In the circuit shown to the right, meter 1 is a \_\_\_\_\_, while meter 2 is connected as a \_\_\_\_\_.  
 a) Ammeter, voltmeter  
 b) Voltmeter, ammeter  
 c) Galvanometer, ohmmeter  
 d) Ohmmeter, galvanometer  
 e) Ammeter, Ammeter



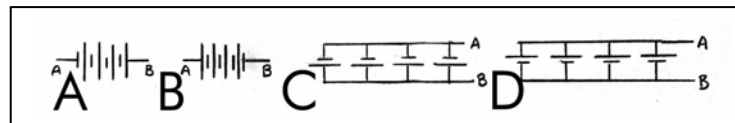
For questions 33 – 34 use the diagram below

33. If each cell has a voltage of 1.5 volts, the voltage between **A** and **B** is \_\_\_\_\_ volts  
 a) 1.5      b) 3.0      c) 4.5      d) 6.0      e) 9.0



34. How many batteries are shown in the diagram?  
 a) 0      b) 1      c) 2      d) 3      e) 4

35. What is the correct circuit diagram for these cells?  
 #35



- a) A      b) B      c) C      d) D      e) none of the above

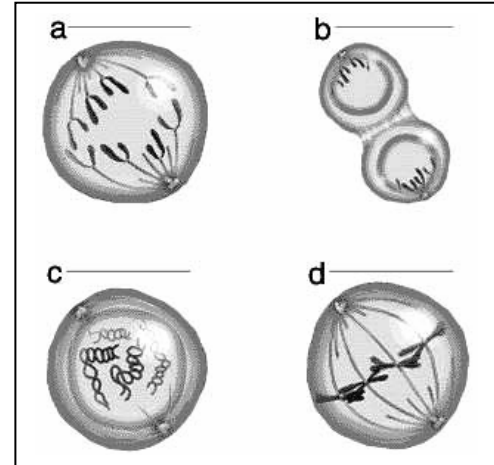
36. When a fuse burns out in your home it means:

- a) too much current is flowing in the circuit  
b) not enough current is flowing in the circuit.  
c) a power failure occurred  
d) more than two loads have been connected to a circuit.  
e) the fuse was incorrectly placed in the fuse box.
37. All of the following except one **must** occur before or during a lightning strike (towards the earth). Which statement does **not** belong?  
a) A chain of ions must form a conducting path from the earth to a cloud.  
b) Due to induction, the earth underneath the clouds is charged opposite to the clouds above.  
c) Protons become negatively charged.  
d) Electrons flow rapidly to neutralize (reduce the charge on) the clouds.  
e) Large electric charges build up in the clouds.
38. A metal leaf electroscope is being charged by induction using a negative strip. Which particles move? Which direction do they move?  
a) electrons move from the sphere to the metal leaves  
b) electrons move from the leaves to the sphere  
c) protons move from the sphere to the metal leaves  
d) protons move from the metal leaves to the sphere  
e) nothing moves
39. Repulsion occurs when ...  
a) a negative charge is brought near a positive charge  
b) a positive charge is brought near a negative charge  
c) a positive charge is brought near a positive charge  
d) a neutral charge is brought near a negative charge  
e) a neutral charge is brought near a positive charge
40. A 100 Watt light bulb replaces a 60 Watt bulb. What measure changes? How does it change?  
a) current decreases  
b) current increases  
c) potential difference decreases  
d) potential difference increases  
e) resistance increases
41. Christmas lights are wired so that if one bulb "dies", the other bulbs will remain lit. These lights are connected in \_\_\_\_\_.  
a) Superposition b) tandem c) conjunction d) series e) parallel
42. A test charge is brought near a negatively charged electroscope. If the test charge is negative....  
a) the leaves will diverge even further  
b) the leaves will come together  
c) the leaves will come together and then diverge  
d) the leaves will rotate  
e) no change in the leaves will be visible
43. Examine the statements below about GROUNDING:  
I. Grounding reduces the chances of sparks occurring.  
II. A metal pipe going into the earth is a very good ground.  
III. Grounding results in the discharge of a charged object.
- Which of the statements above are true?  
a) I and II b) I and III c) II and III d) none e) all

44. Electric circuits can be compared to hydro projects which pump water up to a reservoir and then harness the energy as it falls down a chute. In this analogy, what action would be similar to increasing the voltage of the circuit?
- Increasing the diameter of the pipes
  - Decreasing the diameter of the pipes
  - Increasing the height of the reservoir
  - Decreasing the height of the reservoir
  - Increasing the power of the pump

For questions #45 – 49 use the diagram below

#45-49



45. The correct order for Mitosis is ...
- A, B, C, D
  - C, B, A, D
  - C, D, A, B
  - D, A, B, C
  - D, C, B, A
46. Which diagram shows spindle fibres just about to pull the centromere apart?
- A
  - B
  - C
  - D
  - not shown
47. Which stage is called PROPHASE?
- A
  - B
  - C
  - D
  - not shown
48. In which stage do the chromatin duplicate?
- A
  - B
  - C
  - D
  - not shown
49. In which stage do two nuclei appear?
- A
  - B
  - C
  - D
  - not shown
50. Human sperm and eggs are similar in which of the following respects?
- they both can "swim".
  - They both have the same size.
  - About the same number of each is produced.
  - They have the same number of chromosomes.
  - They both have a tail.
51. What is the name for animals that contain both male and female reproductive organs?
- gymnosperms
  - angiosperms
  - prokaryotes
  - hermaphrodites
  - spongioforms
52. What is the name for organisms that have an exact copy of the genetic material of the mother
- Daughter
  - Clone
  - Nymph
  - Zygote
  - Organelle

53. Which statement is an example of regeneration?
- a) A planarian grows two heads when it is cut in a certain way.
  - b) Different types of apples can grow on the same tree.
  - c) Spores grow into a new organism when conditions are right.
  - d) Parts of a plant that contain meristem cells grow into new plants.
  - e) Two identical daughter ameoba form after the mother divides.
54. How many sperm cells are allowed to penetrate the egg membrane?
- a) 0
  - b) 1
  - c) 2
  - d) 3 or more
  - e) it depends
55. The structure that attaches the embryo to the placenta is the ...
- a) umbilical cord
  - b) yolk sac
  - c) amnion
  - d) fetus
  - e) fallopian tube

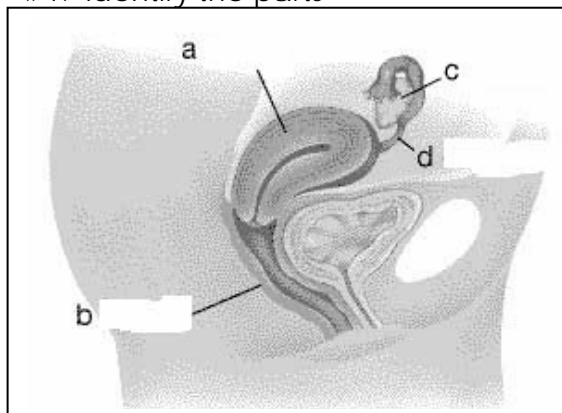
(B) **"TRUE OR FALSE"**: Use the Scantron Card to mark **a** if TRUE and **b** if false.  
(10 marks possible)

[10 marks]

56. An electroscope is charged by contacting with a negatively charged strip. The resulting charge on the electroscope is positive.
57. "Dolly", the cloned sheep was unusual because it was the first time in history that an organism was cloned.
58. The body grows more rapidly than the head after birth.
59. When ice freezes, heat energy is absorbed from the surroundings.
60. One result of cancer is that cells divide more often than they should.
61. One reason that specialized cells have difficulty producing "replacement parts" is that part of their genetic code has been "turned off".
62. To obtain a highly magnified image of a cell using a compound microscope, you first focus with the coarse adjustment knob together with the high power objective lens.
63. Dmitri Mendeleev was able to predict new elements when he organised the known elements according to atomic mass.
64. A pure substance cannot be broken down into separate elements
65. A car is a safe place to be during an electrical thunderstorm because any electrical charge that reaches the car flows outside the metal body.

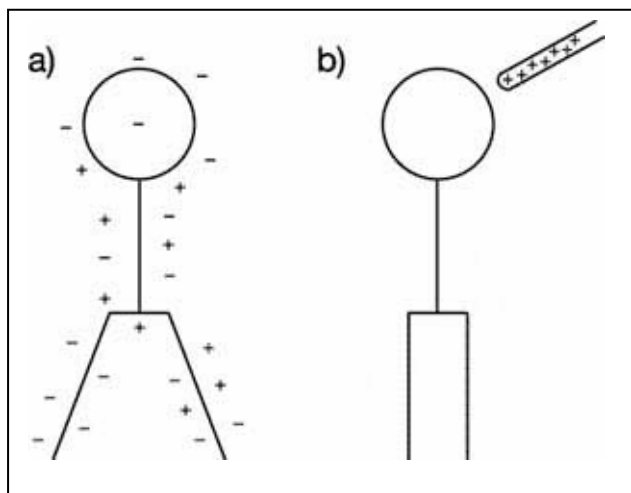
(C) **DIAGRAMS:** Use the spaces below to label each diagram [10 possible marks]

[4] #1. Identify the parts



- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

[2] #2. Place (+)'s and (-)'s in the diagram *in the correct place and number.*



(D) **SHORT ANSWER:** Answer in point form [20 marks possible]

1. What are the differences between the following terms:

a. colloid and suspension: \_\_\_\_\_

\_\_\_\_\_

b. molecule and atom: \_\_\_\_\_

\_\_\_\_\_

c. Isotope and ion: \_\_\_\_\_

\_\_\_\_\_



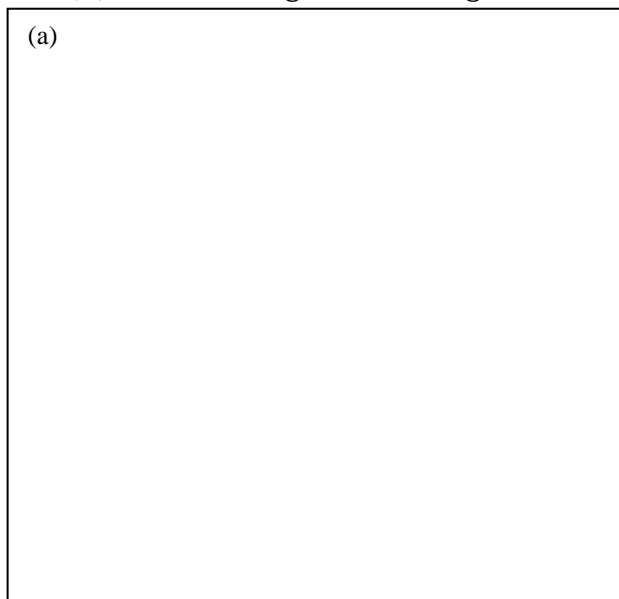
d. Ionic compounds and molecular compounds: \_\_\_\_\_

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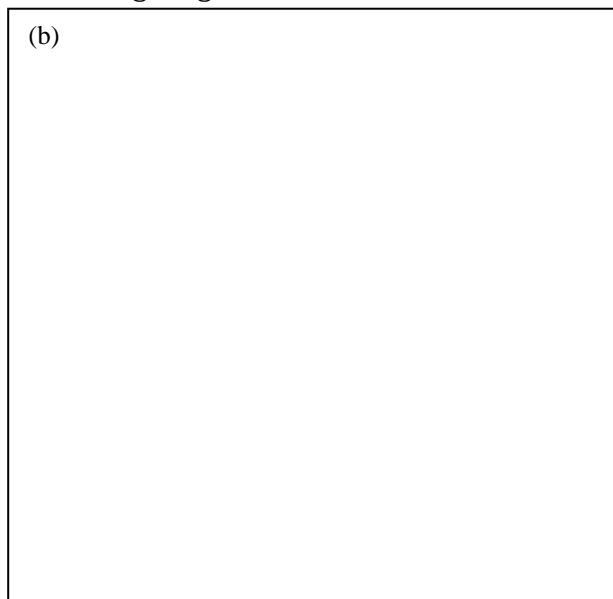
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2. (a) Draw a diagram showing how Calcium and Oxygen will form a compound  
(b) Draw a diagram showing a molecule of Nitrogen gas.

(a)



(b)



3. Give an observation by any of the scientists studied in this course and an **inference** that can be made from that observation.

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4. Draw a circuit diagram that shows three light bulbs in parallel, a battery of two dry cells and a switch to turn off all three bulbs.

[3]

5. From the periodic table give the chemical formula for the compound when sodium reacts with bromine.

[2]

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#4



(E) **CALCULATION: [15 Marks]** Use complete solutions whenever possible and include units in your answer

1. The density of aluminum is  $2.7 \frac{\text{g}}{\text{cm}^3}$ . What is the volume of 0.71 g of aluminum?

2. If a motor requires a current of 11 A and has a resistance of  $12 \Omega$ , determine the voltage of this motor.

3. Calculate the unknown values in the circuit below