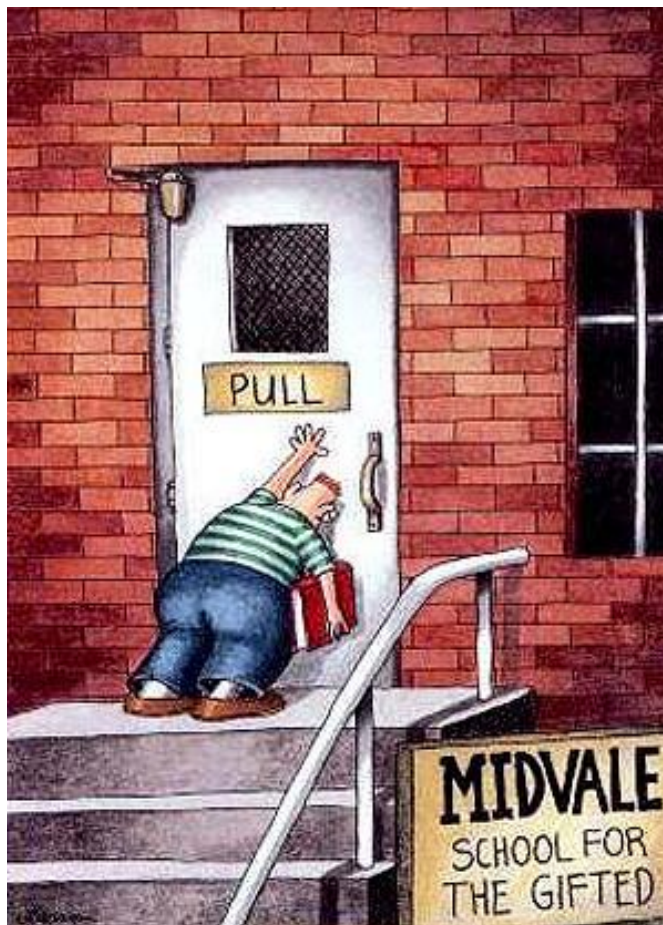# Science 10

Practice Final Exam
Part A
Multiple Choice (66 questions)
Numerical Response (9 numeric)

1. The WHMIS symbol shown would be on the label of a material that is:

   A) corrosive.
   B) poisonous and infectious causing other toxic effects.
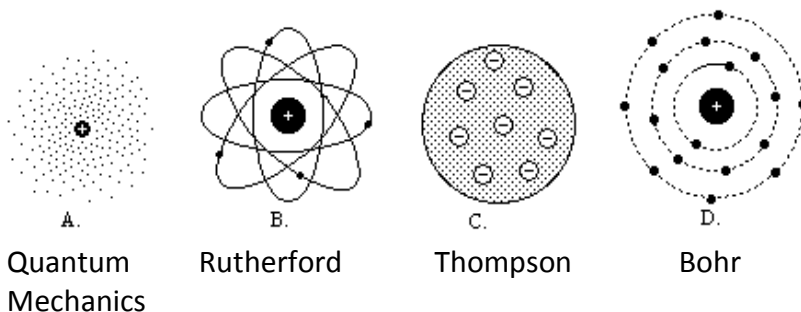   C) oxidizing.
   D) flammable.

2. What is the chemical formula for iron (II) sulfate?

   A) $FeSO_{4(s)}$
   B) $Fe_3SO_{4(s)}$
   C) $Fe_2(SO_4)_{3(s)}$
   D) $Fe_2(SO_4)_{2(s)}$

3. Place the models of the atom in their order of discovery:
   A) A C D B
   B) B C D A
   C) C D B A
   D) C B D A

A.	B.	C.	D.
Quantum Mechanics	Rutherford	Thompson	Bohr

4. $HNO_{3(aq)}$ is commonly used in the production of fertilizers. The correct name of this chemical is:

   A) nitric acid
   B) hydrogen nitrate
   C) aqueous hydrogen nitride
   D) hydronitric acid

5.   Which is the correct IUPAC name for $C_3H_{8\,(g)}$?

  A) tricarbon octahydride
  B) carbon hydride
  C) propanol
  D) propane

6.   Which diagram best represents the electron configuration for an **atom** of nitrogen?

A)	B)	C)	D)
__4e-__	__4e-__	__5e-__	__5e-__
__2e-__	__3e-__	__2e-__	__2e-__
7p	7p	7p	7p
7n	7n	7n	8n

Numeric Response 1

Match each compound listed below with the number that identifies it as:

  1. **ionic**   **2. molecular**   **3. acid.**

Record the correct number in each space provided on your numerical response answer sheet.

____   ____   ____   ____
$CaBr_2$ nitrogen dioxide $H_2SO_{4\,(aq)}$ copper (II) chloride
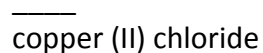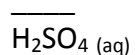
7.   When metallic elements form ions, they

  A) gain electrons and become anions.
  B) lose electrons and become cations.
  C) gain electrons and become cations.
  D) lose electrons and become anions.

Acids and bases have different characteristics. Here is a list of evidence that can help identify the pH of a substance.

I   *turns litmus paper blue*
II   *tastes sour*
III   *feels slippery*
IV   *reacts with metals.*

8.   Which of the above are characteristic(s) of NaOH (aq)?

    A) III
    B) I
    C) II and IV
    D) I and III

9.   The molar mass of solid calcium hydroxide is:

    A) 57.09 g/mol.
    B) 74.10 g/mol.
    C) 97.17 g/mol.
    D) 40.08 g/mol.

10.   Ions made of several non-metallic atoms covalently bonded are called

    A) polyatomic
    B) multiatomic
    C) polyvalent
    D) multivalent

Use the following list to answer the next question.

Properties of a Compound
    I   malleable
    II   solid at room temperature
    III   produces a conductive solution

11.   Which properties above are characteristic of an ionic compound?

    A) I and II only
    B) I, II, and III
    C) II and III only
    D) III only

12.   Which shows the balanced decomposition of SO_2?

   A) $8\ SO_2.(g) \rightarrow S_8(s) + 8\ O_2(g)$
   B) $S_8(s) + 8\ O_2(g) \rightarrow 8\ SO_2(g)$
   C) $SO_2.(g) \rightarrow S\ (s) + O_2(g)$
   D) $8\ SO_2.(g) \rightarrow 8\ S\ (s) + 8\ O_2(g)$

13.   The chemical family that helium, neon, and argon belong to is called the

   A) alkali metals
   B) alkaline-earth metals
   C) halogens
   D) noble gases

14.   The mass of 6.50 mol of water is best represented by:

   A) 2.77g
   B) 7.04×10^{25} g
   C) 18.0 g
   D) 117 g

Numerical Response 2

The number of atoms of manganese, nitrogen, and oxygen in **2 Mn(NO₂)₂** are

___   ___   ___
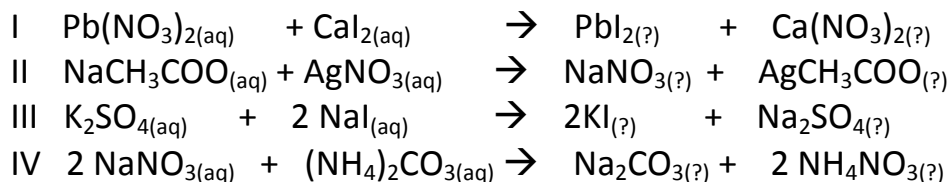**Mn**   **N**   **O**

Record the numbers that correspond to each element in the given order on the numerical response answer sheet.

15.   What is the chemical formula for solid magnesium phosphate?

   A) $Mg_3(PO_4)_2(s)$
   B) $Mg_3PO_4(s)$
   C) $Mg_2(PO_4)_3(s)$
   D) $MgPO_4(s)$

16. Classify the type of reaction occurring when propane gas reacts with oxygen gas to form carbon dioxide gas, water vapor and heat.

    A) decomposition
    B) synthesis
    C) double replacement
    D) combustion

17. A student is given a silver colored solid to test. She determines it is not immediately reactive with air, it is a good conductor of electricity and it can be stretched into a wire. The sample is most likely (a/n)

    A) transitional metal
    B) metalloid
    C) alkali metal
    D) carbon

18. The reaction of nitrogen dioxide forming from its elements is **endothermic**. The correct balanced equation for this reaction is:

    A) $N_{2\,(g)} + O_{2\,(g)} \rightarrow NO_{2\,(g)} +$ heat

    B) $N_{2\,(g)} + O_{2\,(g)} +$ heat $\rightarrow NO_{2\,(g)}$

    C) $N_{2\,(g)} + 2\,O_{2\,(g)} \rightarrow 2\,NO_{2\,(g)} +$ heat

    D) $N_{2\,(g)} + 2\,O_{2\,(g)} +$ heat $\rightarrow 2\,NO_{2\,(g)}$

19. The IUPAC name for $PbO_2(s)$ is:

   A) lead (IV) oxide
    B) lead (II) oxide
    C) lead oxide
    D) lead dioxide

Four pairs of aqueous solutions were mixed in test tubes I to IV.
The balanced reaction for each test tube is shown below.

I $Pb(NO_3)_{2(aq)}$ + $CaI_{2(aq)}$ → $PbI_{2(?)}$ + $Ca(NO_3)_{2(?)}$
II $NaCH_3COO_{(aq)}$ + $AgNO_{3(aq)}$ → $NaNO_{3(?)}$ + $AgCH_3COO_{(?)}$
III $K_2SO_{4(aq)}$ + $2\,NaI_{(aq)}$ → $2KI_{(?)}$ + $Na_2SO_{4(?)}$
IV $2\,NaNO_{3(aq)}$ + $(NH_4)_2CO_{3(aq)}$ → $Na_2CO_{3(?)}$ + $2\,NH_4NO_{3(?)}$

20.   The test tubes that would form precipitates are:

    A) II and III
    B) II and IV
   C) I and II
    D) I and IV

Two science students collect data for a beetle as it is walking. They place a piece of graph paper in front of the beetle and, watching a clock, one of the students shouts every 3 seconds, at which time the other student places a dot on the paper next to the beetle. The section of the paper with the dots on it is shown below.

1.00 cm

Direction of motion
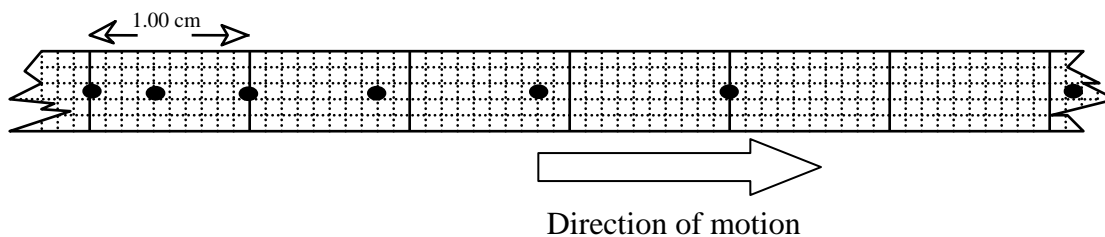
21.   The average speed of the beetle in the first time interval (3.0 seconds) is
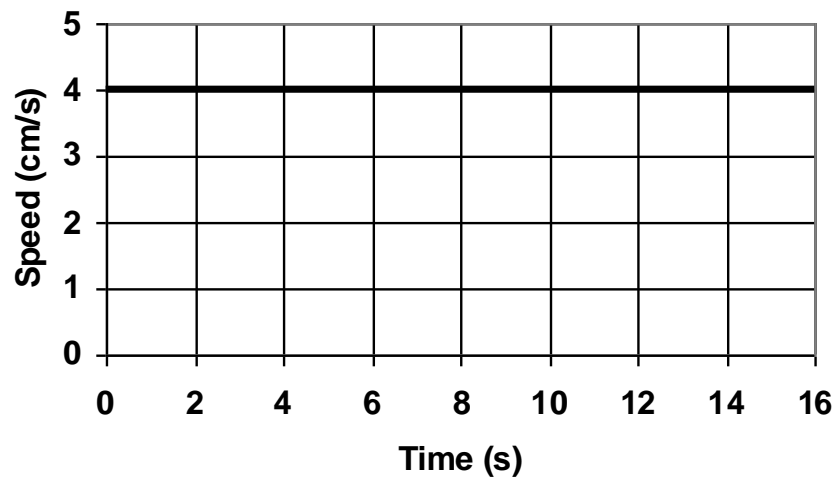
    A.   0.13 cm/s
    B.   0.40 cm/s
    C.   2.4 cm/s
    D.   7.5 cm/s

22.   The graph that BEST shows the beetle's constant positive acceleration is:

a)   d

b)   d

c)   v   t

d)   v   t

7
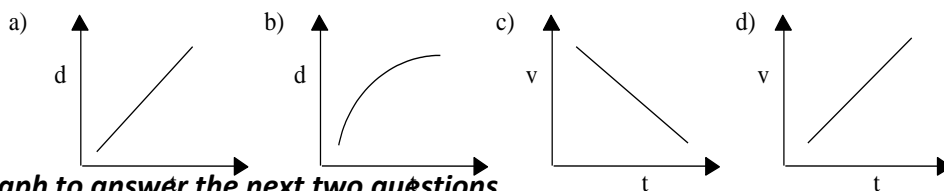
Speed vs. Time of a Toy Car

23. The car was travelling with _____ motion.

   A)   accelerated
   B)   decelerated
   C)   uniform
   D)   no

Numeric Response 3

The car travelled a distance of _____ cm during the time period shown.

*Round and record your answer with 2 digits on the answer page.*

Use the distance-time graph given below to answer the next three questions

A motorcyclist travelled between two towns some distance apart. Distance and time readings were taken at various times and plotted on a graph. The trip was divided into four intervals as shown in the graph.
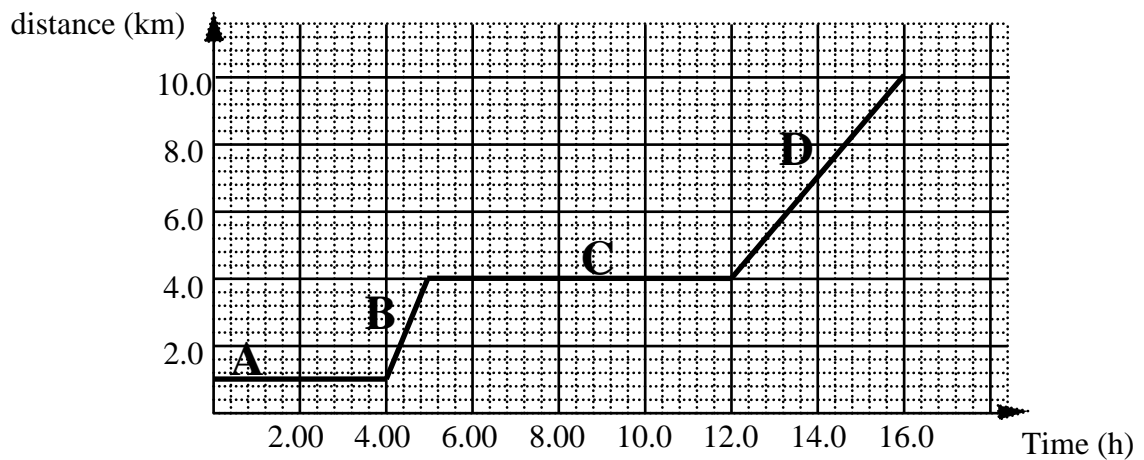
24.   During which interval did the motorcycle travel at the greatest speed?
      A)   A
      B)   B
      C)   C
      D)   D

25.   During which interval was the motorcycle stopped for the greatest length of time?

      A)   A
      B)   B
      C)   C
      D)   D

26.   The speed in section D is

      A)   5.00 km/h
      B)   5.45 km/h
      C)   6.25 km/h
      D)   1.50 km/h

27.   Which of the following quantities are vectors?

      A)   speed, distance, time
      B)   velocity, displacement, time
      C)   velocity, distance, acceleration
      D)   velocity, displacement, acceleration

Use the information to answer the following question.

Position vs. Time of four Pucks
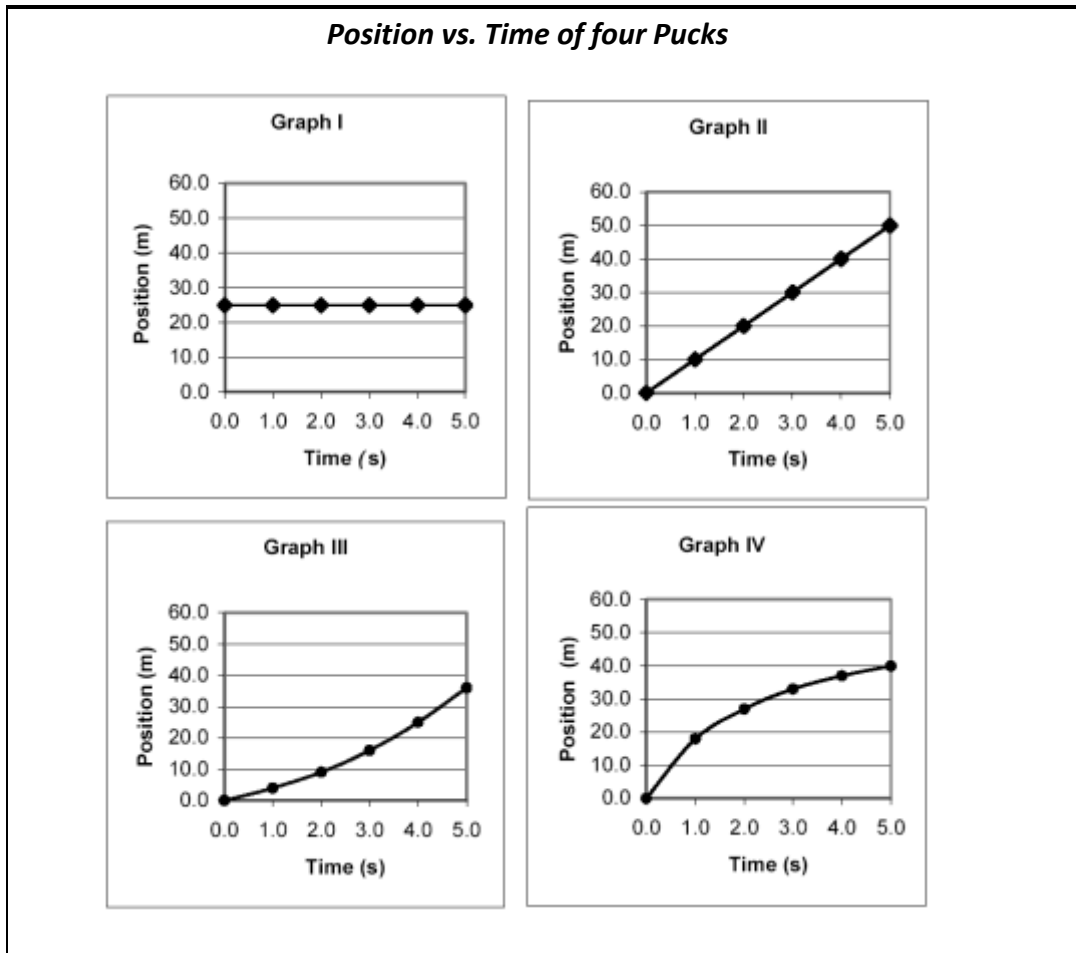
28. The graph above which illustrates a puck travelling with non-zero uniform motion is

A)   I
B)   II
C)   III
D)   IV

29. Select the unit combination equivalent to the Joule.

A)   N·m
B)   kg·m/s
C) $kg^2·m^2/s^2$
D) $kg·m/s^2$

*Use the following information to answer the next **two** questions.*

The Chicken Cannon

A stuffed chicken is fired horizontally from a cannon. It leaves the muzzle travelling at +8.00 m/s, but 2.10 s later the chicken is travelling horizontally at +4.00 m/s.

30.   The change in the chicken's velocity shows

       A)   negative acceleration
       B)   positive acceleration
       C)   uniform motion
       D)   A and C, but not B

Numeric Response 4

The acceleration of the chicken is _____ m/s^2.

Round and record your answer on the answer page with 3 digits.
Do not include direction in your answer.

31.   The time required for a car to reach a velocity of 8.30 m/s starting from rest while accelerating at a rate of 0.750 m/s^2 is:

       A)   3.75 s
       B)   11.1 s
       C)   144 s
       D)   40.0 s

32.   A student pushes a box a horizontal distance of 8.70 m with a horizontal force of 55.0 N. The work done on the box is:

       A) 63.7 J
       B) 0.158 J
       C) 6.32 J
   D) 479 J

33.   A 114 kg hockey player has a kinetic energy of 4.50 kJ, his speed is

    A) 6.28 m/s
    B) 19.7 m/s
    C) 78.9 m/s
    D) 8.89 m/s

Numeric Response 5

 A 3.0 g elastic band is stretched downward 0.20 m with an average force of 0.750 N. It is then shot vertically upwards. The elastic should rise to a maximum height of _____ m.

Round and record your answer with 2 digits on your answer page.

*Use the diagram to answer the following question.*
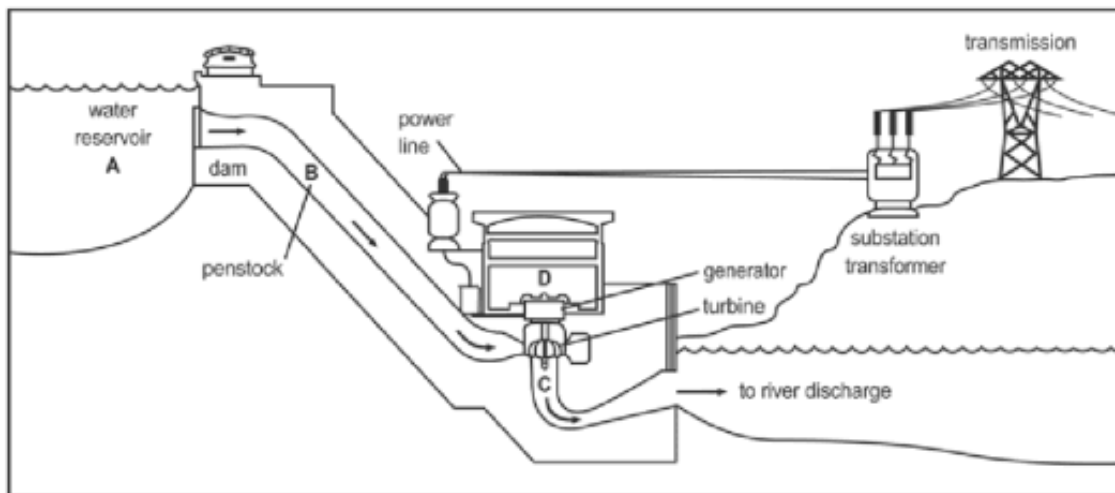
34.   The efficiency of a hydroelectric dam is calculated by the ratio of the output energy divided by the input energy of the water in the reservoir. Identify the output and the input forms of energy as shown in the diagram above.

	OUTPUT	INPUT
A)	electric	kinetic
B)	electric	potential
C)	kinetic	kinetic
D)	kinetic	potential

35. Pierre Leuder's bobsled is at the top of a run. While traveling the run's 1500 m he will descend a height of 121 m. His bobsled, including riders, has a mass of 250 kg. How much gravitational potential energy does the sled have at the top of the run?

A) 3.68×10^3 kJ
B) 297 kJ
C) 30.3 kJ
D) 375 kJ

36. A boy pushes against a 4000 kg wall with a force of 500 N and the wall remains stationary. How much work is done on the wall?
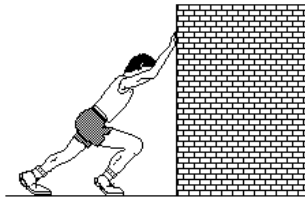

A) No work is done
B) 8.00 J
C) 800 J
D) 2.00 MJ

_____

37. The cell organelle whose main function is to package materials for transport is the

A) rough endoplasmic reticulum
B) vacuole
C) lysosome
D) golgi apparatus

38. When an animal cell is placed in a hypotonic solution, water molecules will:

A) move out of the cell, resulting in shrinkage
B) stop moving unless conditions change
C) move into the cell until it bursts
D) move in and out of the cell in equal amounts

39. Think about nutrient/gas transport in a cell and the sizes of cells.

4 cm

2 cm

1 cm
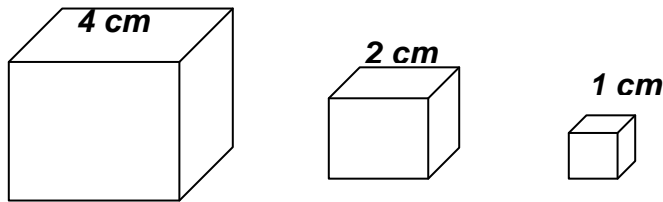
A) largest cell would survive because it has the smallest SA:V ratio
B) smallest cell would survive as it has the biggest SA:V ratio
C) smallest cell would survive because it has the fastest rate of diffusion
D) all cells would survive as they have the same SA:V ratio

40. Which of the following scientists ultimately disproved spontaneous generation?

A) Francesco Redi
B) John Needham
C) Louis Pasteur
D) Lazzaro Spallanzani

Use the following information to answer the next question

A student places two identical potted plants near a light source. She tips one pot on its side so that the plant is sitting horizontally. She leaves the other plant sitting vertically.
In a few days she observes that both stems have bent towards the light as they grew.
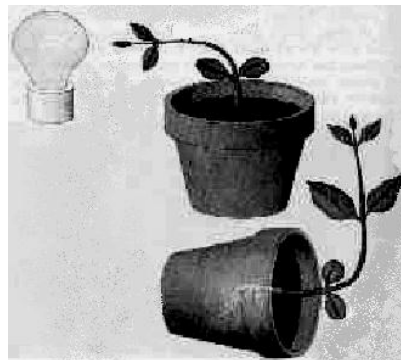
41. The results of her experiment would best be summarized by stating that the stem of the plant exhibits

A) negative phototropism
B) positive phototropism
C) positive gravitropism
D) negative hydrotropism

42.   Which statement is true about xylem tissue?
        A) It moves sugar all around the plant.
        B) It is responsible for gas exchange in plant leaves.
        C) It moves water and minerals up the stem to the leaves.
        D) It retains its cytoplasm when it matures.

Use the following information to answer the next two questions.

Experimenters were interested in determining the effects of carbon dioxide, $CO_2(g)$, on plant growth. They grew groups of plants in environments which had various levels of $CO_2(g)$ Increasing the amount of $CO_2(g)$ was found to increase the rate of plant growth.

43.   The manipulated variable in the experiment described above is

        A)   carbon dioxide level
        B)   rate of plant growth
        C)   amount of water
        D)   temperature

44. A possible explanation for the increased plant growth is the $CO_2(g)$ improved the plants'

        A)   ratio of surface area to volume
        B)   rate of photosynthesis
        C)   rate of transpiration
        D)   rate of cellular respiration

Numeric Response 6

A student builds a model of a cell and compares it to a shopping mall. For each letter in the left column, record the number of the mall structure or service that performs the most similar function.

A. nucleus
B. lysosomes
C. endoplasmic reticulum
D. mitochondrion

1. escalators and hallways
2. doors and windows
3. recycling bins and garbage cans
4. information center
5. gift wrap counter
6. boiler room and power outlets

Record the numbers that correspond to A, B, C, and D in the numerical response answer sheet.

Use these diagrams to answer the next question

W   X   Y   Z
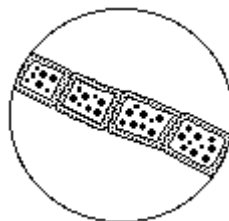
45.   All of the cell shapes given above have the same volume. Which cell shape could absorb nutrients most efficiently and quickly?

A) W
B) X
C) Y
D) Z

46.   The sketch below shows 4 algae cells in a row as they appear through the 40X high power objective lens. If the field diameter is 440 µm, what is the approximate length of each cell?

A) 11 µm
B) 17.6 µm
C) 44 µm
D) 110 µm

Use this list to answer numeric response 7.

Cell Transport Systems

1. endocytosis
2. exocytosis
3. facilitated diffusion

4. osmosis
5. simple diffusion
6. protein pump

Numeric Response 7

The methods of cell membrane transport that <u>require</u> ATP are

Record your answer on the answer page. (in order, you may or may not fill all four spaces)

*Use the diagram to answer the following question.*

Two aqueous solutions of different solute concentration are enclosed in bags made of semi-permeable membrane.
The membrane is **not permeable** to the **solute**.
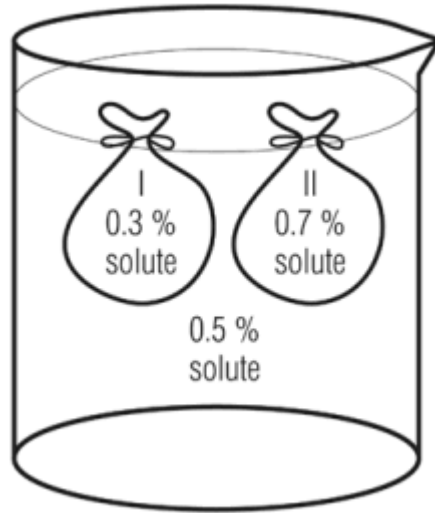
47. The experimenter notes that both bags I and II change during the test. He discovers that the mass of bag __**X**__ changes due to a/an __**Y**__ in ___**Z**___ within the bag.

	X	Y	Z
A)	I	Increase	H_2O
B)	I	Decrease	Solute
C)	II	Increase	H_2O
D)	II	Decrease	H_2O

Use this cell diagram to answer the next question.
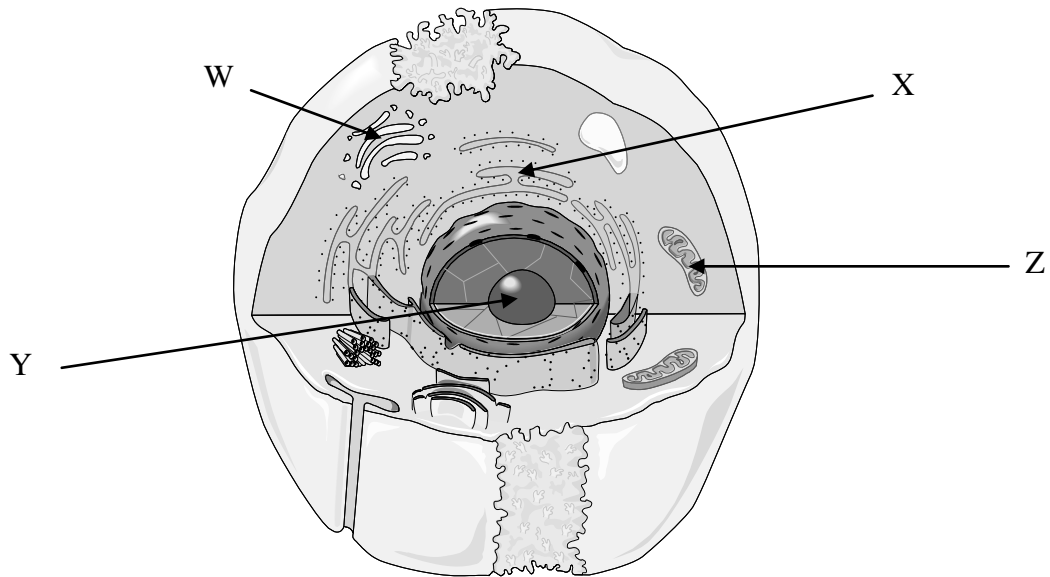
48. The organelle shown in the diagram that is responsible for protein synthesis is

    A)   W
    B)   X
   C)   Y
    D)   Z

49.   Which organelle is responsible for storing digestive enzymes?

    A)   lysosome
    B)   ribosome
    C)   endoplasmic reticulum
    D)   nucleolus

50.   How does a plant shoot produce a phototropic response?

    A) Cells on the side away from the light shrink.
    B) Cells on the side away from the light elongate.
    C) Cells on the side facing toward the light shrink.
    D) Cells on the side facing toward the light elongate.
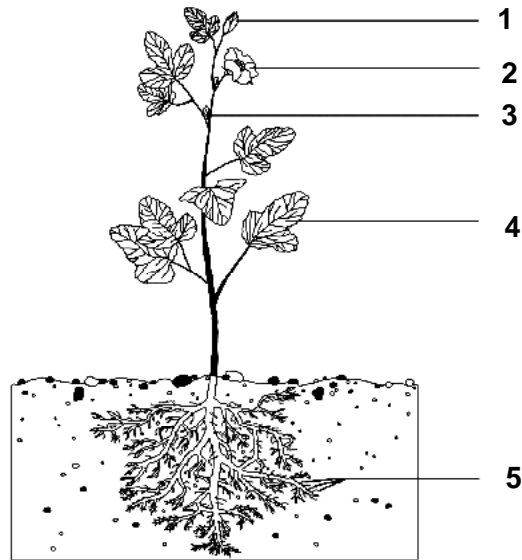
Use the diagram below to answer the next question.
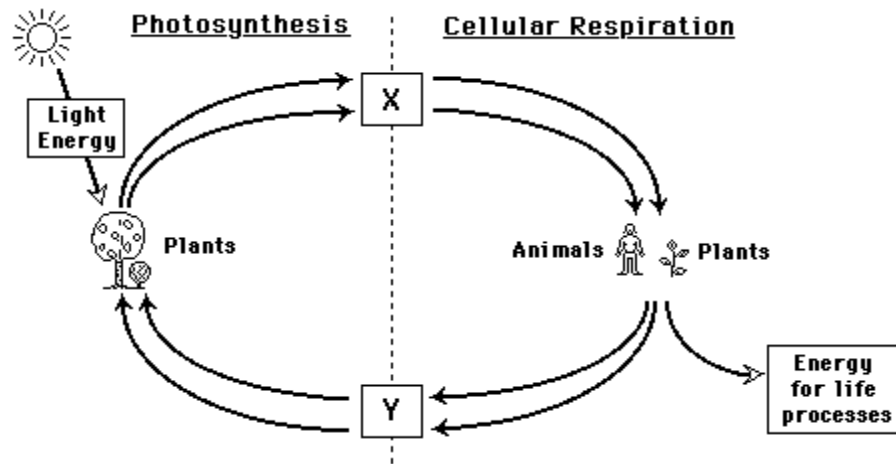
51.   Which of the following molecules should be listed in box X?

A) CO_2 + $C_6H_{12}O_6$
B) $C_6H_{12}O_6$ + O_2
C) O_2 + H_2O
D) H_2O + CO_2

52.   Cellular respiration occurs in the __ i __ of ___ii__ cells

	i	ii
A)	nucleus	only animal
B)	chloroplast	only plant
C)	mitochondria	only animal
D)	mitochondria	animal and plant

Use this diagram to answer numeric response 8.

Numeric Response 8

Match each number of the plant diagram above with its description.

___ A. Area of plant that contains the greatest amount of stomata.
___ B. Location of sexual reproduction.
___ C. Contains cells that are responsible for the absorption of water and minerals.

Record the numbers that correspond to A ___ , B ___ , and C ___ in order on the numerical response answer sheet.

53.   Greenhouse gases in the atmosphere cause a heat gain because they:

A) are highly toxic
B) are present in very high levels in comparison to other gases in the atmosphere
C) react with other gases in the atmosphere to produce heat
D) prevent infrared radiation from exiting the atmosphere

54. Earth's seasons are caused by:

A) variations in the distance of the earth from the sun during the year
B) the angle of inclination of the Earth
C) high albedo values in polar regions
D) ocean currents

Use the information below to answer the next question.

Specific Heat Capacities	
Aluminum	0.92 J/g°C
Iron	0.45 J/g°C
Copper	0.39 J/g°C
Glass	0.84 J/g°C

55. The temperature of 12.0 g of an unknown substance was raised approximately 150 °C when 1656 J of heat energy was added. Identify the substance based on the experimental calculation of its heat capacity.

A) aluminum
B) iron
C) copper
D) glass

56. When water freezes,

A) thermal energy is required
B) thermal energy is released
C) thermal energy is not involved
D) kinetic energy is involved

57. Water has a relatively high boiling point due to water's

A) attraction to other substances (adhesion)
B) polar nature
C) covalent bonds
D) relatively high albedo

The experimental H_{fus} of water is 6.011 kJ/mol
The experimental H_{vap} of water is 40.75 kJ/mol

58.   The amount of heat released when 25.00 moles at 0.000°C of ice melts is

A) 1.626 kJ
B) 4.160 kJ
C) 150.3 kJ
D) 1017 kJ

59.   Greenland is a huge land mass located near the North Pole. It is covered by an ice sheet that is over 1 km thick. This huge amount of water is able to remain frozen because:

A) Solar energy is diffuse and the albedo of ice is high
B) Solar energy is diffuse and the albedo of ice is low
C) Solar energy is concentrated and the albedo of ice is high
D) Solar energy is concentrated and the albedo of ice is low

Use this diagram to answer the next question.
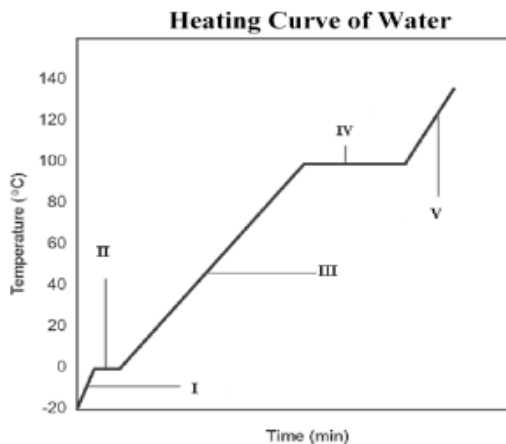
60.   Phase changes occur at:

A) I and II
B) II and IV
C) I and III
D) II and III

Use this diagram to answer the next question.
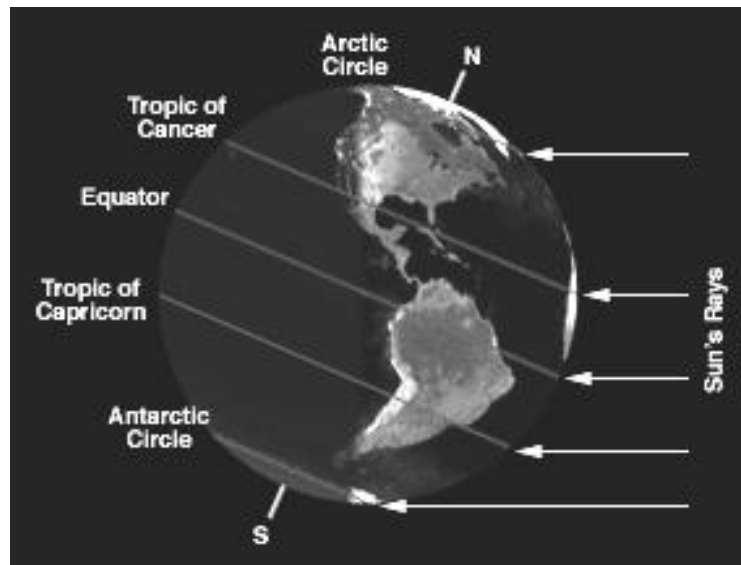
61. Which region in the diagram should have the coldest temperatures?

    A) Arctic Circle
    B) Equator
    C) Tropic of Capricorn
    D) Antarctic Circle

62. Which of the following factors would **NOT** influence the net radiation budget of a biome?

    A) Time of year
    B) Albedo
    C) Cloud cover and atmospheric dust
    D) Longitude

Use this diagram to answer the next two questions.
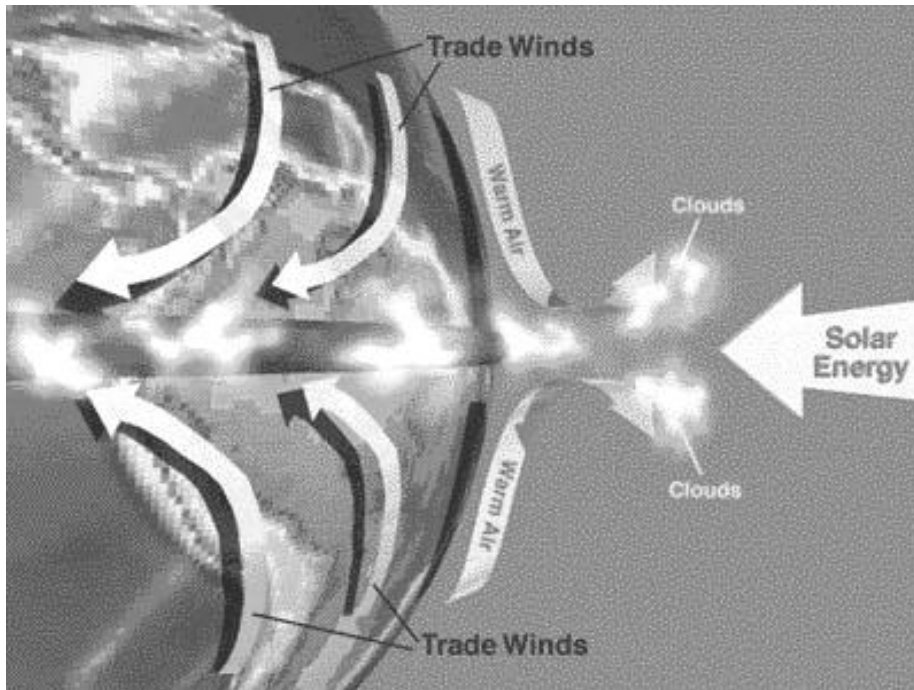
63. Energy is received by Earth in the form of ___*i*___ and it moves around the planet by ___*ii*___.

	i	*ii*
a	convection	radiation
b	convection	convection
c	radiation	radiation
d	radiation	convection

64. The Coriolis effect is best illustrated in the diagram by the arrows labeled

    A) warm air
    B) solar energy
    C) trade winds
    D) clouds

Use the following information to answer the next 2 questions.

The climate graphs shown below indicate 4 different locations around the world that are an equal distance from the equator.
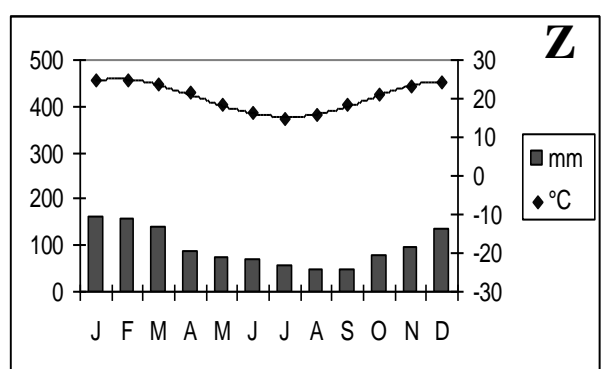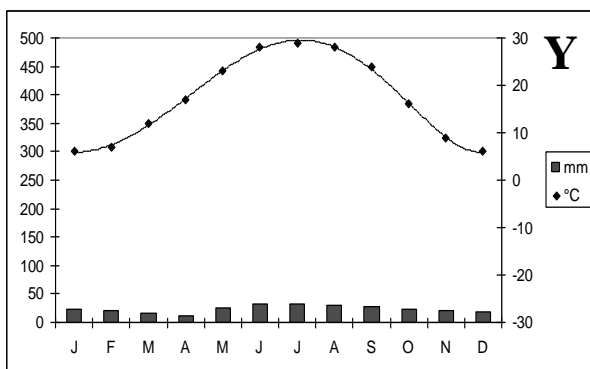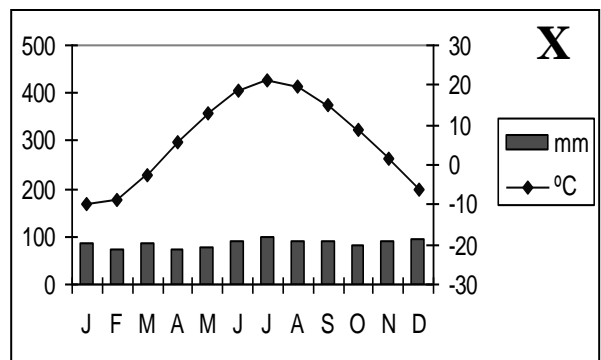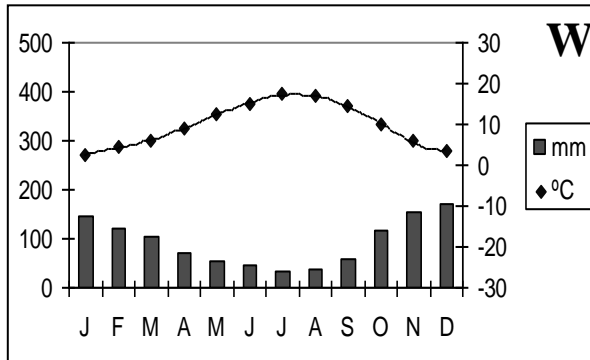
65.   Which climate graph best represents the climate of a northern hemisphere city which is close to an ocean, such as Vancouver?

A)   W
B)   X
C)   Y
D)   Z

66.   Which climate graph best represents a desert biome?

A)   W
B)   X
C)   Y
D)   Z

Use this key to answer Numeric Response 9

1. Regina, SK – dry and warm
2. Edmonton, AB – moderately wet and warm
3. Inuvik, NWT – dry and cold
4. Cairo, Egypt – dry and hot

Numeric Response 9

When the cities are matched with their biome **in this order:**

                Tundra,   Desert,   Taiga,   Grasslands;

The digits are ____   _____   _____,   _____.

Report your 4 digit answer on the answer page provided.

Science 10

Practice Final Exam
Part B: Written Response
(4 written response, total 20 marks)

Written response instructions
- For the following questions, **show all of your work**!
- Marks will be deducted for incorrect use of significant digits, missing units, and for work not shown.
- Use pen or pencil.

Written Response 20 marks

Name:_____

1. Consider the following chemical reaction. **(7 marks in total)**
a. Fill in the **chemical formulas** for the **products** of the reaction in the spaces above. (2mks)
b. **Balance** the reaction using the spaces provided above. (2mks)

____ $Pb(NO_3)_2$(aq) + ____ NH_4Cl(aq) $\longrightarrow$ ____ _____ + ____ _____

c. Write the **IUPAC names** of the **two reactants**: (2mks)

_____ + _____

d. **Type of reaction** shown is :_____ (1mk)

2. Identify three structures in a plant **leaf** that enable it to carry out photosynthesis and/or control water loss. Explain how each structure helps (what is the function) (6 marks)

Plant leaf structures	Explain in detail how that structure functions

3.	The dragonfly is reported to be among the fastest insects. One researcher claimed to record a 2.4×10^{-3} kg dragonfly travelling at an amazing top speed of 27 m/s.

a.	Calculate the kinetic energy of this fly at top speed. (2 marks)
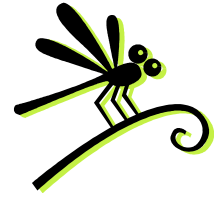
b.	If the dragon fly had to consume 1.30 J of food energy to achieve that speed what is the fly's efficiency? (2 marks)

4. Greenhouse Gases and climate Change: (3mks)

Identify the primary **enhanced** greenhouse gas of concern in society today:
	_____ (0.5 mk)

Explain how **human actions** have added it to the atmosphere: (1mk)

Describe **three** different ways we are reducing/limiting that gas from entering the atmosphere. (1.5 mks)