Unit A: Chemistry		
Key Concept	**Text Pages**	**Recommended Practice** *****answers to "practice problems" are found on p 484-5 of text
WHMIS symbols	8	Know the symbols
MSDS information	7	What information is contained on an MSDS; p.11 #2
classifying matter	10	p. 10 #1,2
atomic theories	12-20	Know how each scientist (Dalton, Thompson, Rutherford, Bohr) contributed to our understanding of the current atom model
determining how many subatomic particles in an atom	22-23	p.23 #6, p36 #1
patterns on the PTOE	25-26	What does the period/group # tell you about the structure of an atom? p27# 9,12
properties metals/non-metals	25	p.27 #10
electron dot diagram	28	Review activity on page 28 (from your notes).
formation of ionic and molecular compounds	30-32	When are electrons donated, when are electrons shared?
naming binary ionic compounds	44-45	p.45 #5-8
naming ionic compounds using Roman numerals	46-47	p.47 #11
naming compounds with polyatomic ions	51	p.52 #13
common acids and bases	64	table 2.9 and 2.10 on page 64. Know the formula for "sulfuric acid, hydrochloric acid, sodium hydroxide) refer to notes for this information
properties of ionic and molecular substances, acids and bases	56-57 64-66	compare physical state, solubility, conductivity, pH, indicator tests
special properties of water	76-77	p.78 #2,3
evidence for a chemical rxn	84	table 3.1 on page 84
predicting solubility	88-89	p.90 # 1,2
law of conservation of mass	94-	matter cannot be created not destroyed, therefore, mass of reactants = mass of products;
classifying chemical rnxs	104-105	table 3.4 on page 114; p.115 #7
Key Concept	**Text Pages**	**Recommended Practice** *****answers to "practice problems" are found on p 484-5 of text
The Mole	116	How do we define a mole?
calculating molar mass and number of moles "n=m/M"	119-121	Use the PTOE to find atomic molar mass, use the formula n=m/M to calculate number of moles given a certain mass.
Unit B: Physics		
steam engines	142	How do we define a "steam engine"?
determining work graphically (geometric shapes)	156	p.157 #10
calculating work using formula	153-154	Be able to re-arrange formula to solve for variable other than "W" p.154 # 1,5,7
The Kinetic-Molecular theory of Heat	159	How is temperature related to the movement of molecules? What is the difference between heat and temperature? p.163 #7
Converting thermal energy	164-168	Energy is converted from one form to another by modern devices (ie.

		internal combustion engines, electrical generating plants).
scalar and vector quantities	176-177	What is the difference between a scalar and a vector quantity?
calculating speed/ velocity using formula	182-183	Be able to re-arrange equation to solve for other variables; p.184 #10, 13, 14
graphing velocity and acceleration	187, 193	recognize the shapes of different curves on a displacement vs time graph and understand how this relates to the motion of the object.
calculating velocity using slope of graph	188-189	Calculate the slope of a curve to be determine the velocity of an object
calculating acceleration using formula	190-191	p.192 #26
calculating kinetic energy using formula	197-199	Be able to re-arrange formula to solve for variable other than "E_k" p.199 #32,36,38
calculating grav. potential energy using formula	210-211	Be able to re-arrange formula to solve for variable other than "E_p" p.42,44
calculating efficiency of energy conversions	223-227	Be able to determine efficiency when given output and input energy values and when given input and having to calculate output energy. p. 227 #2,3,4
efficiency of common technologies and photosynthesis	232-237	p. 242 #4
cogeneration technology	239	p.242 #6
Unit C: Biology		
Characteristics of living organisms	257	p.265 #1
abiogenesis/ biogenesis	258-259	p.265 #2
cell theory	262-263	p.265 #3
light vs electron microscope	266	What are the practical applications for the use of each of these microscopes?
stem cells	274	p.276 # 6; how do adult and embryo stem cells differ?
cell organelles	277-281	study figures representing plant and animal cells, know the differences between plant and animal cells. p.284 #1,6
membrane properties and function	290-291, 295	Study figure 8.2 on page 291, p. 296 #2
cell membrane transport	299, 302-304	Have a firm understanding on how concentration gradients affect passive or active transport, figure 8.14 on page 304; endo/exocytosis
osmosis	302	Understand how a cell will behave in a **hypertonic** and **hypotonic** environment.
cell shape and surface area	310	Understand how cell shape can benefit cell function, ie. microvilli and root hairs.
Key Concept	**Text Pages**	**Recommended Practice** ***answers to "practice problems" are found on p 484-5 of text
specialization of leaf cells	321	Study figure 9.3 on page 321.
multicellular organisms	323	cells → tissues → organs → systems → organism
gas exchange in plants	325	p.330 #1
fluid transport in plants	331, 334-336	What role do xylem and phloem tissues play in transporting fluids around a plant. How does root pressure and transpiration fit in to water transport?
plant tropisms	341, 344-345	p. 348 #1
Unit D: Ecology		
classifying systems	364	p. 374 #1
the radiation budget	366-367	Study figure 10.6 on page 367
climate and seasons	368, 372-373	p.374 #5

calculating quantity of thermal energy using formula	375-377	Be able to re-arrange formula to solve for variables other than "Q". p.377 #1,4,7
energy transfer in the biosphere	380	Understand what roles radiation, convection and conduction play in Earth's energy balance.
calculate quantity of thermal E during phase changes using formula	381-383	Be able to re-arrange formula to solve for variables other than "Q". p.383 #15, 16
how oceans distribute heat	388-389, 393-394	Understand how El Nino and La Nina affect global weather patterns and how oceans regulate costal climates.
climatographs and biomes	404-416	Be able to recognize climatograph data and which biome is represented by the data. Know the common organisms found in each biome.
adaptations	409	Be able to determine if an adaptation is physiological, structural or behavioral
evidence and causes of natural climate change	420-423	p. 428 # 1b, 4
feedback	424	Study figure 11.37 on page 424, understand what positive and negative feedback loops are.
enhanced greenhouse effect	435	p.444 #1
properties of greenhouse gases	436-437	p.444 #4
effects of deforestation and urbanization on global climate change	445-447	p.448 #2,3,4
human response to climate change	459-468	Have an understanding of the KYOTO accord, Precautionary Principle, Gaia Hypothesis.

It is recommended that you use the study guide to first prepare before doing this practice test. Use the key to help you determine your areas of weakness where your studies still need focus.

Learn Alberta Science 10 Practice Test

1. The following WHMIS symbols appear on a container of solvent.


These two symbols indicate that the solvent is

A. biohazardous infectious material and poisonous and infectious material causing immediate and serious toxic effects
B. poisonous and infectious material causing other toxic effects and corrosive material
C. poisonous and infectious material causing immediate and serious toxic effects and corrosive material
D. poisonous and infectious material causing other toxic effects and dangerously reactive material

2. Which of the following symbols indicates that a container is explosive?

A. 
B. 
C. 
D. 

3. Two solutions are mixed together and a cloudy opaque material forms. From your observations, you conclude that

A. a gas is forming
B. a precipitate is forming
C. the temperature is rising
D. no reaction is occurring

4. The First Nations people of the Nass River Valley in British Columbia and Alaska produced plaques from copper deposits they found. The process they used to produce these plaques was

A. heating the copper metal
B. oxidizing the copper metal
C. annealing the copper metal
D. pounding the copper metal

5. Which of the following is **not** part of the ideas John Dalton proposed in his model?

A. Atoms of different elements have different properties.
B. All matter is made up of small invisible particles.
C. Matter is neither created nor destroyed during a chemical reaction.
D. All the atoms of an element have identical properties.

6. Which column in the periodic table contains elements with two electrons in their valence energy levels?

A. the first column on the left
B. the first column on the right
C. the second column from the left
D. the second column from the right

7. An atom of oxygen has 8 protons, 9 neutrons, and 8 electrons. Its mass number is

A. 8
B. 9
C. 16
D. 17

8. In the formula $Na_3PO_4(s)$, the charge on the polyatomic ion is

A. 3 -
B. 3 +
C. 4 -
D. 4 +

9. The correct IUPAC name for $N_2O_3(s)$ is

A. nitrous oxide
B. nitrogen oxide
C. nitrogen trioxide
D. dinitrogen trioxide

10. The following are some properties of substances.

I. soluble in water
II. solid at room temperature
III. conducts electricity as a solid

Which of the properties are true for ionic compounds?

A. I and III
B. I and II
C. II and III
D. I, II, and III

11. Which of the following compounds is only slightly soluble in water?

A. K_2SO_4
B. AgCl
C. $Ba(OH)_2$
D. $KClO_4$

12. Which of the following are general properties of acids?

I. has no reaction with metals
II. tastes sour
III. conducts electricity

A. I and III
B. I and III
C. II and III
D. I, II, and III

13. Which of the following is a base?

A. K_3PO_4
B. HCOOH
C. HNO_3
D. NH_4OH

14. An example of an endothermic reaction is

A. combustion
B. cellular respiration
C. the reaction in a cold pack
D. the reaction in a hot pack

15. The balanced formula equation for the reaction of oxygen and methane is

A. $O_2(g) + CH_4(g) \rightarrow CO(g) + H_2O(l)$
B. $O_2(g) + CH_4(g) \rightarrow CO_2(g) + 2\ H_2O(l)$
C. $2\ O_2(g) + CH_4(g) \rightarrow CO_2(g) + 2\ H_2O(l)$
D. $2\ O_2(g) + CH_4(g) \rightarrow CO_2(g) + H_2O(l)$

16. Lithium metal reacts with nitrogen gas to form a solid white powder. The coefficient of the formula for the product is

A. 1
B. 2
C. 3
D. 4

17. The following balanced equation represents the reaction of aluminium with copper(II) chloride:

$2\ Al(s) + 3\ CuCl_2(aq) \rightarrow 2\ AlCl_3(aq) + 3\ Cu(s)$

This is an example of a

A. formation reaction
B. combustion reaction
C. single replacement reaction
D. double replacement reaction

18. The products of the reaction of aqueous sodium iodide, NaI(aq), and aqueous lead(II) nitrate, $Pb(NO_3)_2(aq)$, are

A. $NaPb(s)$ and $I_2NO_3(aq)$
B. $Na(s)$ and $I_2NO_3(aq)$
C. $NaNO_3(aq)$ and $PbI(s)$
D. $NaNO_3(aq)$ and $PbI_2(s)$

19. The molar mass of aluminium hydroxide, $Al(OH)_3$, is

A. 43.99 g/mol
B. 78.01 g/mol
C. 87.98 g/mol
D. 97.95 g/mol

20. In the balanced equation $Cu(s) + 2\ AgNO_3(aq) \rightarrow Cu(NO_3)_2(aq) + 2\ Ag(s)$, one mole of copper and two moles of silver nitrate will produce

A. one mole of $Cu(NO_3)_2(aq)$ and one mole of Ag(s)
B. one mole of $Cu(NO_3)_2(aq)$ and two moles of Ag(s)
C. two moles of $Cu(NO_3)_2(aq)$ and one mole of Ag(s)
D. two moles of $Cu(NO_3)_2(aq)$ and two moles of Ag(s)

21. Which describes an object moving with uniform motion?

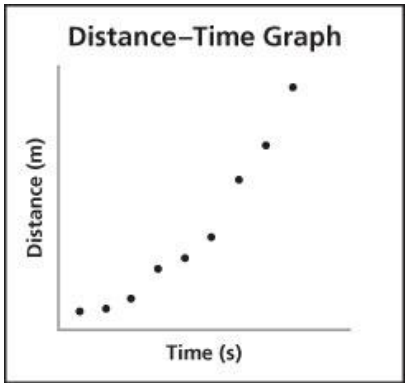
A. The object moves with constant speed along a straight path.
B. The object moves with constant speed along a curved path.
C. The object moves so that an imaginary line segment from the object to a reference point changes in length.
D. The object moves so that an imaginary line from the object to a reference point changes direction.

22. A tsunami, a great ocean wave, travels a distance of 7.2×10^6 m in 2.88×10^4 s. What is the average speed of the tsunami?

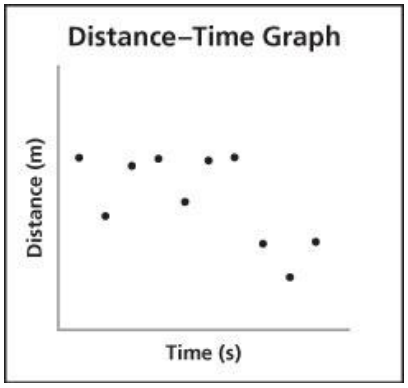
A. 4.0×10^1 m/s
B. 2.5×10^2 m/s
C. 9.0×10^2 m/s
D. 2.1×10^3 m/s

23. Which of the following distance-time graphs most closely describes uniform motion?

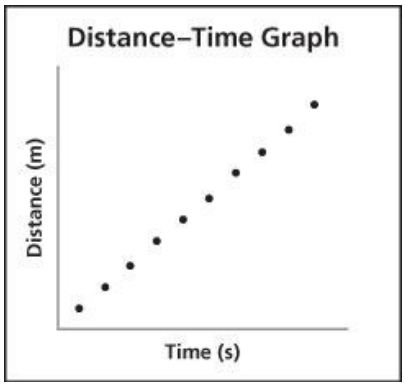
A.



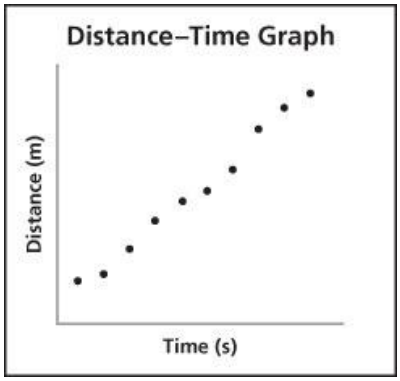
B.



C.



D.



24. A group of students considered the following statements about scalar quantities and vector quantities.

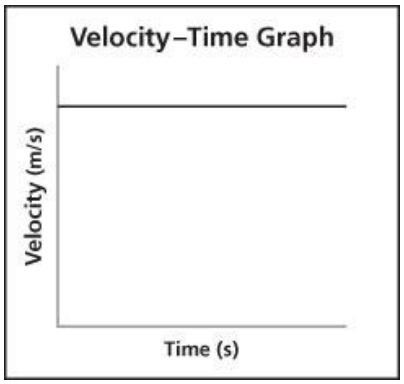
I. A scalar quantity indicates how much and direction.
II. A scalar quantity indicates how much and no direction.
III. A vector quantity indicates how much and direction.
IV. A vector quantity indicates how much and no direction.

Which of these statements is/are correct?

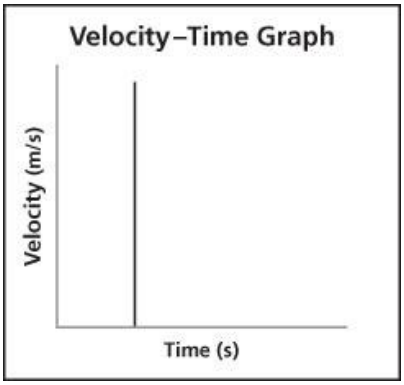
A. I only
B. I and IV
C. II and III
D. IV only

25. Which velocity-time graph indicates positive acceleration?

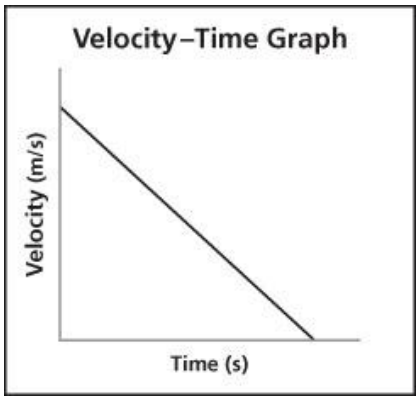
A.



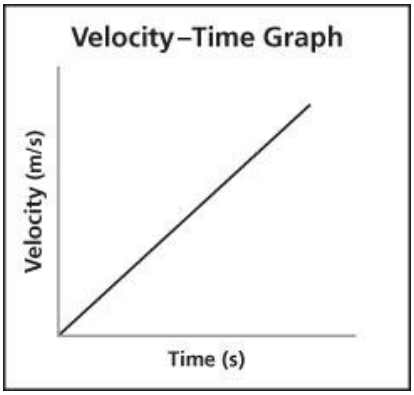
B.



C.



D.



26. The velocity of a falling object changed as indicated by the following data.

Time (s)	0.0	2.0	4.0	6.0
Velocity (m/s)	0.00	19.6	39.2	58.9

Based on the data in the table, what is the acceleration of the object as it falls?

A. 2.0 m/s^2 [up]
B. 9.8 m/s^2 [down]
C. 20 m/s^2 [down]
D. 59 m/s^2 [up]

27. Suppose an object is in motion and all external forces acting on the moving object are balanced. How will the object's motion continue while the external forces are balanced?

A. The direction of the object'½s velocity will change.
B. The speed of the object will remain unchanged.
C. The velocity of the object will increase.
D. The speed of the object will decrease.

28. Madison applied a force of 150 N in a horizontal direction to a sleigh. Meanwhile the sleigh slid 30.0 m across a level surface of snow. What is the work done on the sleigh by Madison?

A. 2.00×10^{-1} J
B. 5.00 J
C. 5.00×10^{1} J
D. 4.50×10^{3} J

29. What is the gravitational potential energy of an object?

A. energy due to only the motion of the object
B. potential energy stored in the nuclei of the object's atoms
C. energy due to only the height of the object above Earth's surface
D. energy due to the motion and position of the object above Earth's surface

30. What kind of energy did pemican have that made it a source of calories in the traditional diet of First Nations peoples?

A. mechanical energy
B. chemical energy
C. magnetic energy
D. thermal energy

31. Manuel placed his 1.42-kg science textbook on the shelf at the top of his locker. The shelf supported the textbook at a height of 1.78 m. At this height, what is the gravitational potential energy of the textbook?

A. 1.26 J
B. 2.53 J
C. 12.4 J
D. 24.8 J

32. A car with a mass of 1800 kg is travelling at a speed of 16.0 m/s. What is the kinetic energy of the car?

A. 4.61×10^{5} J
B. 2.30×10^{5} J
C. 5.76×10^{4} J
D. 2.88×10^{4} J

33. A rock having a mass of 1.25 kg is dropped from the edge of a cliff to the surface of the river water 35.0 m below. With what speed does the rock strike the surface of the water?

A. 20.7 m/s
B. 26.2 m/s
C. 172 m/s
D. 442 m/s

34. There are several energy conversions in a nuclear power plant that conclude with electrical energy flowing through the power lines from the plant. In the sequence of energy conversions, nuclear energy is first converted into

A. thermal energy of a coolant

B. mechanical energy of the rotating turbines
C. mechanical energy of the rotating generator coil
D. kinetic and potential energy of steam in motion and under pressure

35. Which is an expression of the first law of thermodynamics?

A. No process can be 100% efficient.
B. The total energy in a system and its surroundings remains constant.
C. Thermal energy always flows naturally from a hot object to a cold object.
D. No process can remove thermal energy from a source and convert it entirely into mechanical energy.

36. Which process illustrates the second law of thermodynamics?

A. Water in a leather container is heated when hot stones are placed in it.
B. A moving car comes to a stop after the brakes are applied.
C. An airplane banks into a turn as it changes direction.
D. A billiard ball rolls along a straight path.

37. The Watt steam engine was far more efficient than the earlier Newcomen steam engine. What design feature did the Watt steam engine possess that made it more efficient?

A. A flywheel was added to the piston rods.
B. The piston rod was connected to a pivoting beam.
C. The cylinder was used to heat and cool the steam.
D. A separate condenser was included to cool the steam.

38. A construction crane is used to lift a load of materials. The crane performs 7.2×10^3 J of output

work while its input energy is 1.2×10^4 J. What is the percent efficiency of the crane?

A. 16%
B. 60%
C. 66%
D. 167%

39. The magnification of a specimen viewed in a compound light microscope is determined by:

A estimating
B. magnification does not change
C. multiplying the power of the high-power lens by the power of the eyepiece
D. dividing the power of the high-power lens by the power of the eyepiece

40. The power of the eyepiece is 10×, and the power of the high-power lens is 120×. The total magnification of a specimen viewed through the high-power lens is

A. 10×
B. 120×
C. 1000×
D. 1200×

41. Louis Pasteur performed an experiment to disprove the concept of spontaneous generation. In this experiment, Pasteur allowed dust to access one of the flasks, which resulted in the appearance of mould in that flask but not in the other. The growth of the mould is what type of variable?

A. controlled variable
B. manipulated variable
C. responding variable
D. spontaneous variable

42. Which of the following scientist(s) proposed that the cell is the basic unit of all organisms?

A. Pasteur
B. Virchow
C. Brown and Schleiden
D. Schwann and Schleiden

43. A disadvantage of staining a cell for viewing under a light microscope is that

A. staining kills the cells
B. the cell all becomes one colour
C. only the cell membrane can be seen in a stained cell
D. the contrast between internal parts of the cell is reduced

44. Which technology is used to obtain detailed information about the exterior of a specimen?

A. confocal technology
B. X-ray crystallography
C. Scanning Electron Microscope (SEM)

D. Transmission Electron Microscope (TEM)

45. Which technology is used to determine the three-dimensional structure of molecules?

A. brightfield illumination
B. confocal technology
C. X-ray crystallography
D. transmission electron microscopy

46. Rod-like structures of the cell where cellular respiration occurs are called

A. lysosomes
B. ribosomes
C. Golgi apparatus
D. mitochondria

47. The phospholipid bilayer is part of the

A. chloroplasts
B. cell membrane
C. endoplasmic reticulum
D. Golgi apparatus

48. The direction in which water or solutes move through a cell membrane is determined by

A. passive transport
B. rate of diffusion
C. carrier proteins
D. concentration gradient

49. An egg that has had its shell dissolved in vinegar is then placed in a beaker of distilled water. Which of the following occurs?

A. The egg swells.
B. The egg shrinks.
C. The egg loses mass.
D. The egg does not change.

50. A procedure in which blood is removed from the body and cleansed in a special machine using dialysate fluid is

A. hemodialysis
B. peritoneal dialysis
C. reverse osmosis
D. desalination

51. As a cell decreases in size,

A. the surface area increases
B. the volume of the cell increases
C. the surface area to volume ratio increases
D. more molecules need to be transported across the cell surface

52. The purpose of companion cells is to

A. direct the activities of sieve-tube cells
B. help root hairs absorb water from the soil
C. transport sugars from the leaves to other parts of the plant
D. move water and minerals from the roots up the stem to the leaves

53. The part of the leaf containing the structures that allow carbon dioxide to enter the leaf is

A. epidermis
B. palisade tissue
C. spongy mesophyll
D. vascular tissue

54. A vial contains water, a small aquatic plant, and a few drops of bromothymol blue indicator. Carbon dioxide is blown into the water and the colour of the solution changes from blue to yellow. After the vial is kept in the dark for 24 hours, the colour of the solution remains the same. The colour remains the same because

A. oxygen is produced
B. oxygen is used
C. carbon dioxide is not used
D. carbon dioxide is used

55. The loss of water through stomata and lenticels is known as

A. osmosis
B. plasmolysis
C. transpiration
D. perspiration

56. The force that pulls water up from the roots through the xylem in the stem to the leaves is caused by

A. gravity
B. turgor pressure
C. a pressure difference in the leaves
D. transpiration pull caused by the evaporation of the water from the leaves

57. The tip of a plant is covered by an opaque cap, and the plant is exposed to light from one side. The plant will

A. bend away from the light
B. bend toward the light
C. grow straight up
D. not grow at all

58. Positive geotropism is illustrated by

A. a stem bending toward the light
B. a stem growing against the force of gravity
C. a root growing against the force of gravity
D. a root growing in the direction of the force of gravity

59. Which gases, together, make up 99% of Earth's atmosphere?

A. nitrogen, helium, hydrogen, and carbon dioxide
B. carbon dioxide and oxygen
C. nitrogen and oxygen
D. helium and oxygen

60. In which part of the atmosphere do most weather events occur?

A. troposphere
B. mesosphere
C. stratosphere
D. thermosphere

61. Earth's lithosphere is best described as the

A. envelope of Earth that includes bodies of water and water vapour in the air
B. layer of Earth that can support life
C. layer of gases surrounding Earth
D. solid outer portion of Earth

62. Some tropical plants can grow outside in Vancouver, BC, but are not able to grow outside in Edmonton, AB. Which factor most likely accounts for this difference in plant survivability?

A. climate
B. weather
C. altitude
D. soil characteristics

63. Which gas in the atmosphere is the main contributor to the greenhouse effect?

A. carbon dioxide
B. nitrous oxide
C. water vapour
D. methane

64. Which region has the greatest surplus in its net radiation budget?

A. Arctic
B. Atlantic
C. Sub-arctic
D. Equatorial

65. Which statement about the net radiation budget is correct?

A. The outgoing radiation is due to the albedo of Earth's surface.
B. The total of Earth' incoming radiation is less than its outgoing radiation.
C. The total of Earth's incoming radiation and its outgoing radiation is closely balanced.
D. The outgoing radiation is radiation due to the albedo of Earth's surface and reflection from Earth's atmosphere.

66. The Coriolis effect is the

A. movement of air from the equator to the polar regions
B. deflection of moving air from a straight path due to mountain ranges
C. deflection of a moving object from a straight path due to Earth's rotation
D. deflection of a moving object from a straight path due to Earth's angle of inclination

67. The theoretical specific heat capacity of water is

4.19 J/g•°C. What is the thermal energy needed to raise the temperature of 100 g of water from 18.0°C to 38.0°C?

A. 9.38×10^1 J
B. 2.33×10^2 J
C. 4.19×10^3 J
D. 8.38×10^3 J

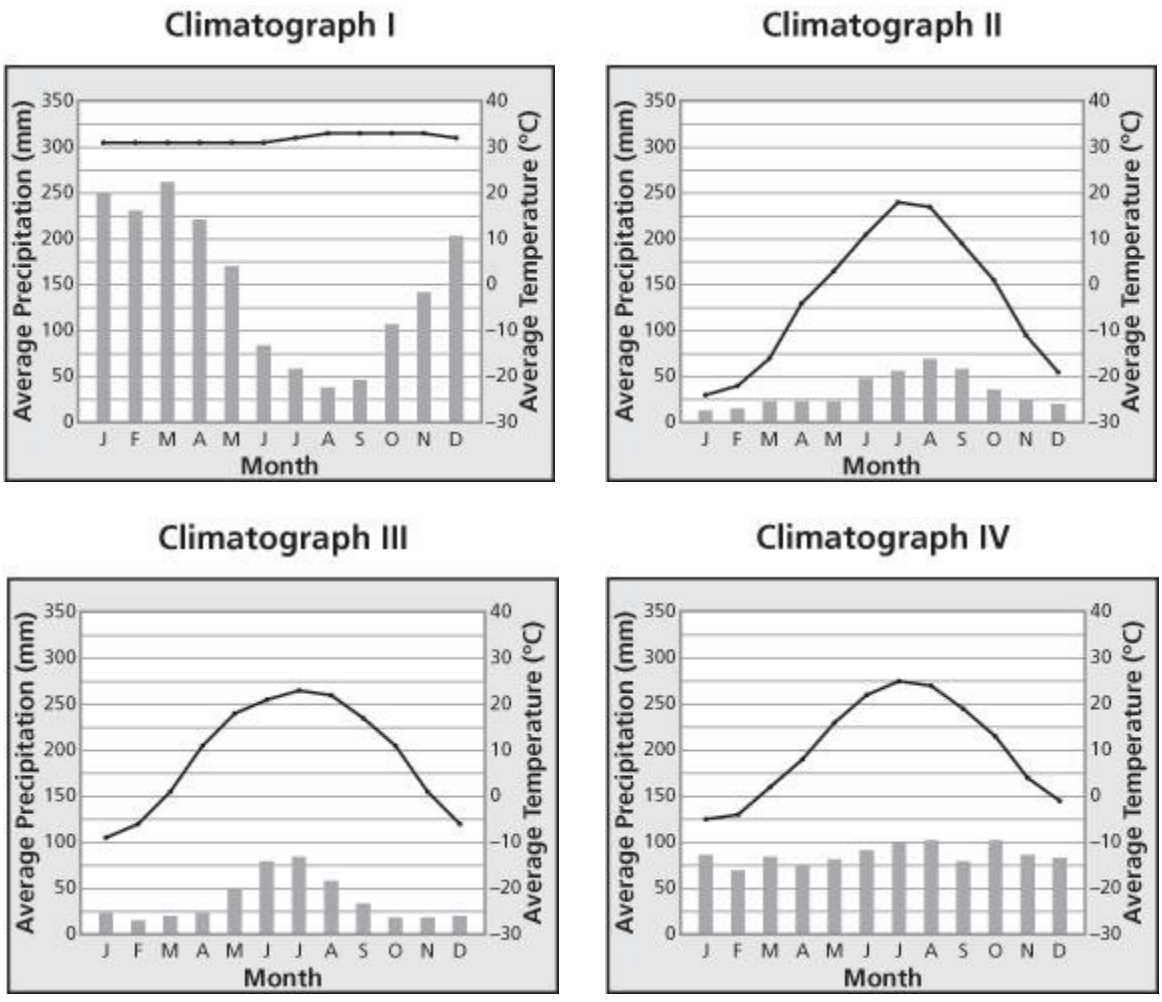
68. The theoretical heat of fusion of ice is 6.01 kJ/mol, and the molar mass of ice is 18.02 g/mol. What is the thermal energy needed to melt 180 g of ice at 0.00°C?

A. 60.0 kJ
B. 339 kJ
C. 1.08×10^3 kJ
D. 1.86×10^3 kJ

69. Which biome receives the least precipitation?

A. taiga
B. tundra
C. grassland
D. rain forest

Use the following climatographs to answer question 70.



70. Which climatograph most closely describes the climate of the deciduous forest biome?

A. Climatograph I
B. Climatograph II
C. Climatograph III
D. Climatograph IV

71. What is a carbon sink?

A. a hole or low place in land or rock
B. a process that removes carbon dioxide
C. the observed increase in Earth's temperature
D. the absorption of thermal energy by atmospheric gases

72. Halocarbons are greenhouse gases that are
A. released from the digestive system of farm animals and landfill sites
B. used as a coolant in air conditioners and refrigerators
C. emitted when applying artificial fertilizers
D. products of the combustion of natural gas

73. What is the Kyoto Protocol?
A. a framework for making international action-plan agreements relating to climate change
B. an international agreement to reduce the production of carbon dioxide
C. a framework for sharing research made by climatologists
D. an international agreement to phase out CFCs

74. Which organization was formed to make the most reliable assessment of the existing knowledge about climate change?

A. Intergovernmental Panel on Climate Change
B. United Nations Environmental Program
C. World Meteorological Organization
D. United Nations General Assembly

75. Which statement cites potential impacts of climate change on Alberta?

A. Significantly warmer climate conditions would introduce Lyme disease into Alberta.
B. In northern Alberta, agricultural conditions could improve due to climate change.
C. More tornadoes and thunderstorms are likely.
D. all of the above

answers:

1. C	**16.** B	**31.** D	**46.** D	**61.** D
2. B	**17.** C	**32.** B	**47.** B	**62.** A
3. B	**18.** D	**33.** B	**48.** D	**63.** A
4. D	**19.** B	**34.** A	**49.** A	**64.** D
5. C	**20.** B	**35.** B	**50.** A	**65.** A
6. C	**21.** A	**36.** A	**51.** C	**66.** C
7. D	**22.** B	**37.** D	**52.** A	**67.** D
8. A	**23.** C	**38.** B	**53.** A	**68.** A
9. D	**24.** C	**39.** C	**54.** C	**69.** B
10. B	**25.** D	**40.** D	**55.** C	**70.** D
11. B	**26.** B	**41.** C	**56.** D	**71.** B
12. C	**27.** B	**42.** D	**57.** C	**72.** B
13. D	**28.** D	**43.** A	**58.** D	**73.** B
14. C	**29.** C	**44.** C	**59.** C	**74.** A
15. C	**30.** B	**45.** C	**60.** A	**75.** D