SC20F Exam Review

Dynamics of Ecosystems

1. Explain what is meant by an ecosystem.

2. Where does all of the energy in an ecosystem originally come from?

3. What is the difference between biotic and abiotic factors?

4. Distinguish between consumers and producers.

5. Consider the following food chain:

   Algae → Plankton → Smelt → Perch → Walleye → Northern Pike → Bald Eagle

   (a) What is meant by a food chain?

   (b) What is meant by the trophic level of an organism?

   (c) In what trophic level are the algae?

6. Construct a food web for the Arctic tundra using the following information.
    - Plants (mainly cotton Sedges) eaten by caribou, voles, lemmings, ground squirrels, jaegers, grizzly bears
    - caribou are eaten by wolves, jaegers
    - voles and lemmings are eaten by wolves, wolverines, jaegers, gulls weasels, owls, hawks
    - ground squirrels are eaten by wolves, wolverines, weasels, owls, hawks, and grizzly bears

7. Explain what is meant by the carbon cycle. Use the words photosynthesis and cellular respiration in your answer. You may use a diagram.

8. This question is about the nitrogen cycle.

   (a) How does a plant get the nitrogen that it needs to grow?

   (b) What would be a potential problem of over fertilization?

9. Define biomagnification and give an example of how it works.

10. What is meant by the carrying capacity of an environment?

11. Explain how each of the following factors affect the carrying capacity of an environment:

    (a) materials and energy

    (b) food chains

    (c) competition

    (d) density

12. State and explain what happens when a population reaches and exceeds the carrying capacity.

13. Factors that affect population density are either density-dependent or density-independent. Define each of these terms and provide an example of each.

    (a) Density Dependent factor

    (b) Density Independent factor

Chemistry In Action

14. Draw an electron dot diagram for each of the following:

(a) Sodium	(b) Magnesium	(c) Fluorine	(d) Sulfur
(e) Neon	(f) K^+	(g) P^{3-}	(h) Cl^-

15. Name the following compounds:

    (a) KCl

    (b) $CaBr_2$

    (c) PbO

    (d) $CuCl_2$

    (e) C_3H_6

    (f) SiO_2

16. Write the chemical formula for each of the following compounds.

    (a) magnesium sulfide

    (b) nitrogen trioxide

    (c) lead(IV) sulfide

    (d) copper(II) oxide

    (e) magnesium nitride

    (f) dicarbon tetrahydride

17. Balance each of the following chemical equations indicate the type of reaction.

    (a) _____Na + _____Cl_2 → _____$NaCl$

    (b) _____Al + _____$CuCl_2$ → _____Cu + _____$AlCl_3$

    (c) _____H_2O_2 → _____H_2 + _____O_2

    (d) _____C_3H_8 + _____O_2 → _____CO_2 + _____H_2O

    (e) _____$NaC_2H_3O_2$ + _____$Cu(NO_3)_2$ → _____$Cu(C_2H_3O_2)_2$ + _____$NaNO_3$.

18. List 2 properties of acids and 2 properties of bases.

Acids	Bases

19. Identify 2 common household acids and 2 common household bases.

Acids	Bases

20. What is the purpose of an indicator?

21. Explain how you can use red and blue litmus paper to determine whether a liquid is an acid or a base.

22. What are the reaction products when an acid is combined with a base?

In Motion

23. Frank can run 120 m in 12 s.

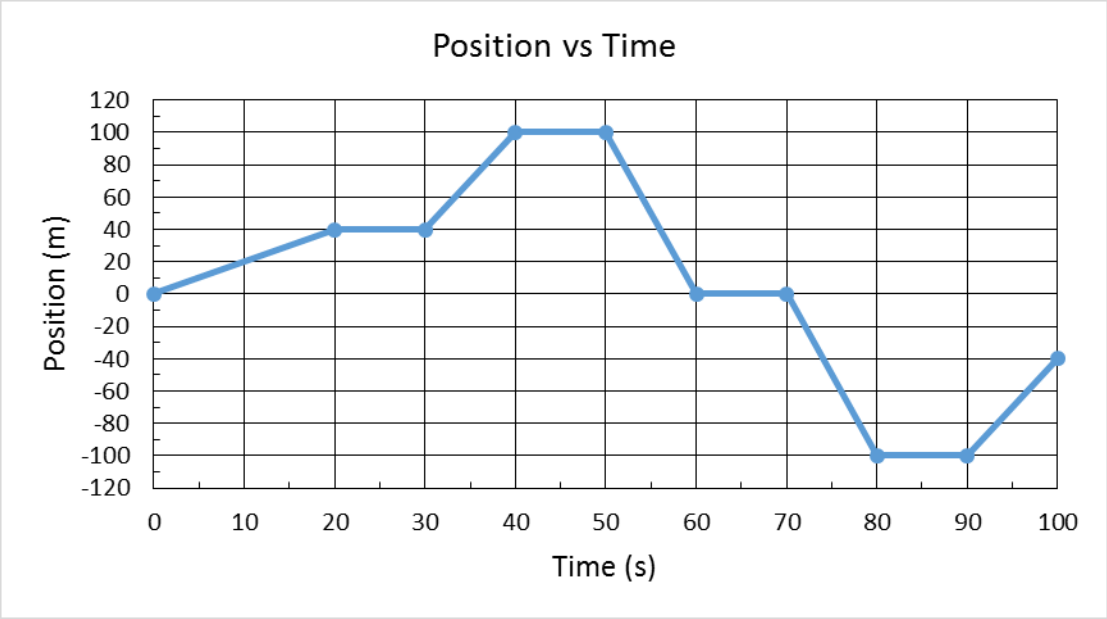
    (a) What is his average speed in m/s?

    (b) Assuming he can run at this average speed for 3 minutes, how far will he travel?

    (c) Assuming he can run at this average speed for an extended period of time, how long would it take him to run a distance of 200 km?

24. Fred Flintstone can accelerate his car from 2.5 m/s to 15 m/s in a time of 10 seconds. Calculate the acceleration of the car.

25. Consider the following position-time graph for a duck walking along a road. The positive direction is towards the East.



(a) How far does the duck travel in the trip?

(b) Calculate the displacement of the duck over the entire trip?

(c) Describe the motion (speed and direction) of the duck during the following time intervals:

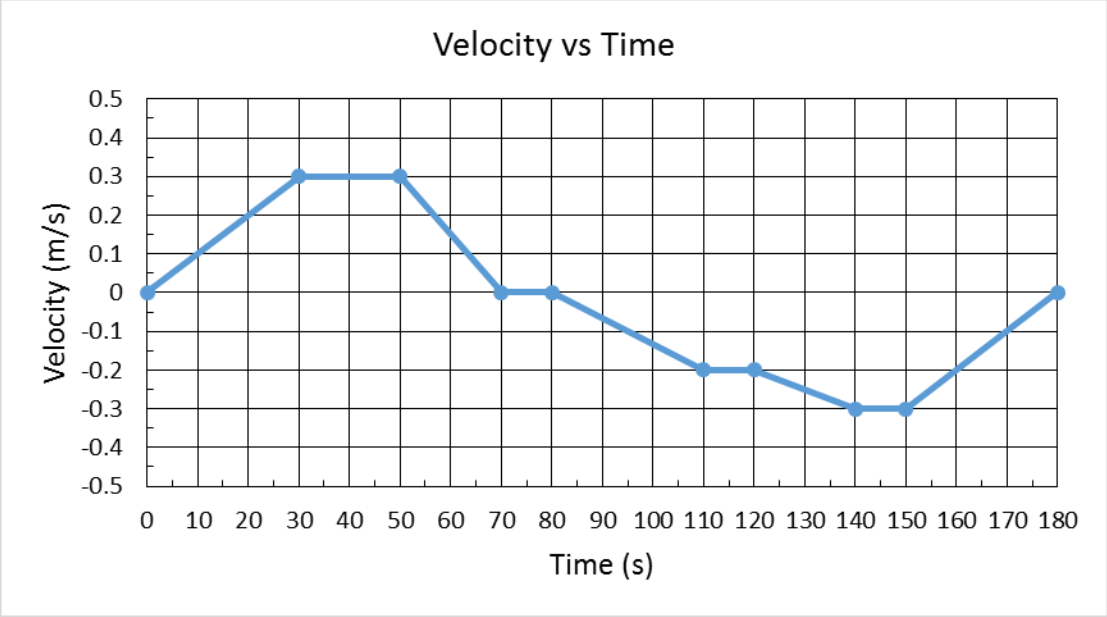
(i) 0 - 20 s

(ii) 40 - 50 s

(iii) 70 - 80 s

(d) What is the velocity of the duck from 50 – 60 s?

26. Consider the following velocity-time graph for a badger walking through the woods. The positive direction is towards the North.



(a) Describe the motion of the Badger (speed, direction) during the following time intervals:

(i) 0 – 30 s

(ii) 30 – 50 s

(iii) 50 – 70 s

(iv) 150 – 180 s

(b) Calculate the badger's acceleration from 120 – 140 seconds.

27. In your own words, describe Newton's three laws of motion.

First Law
Second Law
Third Law

28. Define momentum and give an example.

29. A deer runs out in front of a car traveling 100 km/h on an icy road (k=0.25). If the deer is 250 m away, will the car stop in time?

30. Explain how reaction time changes the amount of time required to stop a vehicle.

31. A car is traveling with a speed of 50 km/h on dry pavement (k = 0.06). The driver has a reaction time of 1.2 s. Calculate the total stopping distance of the car.

32. Choose one safety feature on a car and explain how it works to reduce injury to the passengers.

Weather Dynamics

33. What is the most abundant gas in the atmosphere?

34. Which layer of the atmosphere is closest to the earth?

35. Explain what is meant by the hydrosphere.

36. Explain each of the following:

    (a) ozone layer

    (b) high pressure system

    (c) low pressure system

    (d) Coriolis effect

    (e) albedo

    (f) jet stream

(g) prevailing winds

(h) Fujita scale

37. What would the weather be like in Winnipeg during the weather pattern known as El Niño?

38. The following question is about extreme weather events.

(a) Explain how a thunderstorm forms.

(b) How could you stay safe in a thunderstorm?

(c) Explain how a tornado forms.

(d) What should you do in the event of a tornado?

(e) What conditions are required for Environment Canada to label a snow storm a blizzard?