

NAME: _____

TEACHER: _____

DO NOT OPEN THE EXAM PAPER UNTIL
YOU ARE TOLD BY THE SUPERVISOR TO BEGIN

Biology 2201

COMMON EXAMINATION

June 2009

Value: 100%

General Instructions

This examination consists of two parts. Both parts are contained in this booklet and further general instructions are provided on appropriate pages.

Part I – Multiple Choice (75%)

Select the letter of the correct response from those provided. EITHER shade the letter on your computer scorable card OR place the letter in the blank provided on your Multiple Choice Answer Sheet, whichever format is being used by your school for this exam. **Do ALL questions in this section.**

Part II – Constructed Response (25%)

Answer ALL questions fully and concisely in the space provided.

Student Checklist

The items below are your responsibility. Please ensure that they are completed.

- Write your name and teacher's name on the top of this page.
- Write your name, teacher's name, course name and number on the Part I answer sheet.
- Check the exam to see that there are no missing pages. **ALL MATERIALS MUST BE PASSED IN WITH THIS EXAM.** Use your time wisely. Good luck!

**Biology 2201
Common Exam**

**Part I
Total Value 75%**

Instructions: Place the letter of the correct answer on the answer sheet provided.

1. Which scientist invented one of the first great tools for biological research, the microscope?

(A) Brown
(B) Leeuwenhoek
(C) Schleiden
(D) Virchow

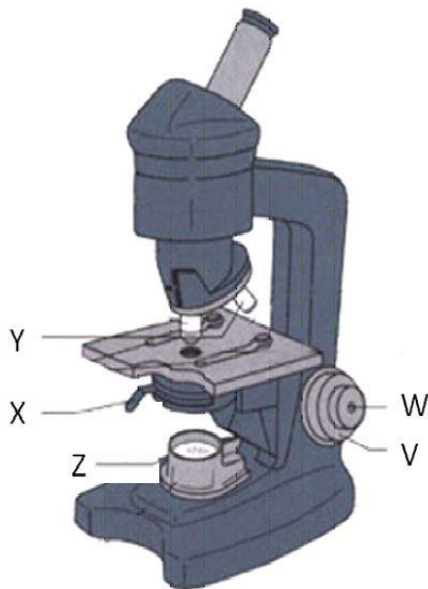
2. Which scientist classified all living organisms into two kingdoms, the plant kingdom and the animal kingdom?

(A) Aristotle
(B) Brown
(C) Schwann
(D) Virchow

3. A Botanist would like to view the surface features of pollen at a high magnification. Which imaging tool would provide this feature?

(A) Compound light microscope
(B) Scanning electron microscope
(C) Simple light microscope
(D) Transmission electron microscope

4. Identify the part of the microscope that controls the amount of light that reaches the specimen being viewed.

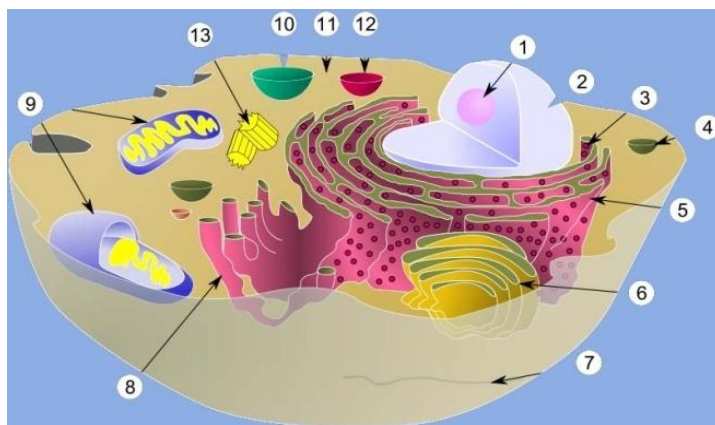


- (A) W
- (B) X
- (C) Y
- (D) Z

5. Which organelle is found in plant cells but not in animal cells or fungi?

- (A) Cell membrane
- (B) Chloroplast
- (C) Cytoplasm
- (D) Cilia

6. Which organelle is responsible for protein synthesis?



- (A) 3
- (B) 4
- (C) 6
- (D) 8

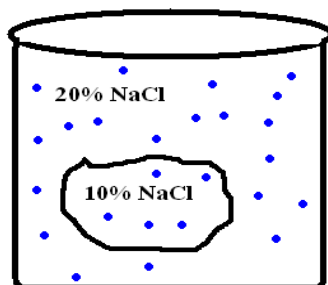
7. Cells release materials against the concentration gradient to their surroundings by which process?

- (A) Diffusion
- (B) Endocytosis
- (C) Exocytosis
- (D) Osmosis

8. Which would move across the cell membrane by simple diffusion?

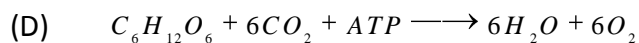
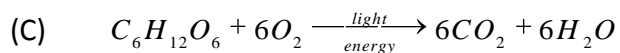
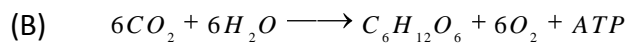
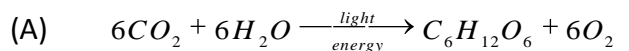
- (A) Glucose molecules
- (B) Oxygen molecules
- (C) Sodium ions
- (D) Starch molecules

9. Which best describes the condition that exists inside the cell?



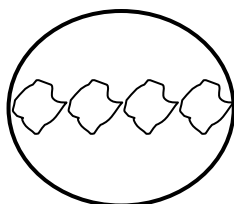
- (A) Hypertonic
- (B) Hypotonic
- (C) Isotonic
- (D) Platonic

10. What is the correct equation representing photosynthesis?



11. A student views the following under a microscope with a field of view of 0.8mm.

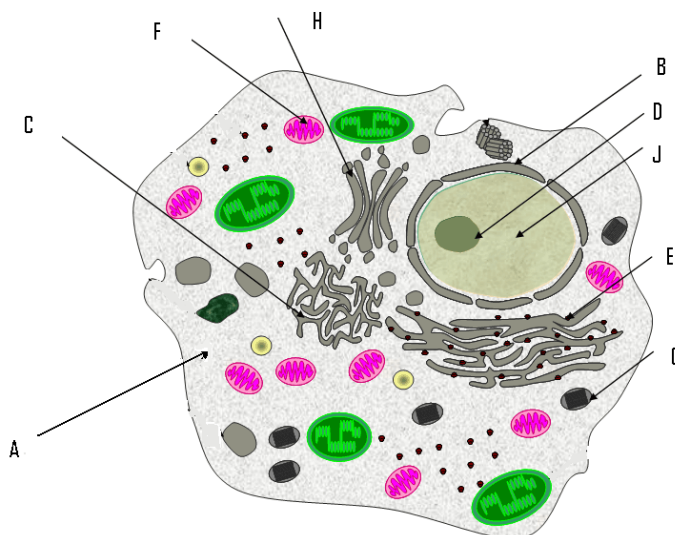
Amoebae – magnification 100x



What is the length of one amoeba?

- (A) 0.2 mm
- (B) 0.4 mm
- (C) 1.6 mm
- (D) 3.2 mm

12. Which is most affected by having the cell placed in a hypertonic solution?

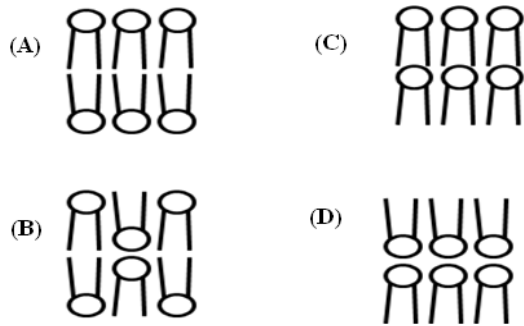


- (A) A
- (B) B
- (C) C
- (D) F

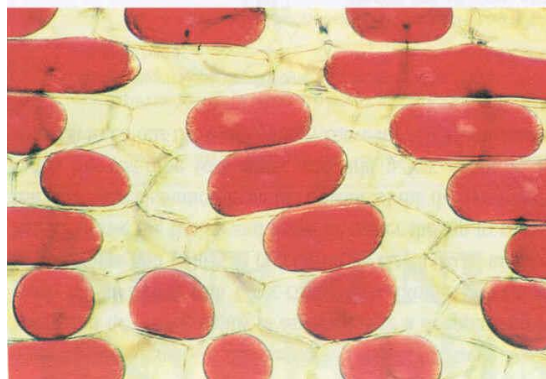
13. How could you prevent cells from shrinking in an extremely hypertonic solution?

- (A) Decrease the concentration of solute inside the cell
- (B) Decrease the concentration of solute outside the cell
- (C) Increase the concentration of solute outside the cell
- (D) Wait for diffusion to reach equilibrium

14. Which is the correct orientation of the phospholipids in the cell membrane?



15. What situation would have led to this cell state?



	External Environment	Direction of water movement
(A)	Hypertonic	Water flows in
(B)	Hypertonic	Water flows out
(C)	Hypotonic	Water flows in
(D)	Hypotonic	Water flows out

16. Deforestation in the Amazon Jungle has proved to be devastating to the environment. How will this occurrence likely impact ATP production in the mammals in the area?

- (A) ATP production has doubled.
- (B) ATP production has increased only slightly.
- (C) ATP production has lowered.
- (D) ATP production has not been affected.

17. Why are cells limited to their ability to grow in size?

- (A) A small surface area/volume ratio is best.
- (B) Cell efficiency decreases as cells get too large.
- (C) Cells must remain small in order to reproduce.
- (D) Organisms must have a limited number of cells.

18. A certain type of drug has been found to interfere with the permeability of the cell membrane to oxygen molecules. What transport mechanism and cellular process will be affected?

- (A) Active transport – protein synthesis
- (B) Diffusion – cellular respiration
- (C) Facilitated diffusion – protein synthesis
- (D) Phagocytosis – cellular respiration

19. Which would explain why a person becomes thirsty after eating a salty meal?

- (A) The blood becomes hypertonic
- (B) The blood becomes hypotonic
- (C) The cells become hypertonic
- (D) The cells become hypotonic

20. A toxic substance has been found to block the uptake of glucose by cells. What would be the possible reason and results of exposure to this toxin?

	Reason	Result
(A)	The toxin blocks carrier proteins	No ATP is produced
(B)	The toxin blocks carrier proteins	No photosynthesis occurs
(C)	The toxin blocks channel proteins	No ATP is produced
(D)	The toxin blocks channel proteins	No photosynthesis occurs

21. What is the Linneaus system for naming organism called?

- (A) Binomial Nomenclature
- (B) Dichotomous Key
- (C) Hierarchical Classification
- (D) Two name system

22. Based on the following data on the coyote, which of the following correctly identifies its scientific name?

Genus	Order	Species	Family	Class
Canis	Carnivora	Latrans	Canidae	Mammalia

- (A) Canidae carnivora
- (B) *Canis canidae*
- (C) *Canis latrans*
- (D) *Latrans canis*

23. As you move down the Linneaus' hierarchy of classification, which applies?

- (A) There is increasing specificity
- (B) There is increasing diversity
- (C) There is decreasing specificity
- (D) There is decreasing relatedness

24. A multicellular organism that contains eukaryotic cells and has a cell wall composed of cellulose, belongs to which of the following Kingdoms?

- (A) Archaea
- (B) Fungi
- (C) Plantae
- (D) Protista

25. Asexual reproduction in Bacteria occurs by which process?

- (A) Binary fission
- (B) Conjugation
- (C) Mitosis
- (D) Meiosis

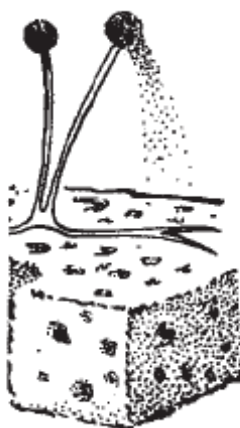
26. Which Kingdom is characterized by multicellular organisms with cell walls composed of chitin?
- (A) Animalia
 - (B) Archaea
 - (C) Bacteria
 - (D) Fungi
27. In which environment would one expect to find Halophiles.
- (A) Hot sulfur springs
 - (B) Peat bog
 - (C) Salt marshes
 - (D) Sewage-disposal plants
28. Which structure contains spores?
- (A) Antheridium
 - (B) Prothallus
 - (C) Sporangiphore
 - (D) Sporangium
29. Which structure within the fern life cycle produces sperm cells?
- (A) Archegonium
 - (B) Antheridium
 - (C) Prothallus
 - (D) Zygospore
30. Which reproduces using seeds covered by a fruit?
- (A) Conifers
 - (B) Ferns
 - (C) Moss
 - (D) Rose
31. Which of the following vertebrates has radial symmetry and the absence of a body cavity?
- (A) Hydra
 - (B) Pinworm
 - (C) Squid
 - (D) Starfish
32. A coelom is a cavity covered by which of the germ layers?
- (A) Ectoderm
 - (B) Endoderm
 - (C) Mesoderm
 - (D) Microderm

33. Use the dichotomous key provided to identify a possible bread mould.

- 1. (i) unicellular..... go to 2
(ii) multicellular..... go to 3
- 2. (i) prokaryotic..... A
(ii) eukaryotic..... B
- 3. (i) autotrophic..... C
(ii) heterotrophic..... D

- (A) A
- (B) B
- (C) C
- (D) D

34. Which type of reproduction is shown in the diagram?



- (A) Asexual
- (B) Budding
- (C) Conjugation
- (D) Sexual

35. Which of the pairs of organisms would be most closely related?

- (A) *Canis lupus*
Canis latrans
- (B) *Canis lupus*
Felis lupus
- (C) *Porifera*
Echinodermata
- (D) *Protista*
Fungi

36. Which describes mosses?

- (A) Nonvascular, requires water for reproduction
- (B) Nonvascular, does not require water for reproduction
- (C) Vascular, requires water for reproduction
- (D) Vascular, does not require water for reproduction

37. What is the correct sequence of viral reproduction?

- (A) Attachment → Entry → Assembly → Lysis → Replication
- (B) Attachment → Entry → Replication → Assembly → Lysis
- (C) Entry → Replication → Attachment → Assembly → Lysis
- (D) Entry → Attachment → Assembly → Replication → Lysis

38. Which correctly describes how pollination occurs in angiosperms and gymnosperms?

	Angiosperm	Gymnosperm
(A)	Wind only	Wind only
(B)	Wind and insects	Wind and insects
(C)	Wind and insects	Wind only
(D)	Wind only	Wind and insects

39. An unclassified organism has been found with the following characteristics:

- multicellular
- cell wall made of chitin
- contains chloroplasts

Which best describes the classification of this organism?

- (A) It will be classified as Kingdom Fungi.
- (B) It will be classified as Kingdom Plantae.
- (C) It will be classified as Kingdom Protista.
- (D) It will be classified in a new Kingdom.

40. Species A produces thousands of eggs during a reproductive cycle while Species B produces between one and ten. Species B has more reproductive success. Why might this be so?

- (A) Fewer egg production means greater success
- (B) Species A has more parental care
- (C) Species A has internal development
- (D) Species B has internal development

41. In a greenhouse a grower is growing ferns, gymnosperms and angiosperms. While away, the sprinkler system keeps the plants well watered, however the greenhouse itself is kept closed. Which plant(s) has the least chance of successful reproduction?

- (A) Both the gymnosperms and angiosperms
- (B) Both the fern and angiosperm
- (C) The fern only
- (D) The angiosperm only

42. Why is the heart of an Amphibian considered less efficient than that of Osteichthyes?

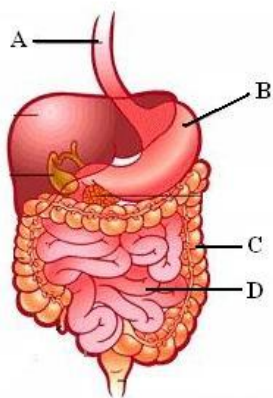
- (A) Amphibia are typically larger than Osteichthyes
- (B) Osteichthyes are more evolutionary advanced than amphibian
- (C) Osteichthyes have a three chambered heart and amphibians have a two chambered heart
- (D) There is mixing of oxygenated and deoxygenated blood

43. Which defines homeostasis?

- (A) Constant energy
- (B) Constant temperature
- (C) Different state
- (D) Same state

44. Which structure is correctly matched with its function?
- (A) Erythrocyte – engulf foreign particles
 - (B) Leukocyte – oxygen transportation
 - (C) Plasma – dissolving medium
 - (D) Platelet – blood clotting
45. What does the term systole refer to in the circulatory system?
- (A) Heart contracting
 - (B) Heart at rest
 - (C) Opening and closing of valves
 - (D) Separation of blood
46. Which process involves removing a segment of a healthy blood vessel and using it to create a new pathway around a blockage in a blood vessel supplying the heart?
- (A) Angioplasty
 - (B) Coronary Bypass
 - (C) Shunt
 - (D) Thrombolytic Therapy
47. Which initiates the blood clotting process?
- (A) Erythrocytes
 - (B) Leukocytes
 - (C) Platelets
 - (D) Valves
48. Which is the correct pathway of an oxygen molecule?
- (A) Nasal Cavity → Bronchi → Alveoli → Diaphragm
 - (B) Nasal Cavity → Bronchiole → Bronchi → Alveoli
 - (C) Nasal Cavity → Trachea → Bronchiole → Alveoli
 - (D) Nasal Cavity → Trachea → Esophagus → Alveoli
49. Which respiratory disorder is characterized by distended alveoli and loss of elasticity of the lungs?
- (A) Asthma
 - (B) Bronchitis
 - (C) Emphysema
 - (D) Pneumonia
50. Which digestive disorder is characterized by inflammation of the ileum, but can affect the entire length of the digestive tract?
- (A) Colitis
 - (B) Crohn's Disease
 - (C) Gall Stones
 - (D) Ileitis
51. Which organ is correctly matched with its function?
- (A) Gallbladder – amylase production
 - (B) Large Intestine – chemical digestion
 - (C) Small Intestine – water absorption
 - (D) Stomach – protein digestion

52. In which organ does chemical digestion and nutrient absorption occur?



- (A) A
- (B) B
- (C) C
- (D) D

53. What is the involuntary movement of food through the alimentary canal?

- (A) Chyme
- (B) Emulsification
- (C) Peristalsis
- (D) Swallowing

54. What is hemodialysis?

- (A) Cleaning of the blood by the liver
- (B) Cleaning of the blood by a machine
- (C) Replacing a kidney with an implant
- (D) Replacing a kidney with a transplant

55. Which process involves the intentional introduction of small amounts of an antigen into the body for the purpose of preventing the spread of disease-causing agents?

- (A) Chemotherapy
- (B) Dialysis
- (C) Transplantation
- (D) Vaccination

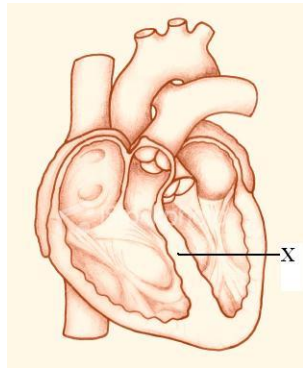
56. Which is an example of an autoimmune disorder?

- (A) Asthma
- (B) Pneumonia
- (C) Rheumatoid Arthritis
- (D) Ulcers

57. Which is an example of a physiological mechanism for homeostatic temperature regulation?

- (A) Hair standing on end when cold
- (B) Nocturnal animal in the desert
- (C) Taking shelter in a wind storm
- (D) Turning up the furnace in winter

58. What is the function of structure X?



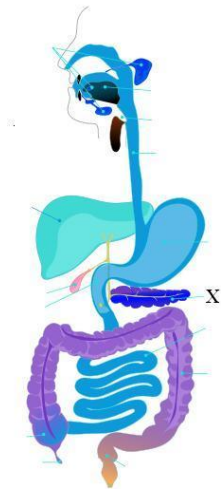
- (A) Absorb oxygen for the cardiac muscle
- (B) Move oxygenated blood throughout the body
- (C) Prevent blood from flowing in the wrong direction
- (D) Separate oxygenated and deoxygenated blood

59. A student tests a solution for common macromolecules using standard methods. Based on the results in the table below, what can be concluded?

Test	Result
Iodine	Turned black
Benedict's	No change
Sudan IV	Turned purple

- (A) Starch and protein were present, but sugar was not.
- (B) Starch was present, but protein and sugar were not.
- (C) Sugar and protein were present, but starch was not.
- (D) Sugar was present, but starch and protein were not.

60. Identify the function of the structure labeled X in the diagram.



- (A) Produce amylase for fat breakdown
- (B) Produce pepsin for protein digestion
- (C) Secrete alkaline fluid to neutralize chyme
- (D) Secrete lactase to breakdown lactose

61. Which treatment would work best for treating an ulcer?

- (A) Administer a vaccine
- (B) Consume vast quantities of water
- (C) Eliminate carbohydrates from the diet
- (D) Medication to reduce hydrochloric acid

62. Which process would be affected by the removal of a person's pancreas?
- (A) Chemical digestion
 - (B) Nutrient absorption
 - (C) Peristalsis
 - (D) Physical digestion
63. How can anorexia nervosa affect homeostasis in the human body?
- (A) Decrease the number of erythrocytes in the blood.
 - (B) Decrease the quantity of nutrients in the blood.
 - (C) Increase the level of carbon dioxide in the blood.
 - (D) Increase the quantity of waste products in the blood.
64. Which is the correct flow of filtrate through the nephron?
- (A) Bowman's Capsule → Glomerulus → Loop of Henle → Collecting Duct
 - (B) Bowman's Capsule → Loop of Henle → Collecting Duct → Glomerulus
 - (C) Glomerulus → Bowman's Capsule → Loop of Henle → Collecting Duct
 - (D) Glomerulus → Loop of Henle → Collecting Duct → Bowman's Capsule
65. A patient with atherosclerosis has reduced blood flow to the glomerulus. What may be observed in the patient's blood?

	Blood Pressure	Salt Concentration
(A)	Decreased	Decreased
(B)	Decreased	Increased
(C)	Increased	Decreased
(D)	Increased	Increased

66. Nutritionists have developed a synthetic fat that the human digestive system will not digest. Which describes the interaction between this fat and the human digestive system?
- (A) Bile can easily emulsify the fat for digestion
 - (B) Lipase cannot act on the fat to change it to smaller molecules
 - (C) Secretions from the pancreas do not neutralize the fat
 - (D) The villi of the small intestine do not interact with the fat
67. Kidney transplant is the preferred treatment for kidney disease. Are there any risks associated with this procedure?
- (A) No – The new kidney has its own antibodies and does not attack the recipient
 - (B) No - The new kidney does not have its own antibodies and does not attack the recipient
 - (C) Yes – The new kidney can be recognized as an antibody
 - (D) Yes – The new kidney can be recognized as an antigen
68. A person has ingested a toxin that has caused the loop of Henle to become impermeable to water molecules. How will this affect the overall health of the individual?
- (A) The body will need to filter the blood faster
 - (B) The body will retain excess amounts of water
 - (C) The body will excrete excess amounts of water
 - (D) The rate of nutrient absorption in the kidney increases

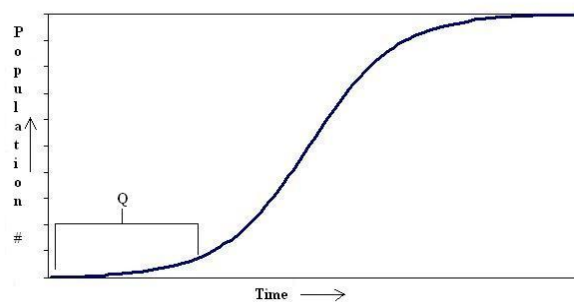
69. Which can be considered a density-independent factor?

- (A) Competition
- (B) Disease
- (C) Space
- (D) Tornado

70. Which factors determine population growth?

- (A) birth rate, death rate, immigration, infertility
- (B) death rate, predation, space, food
- (C) birth rate, death rate, emigration, immigration
- (D) disease, competition, carrying capacity, resources

71. What is represented by the section labeled Q on the graph below?



- (A) Equilibrium
- (B) Exponential
- (C) lag
- (D) logarithmic

72. Which factor has increased the carrying capacity of Earth for human population growth?

- (A) Birth control
- (B) Medical advances
- (C) New diseases
- (D) Shortage of food

73. In population of 100 moose over one year, 15 moose are born, 20 die, 2 emigrate and 7 immigrate. By how much will the population change?

- (A) 0
- (B) -5
- (C) 10
- (D) 20

74. Which region of Newfoundland and Labrador would be most impacted by the outbreak of a new virus?

Map #	Region	Population Density
1	Labrador	1 people/km ²
2	Western NL	25 people/km ²
3	Central NL	25 people/km ²
4	Eastern NL	50 people/km ²
5	Avalon Pen	120 people/km ²

- (A) Avalon Peninsula
(B) Labrador
(C) Central Newfoundland
(D) Western Newfoundland
75. Which could increase the carrying capacity of the environment and increase biotic potential of a population?
- (A) Decrease in food supply with a decrease in disease
(B) Decrease in the size of the environment with an increase in the population of a prey
(C) Increase in resources with a decrease in competition
(D) Increase in the size of the environment with an increase in predation

Part II

Total Value 25%

Instructions: Complete all items in this section. Your responses should be clearly presented in a well-organized manner.

76a) A person has a problem manufacturing adequate amounts of proteins. Identify and explain which organelles must have been affected to cause this condition. (2 marks)

b) Explain how photosynthesis and cellular respiration are considered complementary processes. (2 marks)

c) A person has been diagnosed with Hodgkin's disease. How may a drug that interferes with centrosome production help this patient? (2 marks)

77a) Explain why all chordates are not considered to be vertebrates yet all vertebrates are chordates? (2 marks)

b) A student discovers what she feels is a new life form. Its characteristics include: autotrophic, microscopic, asexual reproduction, and prokaryotic. Has the student discovered a new life form? Give two reasons to support your answer. (2 marks)

c) A birth defect in a mammal results in a hole in the septum of the heart. What vertebrate class does this defect mimic and what are the consequences for the mammal? (3 marks)

78a) In some countries people receive money for donating blood. Would this be a good practice for organ donation? Provide one argument for and one against such an idea. (2 marks)

b) After finding a tumor in the colon, it is common to have a portion of the colon surgically removed. State two ways that this will impact digestion. (2 marks)

c) Mother A has chosen not to breastfeed her child whereas mother B has decided to go ahead with the practice. How might this affect the general health of each child within the first year? (2 marks)

d) Many athletes will train at high altitudes, where oxygen levels are low, to increase their endurance at sea level. Using the concept of homeostasis, explain 2 reasons for their increased performance. (2 marks)

79a). Provide two reasons for **or** two against instituting mandatory birth control for humans. (2 marks)

b) A population of mice is introduced to a new environment and the population growth for the first five years is shown in the graph. Predict the population change of the mice by continuing the graph. Justify your answer (2 marks)

