

Name: \_\_\_\_\_

Teacher: \_\_\_\_\_

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



# Biology 2201

## FINAL EXAMINATION

June 2009

Value: 100%

Time: 2½ hours

### 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.***

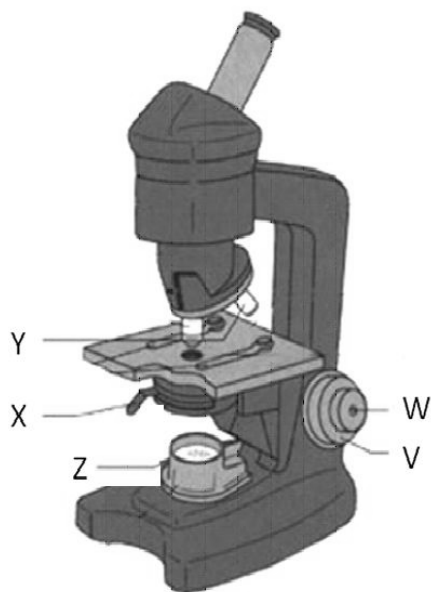
- Write your name and teacher's name on the top of this page.
- Write your name, teacher's name, course name and number on the Part I answer sheet.
- Check the exam to see that there are no missing pages.

**ALL MATERIALS MUST BE PASSED IN WITH THIS EXAM.** Use your time wisely. Good luck!

**Part I**  
**Total Value 75%**

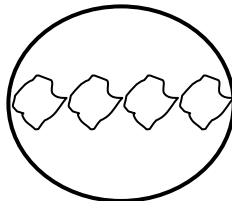
**Instructions: Place the letter of the correct answer on the answer sheet provided.**

1. Who invented 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. Which part of the microscope below controls the amount of light that reaches the specimen being viewed?



- (A) W  
(B) X  
(C) Y  
(D) Z
  
4. 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

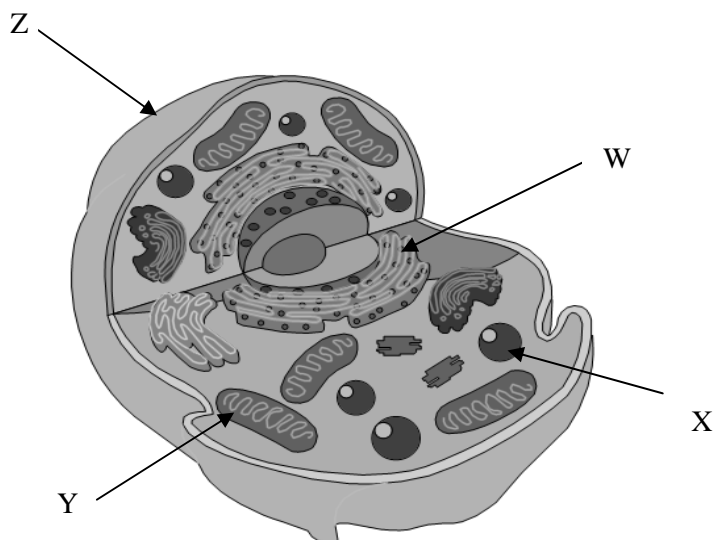
5. Which would provide a three dimensional image with the highest magnification?

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

6. Which organelle is found only in plant cells?

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

7. Which arrow is pointing towards the location of the endoplasmic reticulum?



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

8. Which organelle contains digestive enzymes that break down worn out cell components?

- (A) Centrosome
- (B) Golgi apparatus
- (C) Lysosome
- (D) Vacuole

9. Which organelle is responsible for transforming the energy in nutrients into ATP?

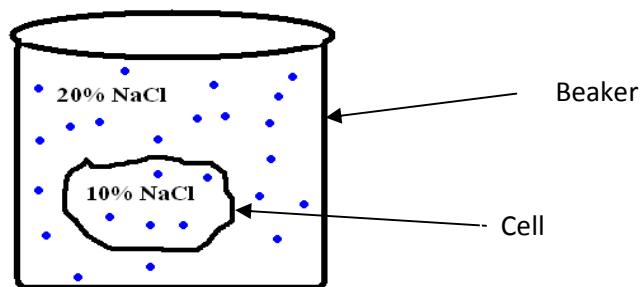
- (A) Cytoplasm
- (B) Endoplasmic reticulum
- (C) Lysosome
- (D) Mitochondria

10. By which process do cells release materials against the concentration gradient to their surroundings?

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

11. Which would move across the cell membrane by simple diffusion?
- (A) Glucose molecules
  - (B) Oxygen molecules
  - (C) Sodium ions
  - (D) Starch molecules

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



- (A) Hypertonic
  - (B) Hypotonic
  - (C) Isotonic
  - (D) Platononic
13. How could you prevent cells from shrinking in an extremely hypertonic solution?
- (A) Increase the concentration of solute outside the cell
  - (B) Decrease the concentration of solute outside the cell
  - (C) Wait for diffusion to reach equilibrium
  - (D) Wait for osmosis to reach equilibrium
14. Which is most affected by having the cell placed in a hypertonic solution?
- (A) Cytoplasm
  - (B) Endoplasmic reticulum
  - (C) Golgi apparatus
  - (D) Mitochondrion
15. Why are cells limited to their ability to grow in size?
- (A) Cell efficiency increases as cells get large
  - (B) Cell efficiency decreases as cells get large.
  - (C) Cells must remain small in order to reproduce.
  - (D) Organisms must have a limited number of cells.
16. A 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
17. 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

18. What is the process by which energy enters a food chain?
- (A) Cellular respiration  
 (B) Combustion  
 (C) Photosynthesis  
 (D) Water cycle
19. What is the correct equation representing photosynthesis?
- (A)  $6CO_2 + 6H_2O \xrightarrow[\text{energy}]{\text{light}} C_6H_{12}O_6 + 6O_2$   
 (B)  $6CO_2 + 6H_2O \longrightarrow C_6H_{12}O_6 + 6O_2 + ATP$   
 (C)  $C_6H_{12}O_6 + 6O_2 \xrightarrow[\text{energy}]{\text{light}} 6CO_2 + 6H_2O$   
 (D)  $C_6H_{12}O_6 + 6CO_2 + ATP \longrightarrow 6H_2O + 6O_2$
20. 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.
21. What is the Linneaus system for naming organism called?
- (A) Binomial Nomenclature  
 (B) Dichotomous Key  
 (C) Hierarchical Classification  
 (D) Two name system
22. Which pair of organisms would be most closely related?
- (A) *Lynx canadensis*  
*Lynx rufus*  
 (B) *Canis lupus*  
*Felis lupus*  
 (C) *Porifera*  
*Echinodermata*  
 (D) *Protista*  
*Fungi*
23. 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

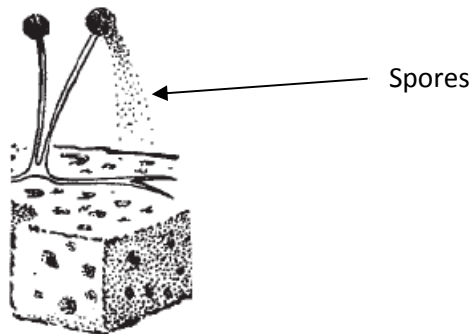
- (A) Canidae carnivora  
 (B) *Canis canidae*  
 (C) *Canis latrans*  
 (D) *Latrans canis*

24. Which applies as you move down the Linneaus' hierarchy of classification from kingdom to species?
- (A) Decreasing similarity  
 (B) Decreasing specificity  
 (C) Increasing diversity  
 (D) Increasing relatedness
25. Which organism represents bread mould according to the dichotomous key below?
- |    |                         |         |
|----|-------------------------|---------|
| 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
26. A multicellular organism that contains eukaryotic cells and has a cell wall composed of cellulose, belongs to which kingdom?
- (A) Archaea  
 (B) Fungi  
 (C) Plantae  
 (D) Protista
27. Asexual reproduction in Bacteria occurs by which process?
- (A) Binary fission  
 (B) Budding  
 (C) Conjugation  
 (D) Propagation
28. 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
29. Which kingdom is characterized by multicellular organisms with cell walls composed of chitin?
- (A) Animalia  
 (B) Archaea  
 (C) Bacteria  
 (D) Fungi
30. In which environment would one expect to find the most Halophiles?
- (A) Hot sulfur springs  
 (B) Peat bog  
 (C) Salt marshes  
 (D) Sewage-disposal plants

31. Which structure contains spores?

- (A) Antheridium
- (B) Prothallus
- (C) Sporangium
- (D) Sporophyte

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



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

33. Which structure within the fern life cycle produces sperm cells?

- (A) Archegonium
- (B) Antheridium
- (C) Prothallus
- (D) Zygospore

34. Which reproduces using seeds covered by a fruit?

- (A) Angiosperm
- (B) Conifers
- (C) Ferns
- (D) Moss

35. Which invertebrate has radial symmetry and the absence of a body cavity?

- (A) Hydra
- (B) Pinworm
- (C) Squid
- (D) Starfish

36. What is name of the fluid filled body cavity which is surrounded by the mesoderm?

- (A) Coelom
- (B) Digestive Tract
- (C) Endoderm
- (D) Stomach

37. Which describes mosses?

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

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

	<b>Angiosperm</b>	<b>Gymnosperm</b>
(A)	Wind only	Wind and insects
(B)	Wind and insects	Wind and insects
(C)	Wind and insects	Wind only
(D)	Wind only	Wind only

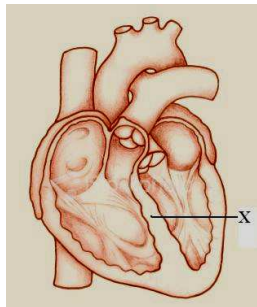
39. An unclassified organism has been found with the following characteristics:  
- unicellular  
- motile  
- contains chloroplasts  
Which best describes the classification of this organism?
- (A) Archaea  
(B) Fungi  
(C) Plantae  
(D) Protista
40. Species A produces thousands of eggs during a reproductive cycle while Species B produces between one and ten. Species B has more reproductive success. Why might this be so?
- (A) Species A has more parental care  
(B) Species A has internal development  
(C) Species B has external fertilization  
(D) Species B has internal development
41. Why is the heart of an amphibian considered less efficient than that of a mammal?
- (A) Amphibians are typically larger than mammals.  
(B) Amphibians have more heart chambers than mammals.  
(C) Mammals are less evolutionary advanced than amphibians.  
(D) There is mixing of oxygenated and deoxygenated blood.
42. In a dry climate, which organism would have the least chance of successful reproduction?
- (A) angiosperms  
(B) coniferous trees  
(C) ferns  
(D) gymnosperms
43. Which best defines homeostasis?
- (A) Constant external environment  
(B) Constant internal environment  
(C) Varying external environment  
(D) Varying internal environment
44. 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
45. Which is correctly matched with its function?
- (A) Erythrocyte – engulf foreign particles  
(B) Leukocyte – oxygen transportation  
(C) Plasma – genetic material  
(D) Platelet – blood clotting



46. What does the term systole refer to in the circulatory system?

- (A) Heart contracting
- (B) Heart relaxing
- (C) Opening and closing of valves
- (D) Separation of blood

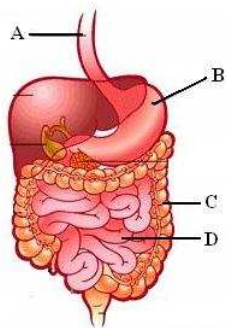
47. What is the function of structure X?



- (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
48. 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
49. Which contains hemoglobin?
- (A) Erythrocytes
  - (B) Leukocytes
  - (C) Platelets
  - (D) Valves
50. Which respiratory disorder is characterized by distended alveoli and loss of elasticity of the lungs?
- (A) Asthma
  - (B) Bronchitis
  - (C) Emphysema
  - (D) Pneumonia
51. Which is the correct pathway of an oxygen molecule as it leaves the nasal cavity?
- (A) Bronchi → Alveoli → Diaphragm
  - (B) Bronchiole → Bronchi → Alveoli
  - (C) Trachea → Bronchiole → Alveoli
  - (D) Trachea → Esophagus → Alveoli
52. Which disorder can affect the top layer and lining of the large intestine?
- (A) Anorexia nervosa
  - (B) Bulimia
  - (C) Colitis
  - (D) Gall Stones

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

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



54. 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

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

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

56. 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

57. Which is an example of an autoimmune disorder?

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

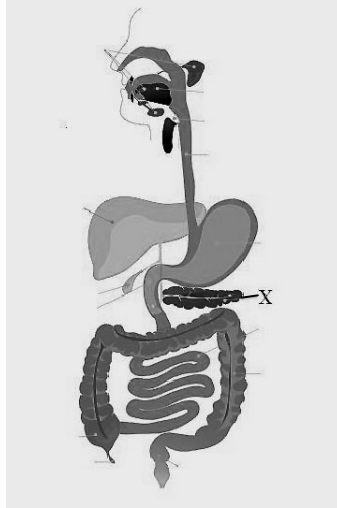
58. Which would work best for treating an ulcer?

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

59. A student performs a test in which Benedict's solution turns from blue to orange. Which substance is present?

- (A) fat
- (B) protein
- (C) starch
- (D) sugar

60. What is the function of the structure labeled X in the diagram below?



- (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 process would be affected by a poorly functioning pancreas?
- (A) Chemical digestion
  - (B) Water absorption
  - (C) Peristalsis
  - (D) Physical digestion
62. 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
63. How can anorexia nervosa affect homeostasis in the human body?
- (A) Decrease the quantity of antigens in the blood.
  - (B) Decrease the quantity of nutrients in the blood.
  - (C) Increase the quantity 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. 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

66. A patient with atherosclerosis has reduced blood flow to the glomerulus. What may be observed in the patient's blood?

	Blood Pressure	Urine Output
(A)	Decreased	Decreased
(B)	Decreased	Increased
(C)	Increased	Decreased
(D)	Increased	Increased

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 excrete excess amounts of water.
- (B) The body will increase of the absorption of nutrient in the kidney.
- (C) The body will need to filter the blood faster.
- (D) The body will retain excess amounts of water.

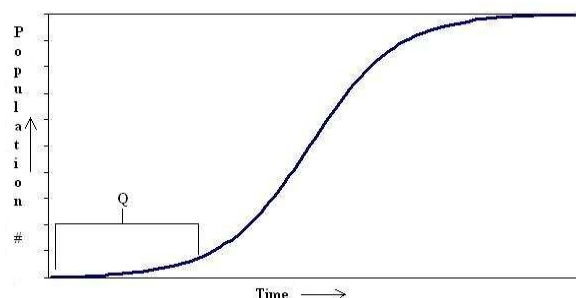
69. Which can be considered a density-independent factor?

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

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

NL Region	Population Density
Central	30 people/km <sup>2</sup>
Eastern	50 people/km <sup>2</sup>
Labrador	2 people/km <sup>2</sup>
Western	25 people/km <sup>2</sup>

- (A) Central
  - (B) Eastern
  - (C) Labrador
  - (D) Western
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 prey population
  - (C) Increase in resources with a decrease in competition
  - (D) Increase in the size of the environment with an increase in predation

**End of Part I**

**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 two organelles that are affected to cause this. Explain. (2 marks)

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

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c) If you were diagnosed with Hodgkin's disease. What would be your preferred treatment? Give one reason why? (2 marks)

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77a) Give two reasons why there are more species of bees on the Earth than there are species of earthworm? (2 marks)

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b) A student discovers an organism with the following characteristics: autotrophic, microscopic, asexual reproduction, and prokaryotic. Has the student discovered a new life form? Give two reasons to support your answer. (2 marks)

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c) A birth defect causes a hole in the septum of the heart. What vertebrate class does this affect and give two consequences of this defect? (3 marks)

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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)

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

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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)

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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)

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

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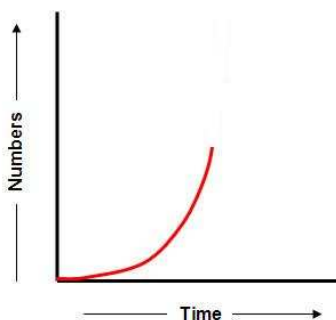
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b) A population of mice is introduced to a new environment and the population growth for the first five years is shown in the graph. Predict the population change of the mice by continuing the graph. Justify your answer (2 marks)



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