OTTAWA CATHOLIC SCHOOL BOARD

St. Nicholas Adult High School

Biology College Preparation

SBI3C - Final

(Sample Exam)

Length of Exam: 2 hours

Name: _____

Teacher: _____

Date: _____

General Instructions

1. Look through the **entire** exam before proceeding. The exam consists of **11 pages**, including this one. Make sure you have all of them. Also, ensure you have the correct exam (course and midterm vs. final)
2. A non-programmable calculator is permitted; however, no sharing of calculators is allowed.
3. Multiple choice questions are to be answered directly on the exam. Circle only one answer per question.
4. Short answer questions can be answered directly on the exam or on the paper provided.

Good Luck!

Multiple Choice (K/U)	_____/**26 Marks**
Diagrams (K/U)	_____/**13 Marks**
Short Answers (T/I, A)	_____/**63 Marks**
TOTAL	_____/**102 Marks**

PART A: Multiple Choice (26 marks – each question is worth 1 mark)

1. **Which of the following is *not* a polysaccharide?**
    a. Starch
    b. Glucose
    c. Glycogen
    d. Cellulose

2. **ATP is an example of a:**
    a. carbohydrate
    b. enzyme
    c. protein
    d. nucleic acid

3. **These are chemicals produced by the body to help speed up digestion.**
    a. Mucus
    b. Bolus
    c. Chime
    d. Enzymes

4. **The movement of large molecules *out* of the cell occurs by:**
    a. endocytosis
    b. exocytosis
    c. osmosis
    d. pinocytosis

5. **Which of the following is *not* one of the kingdoms used to classify organisms?**
    a. Protista
    b. Plantae
    c. Viruses
    d. Fungi

6. **The bacteria that causes sore throats is called *Streptococcus bacilli*. The shape of this bacteria is:**
    a. spherical
    b. rod
    c. spiral
    d. none of the above

7. **The two kingdoms whose organisms can undergo photosynthesis are:**
    a. Plantae and Protista
    b. Plantae and Fungi
    c. Fungi and Bacteria
    d. Protista and Animalia

8. **An organism found in the class aquarium has these characteristics: unicellular, eukaryote, reproduces by binary fission, has a whip-like tail, and makes its own food through photosynthesis. What organism do these characteristic describe?**
    a. Bacteria
    b. Protist
    c. Plant
    d. Fungi

9. Which cells in your body underwent meiosis?
   a. Skin cells
   b. Sex cells
   c. Blood cells
   d. Any body cell can undergo meiosis

10. Which is a result of meiosis?
   a. Chromosome number is reduced by one-half.
   b. New combinations of genetic information are produced when crossing over occurs.
   c. Genetic variation is maintained within a species.
   d. All of the above

11. Which of the following is *not* considered to be an environmental mutagenic agent?
   a. Radiation from x-rays
   b. Air Pollutants
   c. Pesticides
   d. Vitamins

12. Humans possess:
   a. 22 chromosome pairs and 1 pair of sex chromosomes.
   b. 22 sex chromosomes and 1 pair of non-sex chromosomes.
   c. 23 pairs of autosomes.
   d. equal numbers of sex chromosomes and non-sex-chromosomes.

13. This is the term used to describe the characteristics of an individual.
   a. Genotype
   b. Phenotype
   c. Heterozygous
   d. Homozygous

14. Which is the correct order of food passage through the digestive system?
   a. Small intestine, rectum, large intestine
   b. Large intestine, small intestine, rectum
   c. Small intestine, large intestine, rectum
   d. Stomach, pancreas, liver, small intestine

15. The structure that stops food from going into the lungs is the:
   a. Epiglottis
   b. Tongue
   c. Sphincter
   d. Rectum

16. The functional unit of the kidney is the:
   a. Urethra
   b. Urea
   c. Bladder
   d. Nephron

17. The body uses numerous processes to maintain a steady internal balance. This is called:
   a. Metabolism
   b. Homeostasis
   c. Reflex
   d. Circulation

18. Blood returns to the heart by:
   a. a vein
   b. a venule
   c. capillary
   d. an artery

19. Peristalsis is a(n)
   a. involuntary muscle contraction regulating pH.
   b. involuntary muscle contraction which pushes materials through hollow organs.
   c. voluntary muscle contraction regulating digestion.
   d. voluntary muscle contraction resulting in the elimination of undigested food stuff.

20. The volume of gas inspired or expired in a normal unforced breath is the:
   a. Inspiratory reserve volume
   b. Expiratory reserve volume
   c. Vital capacity
   d. Tidal volume

21. Vascular tissues include:
   a. Phloem and stem cells
   b. Phloem and meristem cells
   c. Xylem and guard cells
   d. Xylem and phloem cells

22. Plants are important because they:
   a. are a major source of food.
   b. provide oxygen.
   c. absorb carbon dioxide.
   d. All of the above

23. These are specialized reproductive structures that are protected by a thick outer coating and contain a food supply
   a. Seeds
   b. Pollen
   c. Eggs
   d. Spores

24. Which of the following is in order of increasing complexity?
   a. Organism, community, ecosystem, biosphere, population
   b. Organism, population, community, ecosystem, biosphere
   c. Biosphere, ecosystem, population, community, organism
   d. Population, organism, biosphere, community, ecosystem

25. A heterotroph is an organism that:
   a. is self-feeding.
   b. feeds off others.
   c. shows great genetic variety within its species.
   d. None of the above

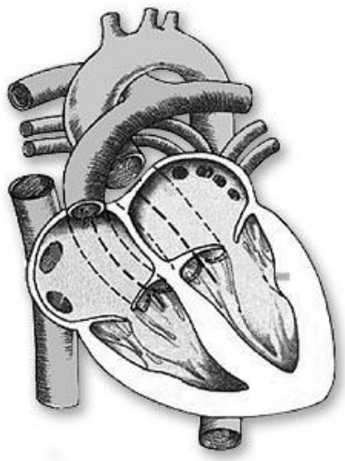
26. The part of a plant that demonstrates positive geotropism is the:
   a. Leaf
   b. Stem
   c. Seed
   d. Root

Part B: Diagrams [13 marks – Label the following diagrams]

Circulatory System – Heart [5 marks]

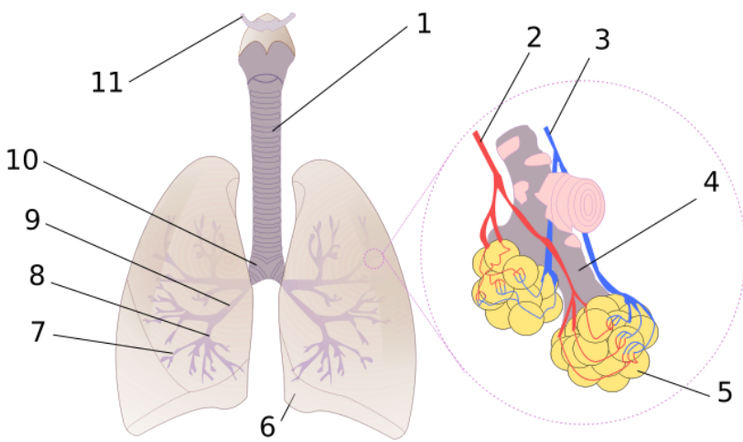
pulmonary artery septum superior vena cava

pulmonary vein inferior vena cava



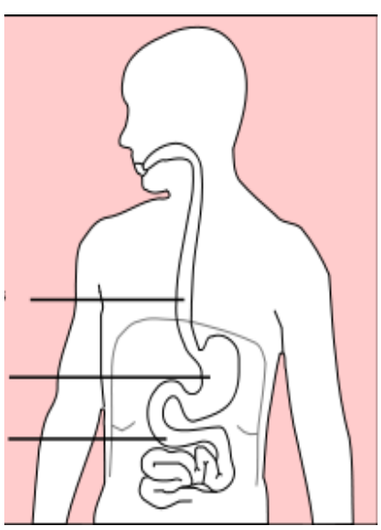
Respiratory System [5 marks]

trachea alveoli bronchiole capillary bronchus



Digestive System [3 marks]

esophagus stomach small intestine



Part C: Short Answers [marks]

1. Complete the following table comparing cellular respiration and photosynthesis. [6 marks].

	Photosynthesis	**Cell Respiration**
Organelle where the reactions occur		
Reactants (starting materials)		
Products (final chemical compounds)		

2. Complete the following table comparing the various forms of cellular transport. [4 marks]

Pairs of Terms	**Similarities (How are they related?)**	**Differences (How do they differ?)**
osmosis & diffusion		
pinocytosis & phagocytosis		

3. Complete the following table by comparing the biochemical molecules below. [3 marks]

Molecule	**Major Function(s) in the Body**
Carbohydrates	
Lipids	
Proteins	

4. Why do muscle cells contain more mitochondria than skin cells? [2 marks]

5. a) What is the function of cell membranes? [1 mark]

b.) Which part of a cell membrane, the lipid or the protein, changes shape to let certain molecules move through it? [1 mark]

6. List two characteristics common to all microorganisms. [2 marks]

8. Are viruses living or dead? Explain your answer. [2 marks]

9. Read the passage and answer the questions that follow:

On May 12, 2000, heavy rains washed *E. coli* bacteria from cattle manure into well water near the town of Walkerton Ontario. Walkerton is a small farming community of 5,000 residents about 145 km west of Toronto. Within 10 days, hundreds of residents had symptoms of *E. coli* poisoning: vomiting, cramps, bloody diarrhea and fever. By May 22, the first death linked to this bacteria was reported. In the end, seven people died (6 adults, 1 baby), Government testing of the water confirmed that it was contaminated with the deadly strain of *E. coli*. There are hundreds of different forms of this bacteria, most are harmless and some even live normally in human intestines. The deadly form secretes toxins that are poisonous to humans. A health person's immune system can fight off the bacteria however young children and those ill or elderly may become deathly ill. The toxin destroys a person's red blood cells and causes kidney failure, seizures or a stroke. Besides manure another major source of this bacteria is undercooked ground beef. This is because the deadly bacteria lives in the intestines of cattle and when they are killed for food the bacteria can get mixed with the beef as it is ground up.

a. What are the symptoms of *E. coli* poisoning? [2 marks]

b. Who is at the most risk of becoming ill from this bacteria? [2 mark]

c. How does the bacteria affect humans and cause disease? [2 mark]

10. In guinea pigs, black fur colour is dominant over white fur colour. If a heterozygous black male is crossed with a white female, what are the possible genotypes and phenotypes of the offspring? **Show all your work.** [4 marks]

11. Think about the food you ate today. Some, if not all, of the food contained genetically altered ingredients; perhaps the cereal or fruit you ate? Do you think the Canadian government should force food producers to label their products as genetically altered? What effect do you think this would have on what you buy and eat? [4 marks]

12. Which parent determines the sex of the baby? [1 mark]

13. If a couple has three children, all girls, what is the probability that the next child will be another girl? Explain. [2 marks]

14. Explain why mutations in gametes (sex cells) are more serious than those in somatic (body) cells. [2 marks]

15. Explain how cholesterol and a diet high in saturated fats can lead to circulatory problems, like hardening of the arteries or a stroke. [4 marks]

16. Complete the following table: [3 marks]

Nutrient	**Location of Chemical Digestion**
Proteins	
Carbohydrates	
Lipids	

17. Describe the mechanisms the body uses when exhaling and inhaling. Include the names of the muscles involved. [3 marks]

18. If a gallbladder is removed, what kind of dietary changes would a person need to make? Why? (3 marks)

19. Complete the following table. [6 marks]

Adaptations of Plants

	Natural Environment (wet, moderate or dry)	**Structural Features Common to These Plants**
Hydrophytes		
Xerophytes		
Mesophytes		

20. Complete the following table. [4 marks]

Vascular Tissues

	Xylem	**Phloem**
Material moved or transported		
Forces involved in the movement		