

# **BIOLOGY III 2001-2002**

## **SECTION A**

### **ANSWER 001**

Materials for the survival of the cells:

- Water.
- Amino acids
- Glucose (Carbohydrates)
- Enzymes.
- Vitamins.
- Mineral salts.
- Lipids

### **ANSWER 002**

a) Characteristics possessed by both plants and animals :

- Respiration
- Nucleic acids ( DNA,RNA)

b) Characteristics possessed by plants only :

- Presence of plasts
- Presence of cellulose cell wall.
- Cells with regular shapes.

### **ANSWER 003**

A motor car can move, respire(gives out  $\text{CO}_2$  and takes in  $\text{O}_2$ ) But it can not reproduce and grow. Therefore it can not be qualified as a living organism.

### **ANSWER 004**

Obtention of  $\text{O}_2$  by roots and leaves:

Roots and leaves obtain oxygen ( $\text{O}_2$ ) by the phenomenon of diffusion:

Xylem by roots and stomata for leaves.

## ANSWER 005

- a) Respiration takes place (occurs) in mitochondria.
- b) The importance of respiration is to give energy.
- c) The products of respiration are water (  $H_2O$ ) and carbon oxide(  $CO_2$ ).

## ANSWER 006

a)

LIFE PROCESS	MEANING
Reproduction	Producing fertile offspring
Growth	Getting larger or more developed
Movement	Changing the position of a part or all of the body
Sensibility	Responding to the environment

- b) Decreasing order of parts of an organism:  
System→Organ →Tissue→ Cell Chromosome →Gene.

## ANSWER 007

Adaptation of a dicotyledonous leaf to its function:

- Development of many ribs
- Extension of leaves.

## ANSWER 008

**a) The requirements of photosynthesis are:**

- Water (  $H_2O$ ).
- Carbon dioxide (  $CO_2$ ).
- Light energy.
- Chlorophyll.

**b)**

- Water: from soil by osmosis.
- Carbon dioxide: from the atmosphere by respiration.
- Energy: from sunshine.

--Chlorophyll: from chloroplast of green leaves.

### **ANSWER 009**

Importance to bacteria to man:

**-Fertilization** of soil during decomposition of organic matter into humus or during fixation of atmospheric nitrogen ( $N_2$ ) in the soil.

**-Fermentation** (in industries: milk, alcohols).

### **ANSWER 010**

- a) Arrows indicating direction of blood flow through the heart
- b) The function of Atrio-ventricular valves (A and B ) is to prevent back flow of blood in the atria when they contract.
- c) Ventricles have thicker muscular walls than atria because ventricles must contract with a strong force (pressure) in order to push blood towards different parts of the body and in long distance.

### **ANSWER 011**

a) Parts of nerve cell (motor neuron):

A: Cell membrane

B: Cytoplasm

C: Nucleus

- b) The function of part X is to receive the nervous impulse.
- c) The direction of a nerve impulse: from cell body to axon.

### **ANSWER 012**

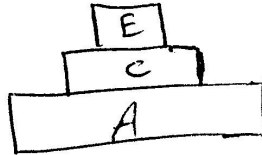
a) Given a simple food web above:

i) Herbivore is B or C.

ii) Omnivore is none.

iii) A producer is A.

- b) i) In a food web, an animal gets energy from the food it eats.  
Therefore, A gets energy from sunlight.  
ii) The pyramid of energy for the food web:



### ANSWER 013

Sex determining chromosomes are X and Y.

a) Punnett square.

	X PARENT 1 X	
X PARENT 2	XX	XX
Y	XY	XY

- b) The PARENT 1 is the mother.  
c) The chances of getting a baby boy is :2:2 → 50% (2:4 = 1/2)

### ANSWER 014

Given a human skeleton (endoskeleton)

- a) i) Structure A: Sternum.  
B: Ribs  
ii) The function C is to protect the brain.

- b) Animals with exoskeleton include:  
Flies, crab, spider, sea anemones and other arthropods.
- c) Bones and muscles in human arm
- i) When muscles X (biceps) contracts, there is :  
-Compression front-arm.  
-Extension of front-arm.

## **SECTION B**

### **ANSWER 015**

- a) Diseases caused by bacteria include;  
Tuberculosis (TB), cholera, gonorrhoea, bacterial dysentery, pneumonia, meningitis.
- b) Prevention of bacterial diseases: \*
- Destroying habitat of vector.
  - Personal hygiene (body hygiene).
    - ❖ Installation of sanitary system (sanitation)
    - ❖ To clear the environment
    - ❖ Wash hands before and after meal.
    - ❖ Drink boiled water.
    - ❖ Avoid contaminating rivers and other water bodies.
  - Avoid coughing in people and near the food.
  - Take medicines to avoid infection.
  - Giving care to infected persons.
  - Isolate infected persons.
  - Utilization of antibiotics to kill bacteria.
  - Sterilization.

## ANSWER 016

Vegetative reproduction differs from sexual reproduction as follows:

VEGETATIVE REPRODUCTION (Asexual)	SEXUAL REPRODUCTION
Only one parent is implied.	Two parents are implied.
No production of gametes	Production of gametes
Absence of meiosis.	Presence of meiosis to avoid doubling of chromosomes.
Identical descendents.	Non -identical descendents.
Ordinary found in less differentiated plants than in animals.	In majority of plants and animals.
Produce more rapidly to a large number of descendents.	Less rapid in numeric growth.

## ANSWER 017

- a) **\*Digestion:** Physical and chemical process where nutritive substances (macromolecules) which are insoluble are transformed in small simple units which are soluble that can be absorbed.
- \*Absorption** is diffusion of simple nutritive substances in blood vessels.
- \*Assimilation** is a process of utilization products of digestion.
- \*Ejection** is elimination of non-digestion food to anus.
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- b) -Digestion takes place in alimentary canal.
    - Absorption takes place in small intestine.
    - Assimilation takes place in cells.
    - Ejection is done by anus.
  - c) The food must be digested before it can be used in order to reduce or to breakdown large molecules into small molecules that can be absorbed.

### **ANSWER 018**

Experiment of osmosis.

- a) Change: -In tube 1:
  - The volume of 20% sucrose solution will increase.-In tube 2:
  - The volume of distilled water will decrease.

### **Explanations:**

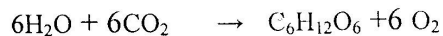
\*20% of the solution contains more molecules of sucrose than in 5% of the solution, but this solution has more water than in 20 % of the solution of sucrose. This is why water molecules will move from tube 1 by osmosis thus increasing the volume of tube 1.

\*The tube 2 will loose some molecules of its water moving towards the sucrose solution of 5% .The tube 2 has more molecules of water than sucrose solution in the beaker. Water molecules move by osmosis.

- b) In living things, osmosis is used in:
  - Absorption of digested food from small intestine to blood vessels.
  - \*Absorption of water and mineral salts by root system.
  - \*Entrance of water in vacuoles of plant cells.

## ANSWER 019

- a) i) The type of energy needed by photosynthesis is solar energy (energy from sun).  
ii) The substance that absorbs this energy is chlorophyll.  
iii) Photosynthesis takes place in chloroplast of the plant cell.



- b) The rate of photosynthesis can be speeded by:  
-Increasing intensity of light.  
-Provision of more water.  
Increase concentration of carbon dioxide.  
-Change the wavelength of light.

## SECTION C

### ANSWER 020

- a) i) Reasons for gathering of water in the hollowed portion of potato B:  
\* The sap of potato B exerts an osmotic pressure on the water and absorbs (attracts) water from the beaker.  
\* The sugar present in the hollowed portion of the potato forms a more concentrated solution compared to potato cells with more dissolved molecules. It exerts an osmotic pressure on the potato cells and attracts water from the potato with the hollowed portion (cavity).

**Direction of water movement:**

**Beaker → Potato B → Portion of hollowed potato**



ii) No gathering of water in the hollowed portion of potato A and C because:

- The cells of the potato A have equal concentrations.
- Water does not enter in C because it is boiled; the heat killed the cells of C: therefore no osmosis.

iv) Reason for presence of Potato A in this experiment is a control experiment.

- b) i) These pigs belong to class Mammalia  
ii) Red river hog belongs to family Suidae  
iii) The bearded pig belongs to genus Sus.  
iv) The species name of Bush pig is *Potamochoerus Larvatus*.