

**ADVANCED LEVEL NATIONAL EXAMINATIONS 2010:**

**BIOLOGY II**

**SECTION A**

**ANSWER 001**

a)The bond that links amino acids together in a chain is called peptidic bond.

b)Amino acid is described as being amphoteric because it contains an amino group which is basic and group which is acidic.

**ANSWER 002 °**

Kingdom	Animalia
Phylum	Arthropoda
Class	Insecta
Order	Coleoptera
Family	Coccinellidae
Genus	Adalia or Adalis
Species	Bipuncta or Adalia bipuncta

**ANSWER 003**

Water will move from outside to inside of Amoeba .The contractile vacuole will swell and intervene to establish equilibrium.

**ANSWER 004**

- a) Palisade mesophyll cells have chloroplasts which contains chlorophyll pigments used in photosynthesis (control a process of photosynthesis).
- b) Xylem: Is a continuous tube with side holes. The tube is made of walls strengthened with bordered pits that conduct water.
- c) Air space in spongy mesophyll: The air spaces are continuous with the outside to allow movement of air in and out of the leaf. This allows the cells to receive carbon dioxide for photosynthesis.
- d) Guard cells: They are made of cell walls with uneven thickenings. This enables the formation of stomata when they become turgid. Stomata allows gaseous exchange also guard cells contain chloroplasts. (Transport the product of photosynthesis).

**ANSWER 005**

System	Main organ in the system	Main function of the system
Circulatory system	Heart, blood vessels, lymphatic vessels	-Defense. -Transport of gases and nutrients
Lymphatic system	Lymph nodes and vessels	-Defense. -Produce antibodies. -Transport white blood cells. -Protect against diseases.
Excretory system	Kidney, lungs, liver, bladder, ureter, urethra	-Remove waste products. -Osmoregulation.
Reproductive system	Ovary, testis, uterus, penis, Vagina oviducts	Produce offspring

**ANSWER 006**

Round: R      Wrinkle : r , Yellow : Y ,   green : y

Parents:    Phen: round and green x wrinkle yellow

Gen :RRyy                                  rryy

Gametes: Ry                                  ry

F1 :RrYy

Test cross:

Parent :RrYy    X    RRyy

Gametes:Ry ,Ry,rY ,Ry    X    Ry

	RY	Ry	rY	ry
Ry	RRYy	RRyy	RrYy	Rryy

2 round and yellow

2 round and green

Or

Parents: RrYy x rrYY

Gametes: RY,Ry,Ry,rY,ry

	RY	Ry	rY	ry
ry	RrYy	Rryy	rrYy	rryy

**ANSWER 007**

- a) i) The cell labeled X: is a zygote (egg, ovum cell).  
 ii) They are identical twins because both originate from the same zygote or egg fertilized by same sperm.
- b) The function of:
- i) Umbilical arteries: Carry deoxygenated blood and waste products.  
 ii) Umbilical veins: They carry oxygenated blood and nutrients or transports of blood.

**ANSWER 008**

- a) i) The induced fit model : It explains that the structure of active is not complementary to the structure of the substrate .  
 The substrate induces the structure of the active site to be complementary to that of the substrate.
- ii) Competitive inhibition: It is the type of inhibition which the inhibitor competes for the active site of substrate because they have similar structure.
- iii) Lock and key hypothesis: The structure of the active site is complementary that of the substrate structure.

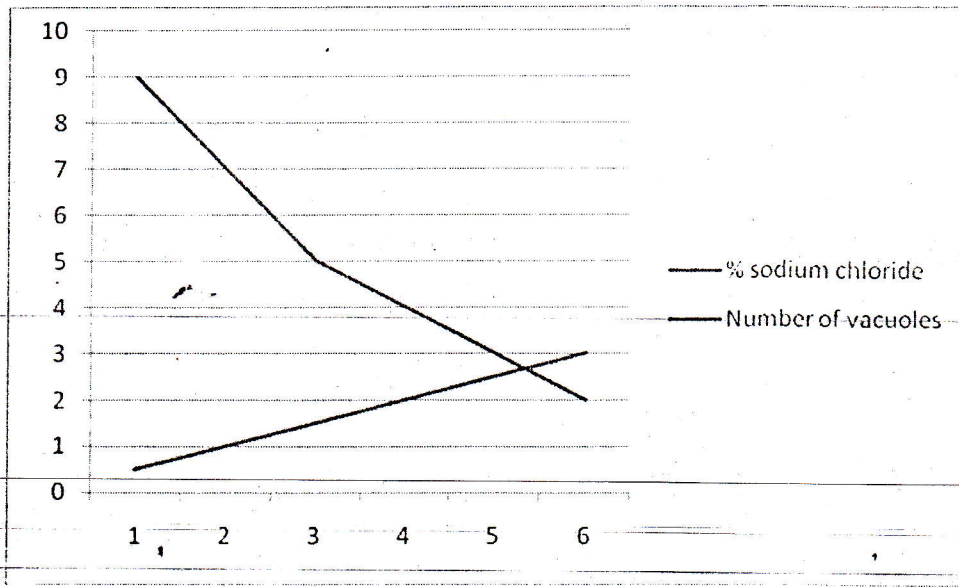
**ANSWER 009**

- a) A: Photosystem II  
 B: Photosystem I
- b) Photolysis or water decomposition by light.
- c) ATP, NADPH<sub>2</sub>, Oxygen, NADPH, H<sup>+</sup>

## ANSWER 010

a)

% sodium chloride	0.5	1.0	1.5	2.0	2.5	3.0
Number of vacuoles	9	7	5	4	3	2



b) The number of contractile vacuole in 0.5 were many because more water enters. In 2.5 % NaCl, the number of vacuole decrease because there is a little water formed.

c) In 5% NaCl solution, vacuole formed stopped because the value of water potential in the cytoplasm is the same as that of NaCl solution. Therefore, amoeba did not die. Also it may have been a cyst.

**ANSWER 011**

a) The cell is adapted to absorb material from the tubule by having mitochondria that produce energy needed in active transport. Also the membrane is folded to form microvilli that increase the surface area for absorption has their membrane.

b) Glucose is removed by active transport while water is removed by diffusion and osmosis. Glucose is removed by passive diffusion.

**ANSWER 012**

a) Dark : D Albino: d ,long hair: h ,Short hair : H  
Parents: dark and short hair X albinos and long hair.

Genotypes : DDHH X ddhh

Gametes : DH X dh

F1: DdHh(100% Dark short hair ).

Parents 2 : Dark short hair X Dark short hair .

Genotypes : DdHh X DdHh .

F1 X F2:

	DH	Dh	dH	dh
DH	DDHH	DDHh	DdHH	DdHh
Dh	DDHh	DDhh	DdHh	Ddhh
dH	DdHH	DdHh	ddHH	ddHh
dh	DdHh	Ddhh	ddHh	ddhh

- Dark short: 9/16
- Dark long: 3/16
- Albinos short: 3/16
- Albinos long: 1/16
- Phenotypic ratio: 9:3:3:1

### ANSWER 013

The pancreas is both an exocrine and endocrine gland. So it produces digestive enzymes that are carried by the pancreatic duct into the duodenum.

So, digestive enzymes do not reach the duodenum and digestion fails. However, hormones (insulines and glucagon) responsible for balancing blood glucose are not affected.

### ANSWER 014

Tapeworm has:

a) No digestive system because it absorb only digested food which requires no digestion. Skin is permeable to nutrients.

b) No means of locomotion: It does not need to look for food and sex male.

It is fixed. It is transported in faeces. It is hermaphrodites.

c) Reduced nervous system: Movement are limited and has no signs organs.

Loose proglottids reduce nervous system. It is a primitive animal.

## ANSWER 015

Vaccination can be used to make a person immune to the influenza. When particles of influenza virus are introduced into weakened body, these particles act as antigens that stimulate the immune system to produce a lot of T and B lymphocytes. The B lymphocytes produce antibodies and memory cells.

Memory cells make a person immune to the influenza.

## SECTION B

### ANSWER 016

a) Difference between osmosis and diffusion:

For osmosis, there is semi-permeable membrane.

For diffusion, no semi-permeable membrane needed.

b) i) The potato strips increased in a liquid which are 0% (water) and 5% water moved into the potato strip by osmosis.

ii) The potato strips decrease in mass in the liquids: 10%, 15% and 20% because water moved out of the potato to the sucrose solution.

iii) If potato strips were smaller, the activities would increase because the surface area: volume ratio is increased i.e. the distance from outside to inside is shorter.

iv) If potato strips had been boiled, there would be no activity as osmosis cannot take place, this is because boiling destroys the plasma membrane and it fails to act as a semi-permeable membrane.



## ANSWER 017

Mitosis cell division take place through the following stages:

Stages of mitosis	Characteristic events.
Interphase	<ul style="list-style-type: none"> <li>▪ Centrioles duplicates and drift to opposites poles.</li> <li>▪ Chromosomes disappear and replaced by chromatides.</li> </ul>
Prophase	<ul style="list-style-type: none"> <li>▪ Chromosomes appear as thread like structures is called chromatids.</li> <li>▪ Centriole produce spindle fibbers.</li> <li>▪ Spindle fibbers tear down the nuclear membrane.</li> <li>▪ Spindle</li> <li>▪ Nucleatus disappear.</li> <li>▪ Spindle fibbers get attached to centromere.</li> </ul>
Metaphase	<ul style="list-style-type: none"> <li>▪ Homologous chromatids come together.</li> <li>▪ Sister chromatids move to the equater.</li> </ul>
Anaphase	<ul style="list-style-type: none"> <li>▪ Sister chromatids separatids.</li> <li>▪ Sister chromatids move to opposites poles.</li> </ul>
Telophase	<ul style="list-style-type: none"> <li>▪ Spindle fibbers disappear.</li> <li>▪ Nuclear membrane reappears.</li> <li>▪ Cytokinesis starts from outside in animal cells and from inside in plant cells.</li> <li>▪ Two daughter cells are formed which are identical.</li> </ul>

## ANSWER 019

a) Three ways in which smoking damages the lung are:

- For coats the alveoli and reduces diffusion.
- For increase mucus production that blocks air passages.
- For contains carcinogens that can cause cancer in lung cells.
- Lung becomes black.

c) The percentage increase in the annual number of deaths from lung cancer between 1940 and 1950:

1940: 50 deaths ( $I_1$ )

1950: 125 deaths ( $I_2$ )

$$\frac{(125-50) \times 100}{50} = \frac{75 \times 100}{50} = 150\%$$

$$\text{Formula} = \frac{(I_2 - I_1) \times 100}{I_1}$$

d) i) Tuberculosis cases decreased because of:

- Increase science and technology knowledge that helped to understand the disease more.
- Increased effective drugs.
- More awareness as more teacher are taught about T.B.
- More control at border and airports.

ii) Lung cancer cases increased because:

- Increased urbanization as lifestyle of people change.
- Increased production of tobacco due to increased science and technology.
- Production of cheap cigarettes.
- Ignorance about changes tobacco smoking.

**ANSWER 020**

The role of mammalian liver:

a) Protein metabolism:

-Liver protein are metabolized in liver in a process called desamination and transamination .

During desamination, the amino group is removed from the amino-acid and turned into urea in orithrine cycle.

When there is a deficiency of protein in the body, the liver manufactures amino-acid from carbohydrates and lipids – formation of amino-acids is done in transamination process .

-Destruction of hormones.

b) The role of mammalian liver in carbohydrates metabolism:

-Excess blood glucose triggers production of insulin hormone that stimulates the liver to absorb and convert excess blood glucose.

-Liver cells converts excess glucose to lipids and proteins.

-It also converts lactic acid to pyruvic acid for aerobic respiration.

Low concentration of blood glucose stimulates the pancreas to produce hormone called glucagon.

