

**THE UNITED REPUBLIC OF TANZANIA  
NATIONAL EXAMINATIONS COUNCIL  
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION**

**033/1**

**BIOLOGY 1**

(For Both School and Private Candidates)

**Time: 3 Hours**

**Wednesday, 07<sup>th</sup> November 2018 a.m.**

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**Instructions**

1. This paper consists of sections A, B and C with a total of **thirteen (13)** questions.
2. Answer **all** questions in sections A and B and **one (1)** question from section C.
3. Except for diagrams that must be drawn in pencil, all writing should be in blue or black ink.
4. Calculators, cellular phones and any unauthorised materials are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).

## SECTION A (20 Marks)

Answer **all** questions in this section.

1. For each of the items (i) - (x), choose the correct answer among the given alternatives and write its letter beside the item number in the answer booklet provided.

- (i) Mitosis normally takes place in  
A reproductive cells B animal cells only C blood plasma  
D plant cells only E somatic cells.
- (ii) Which of the following is the symptom of the disease caused by lack of protein in children?  
A Anemia B Swollen head C Breeding  
D Pale and thin hair E Sneezing.
- (iii) How many gametes are produced from one cell during meiosis?  
A Eight B Two C Four D Six E Ten.
- (iv) Which of the following is the excretory organ in humans?  
A Mouth B Kidney C Pancreas D Stomach E Anus.
- (v) Which of the following hormones stimulates seed germination in plants?  
A Gibberellins B Auxin C Cytokinins  
D Abscisic acid E Ethene.
- (vi) A joint which allows rotation in all planes is called  
A suture B ball and socket C pivot D ligament E hinge.
- (vii) In which environmental condition the loss of water vapour from plants is mostly favourable?  
A Hot and Windy day B A saturated atmosphere  
C Cool and dry atmosphere D Windy day  
E Hot day.
- (viii) The function of the bright coloured petals in flowers is  
A to store nectarines B to hold sepals in position  
C to produce colour of the flower D to receive pollen grain  
E to attract insects for pollination.
- (ix) The function of hydrochloric acid in food testing experiments is  
A to decolourise food sample B to test reducing sugar C to oxidize the food sample  
D to neutralize sugary foods E to hydrolyze complex to simple sugar.

- (x) The interaction between two species in which both organisms benefit is known as  
 A ectoparasite B parasitism C commensalism D mutualism  
 E endoparasite.

i	ii	iii	iv	v	vi	vii	viii	ix	x
E	D	C	B	A	B	A	E	E	D

2. Match the phrases in **List A** with the responses in **List B** by writing the letter of the correct response from **List B** beside the item number of **List A** in your answer booklet provided.

LIST A	LIST B
<p>(i) Larvae released in water by snails before infecting human and cause the disease.</p> <p>(ii) A pandemic disease caused by virus and has no cure to the moment.</p> <p>(iii) An endemic disease characterized by periodic fever, vomiting and joint pain and sometimes death.</p> <p>(iv) A disease caused by deficiency of carbohydrates in humans.</p> <p>(v) A deficiency disease caused by lack of vitamin C.</p> <p>(vi) An epidemic disease diagnosed by the extreme fluid loss and diarrhea looking like ‘rice water’.</p> <p>(vii) An air bone disease diagnosed by prolonged coughing and sputum contain blood.</p> <p>(viii) Malnutrition disorder identified by swellings of stomach, thin limbs, thin and pale hairs in children.</p> <p>(ix) A disorder characterized by failure of blood clotting.</p> <p>(x) A sexually transmitted disease which shows painless sore in various parts of the body.</p>	<p>A Cholera</p> <p>B Typhoid</p> <p>C AIDS</p> <p>D Malaria</p> <p>E Syphilis</p> <p>F Kwashiorkor</p> <p>G Scurvy</p> <p>H Common cold</p> <p>I Pneumonia</p> <p>J Hemophilia</p> <p>K Sickle cell anemia</p> <p>L Tuberculosis</p> <p>M Schistosoma</p> <p>N Marasmus</p> <p>O Measles</p>

i	ii	iii	iv	v	vi	vii	viii	ix	x
M	C	D	N	G	A	L	F	J	E

## **SECTION B (60 Marks)**

Answer **all** questions in this section.

All questions carry **8 marks** except question three (3) and seven (7) which carry **6 marks** each.

3. (a) Differentiate the term “Biological apparatus” from “Biology Laboratory”.

Biological apparatus are tools and equipment found in Laboratory, used for Biological experiments, WHILE Biology laboratory is the special room where biological experiments are done.

- (b) Briefly explain why the following substances are dangerous?
- (i) Toxic substances
  - (ii) Highly flammable
  - (iii) Corrosive substances
  - (vi). Radioactive substances.

### **ANSWERS**

- (i) is a chemical substance which can poison you and can cause death.
- (ii) is the substance which can catch fire easily .
- (iii) is a chemical substance which can burn the skin.
- (iv) is a chemical substance which emits dangerous radiations that can endanger the life.

4. (a) Give the meaning of the following terms as used in Biology:

- (i) Blood transfusion.

Blood transfusion is the process of infusion of blood to a person who lack it.

- (ii) Blood compatibility.

Blood compatibility is the ability of the blood from different person to mix with that of the other without clamping of red blood cells.

- (b) (i) State two advantages of blood transfusion.

- it serves life to a person who got accident and lose some blood.
- it serves life to the people with genetic disorders like anaemia.

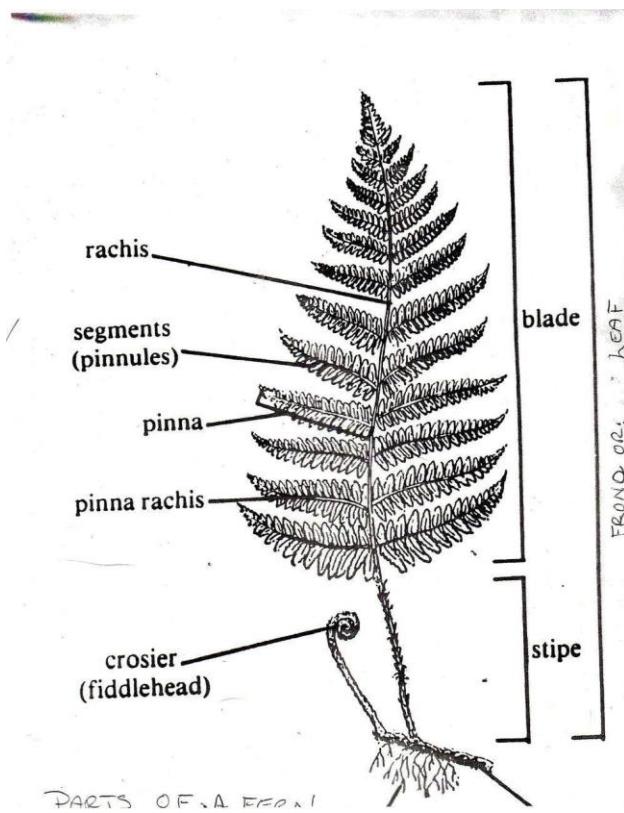
(ii) Outline four precautions to be taken during blood transfusion.

- to check the blood group.
- blood must be screened.
- blood from veins.

5. (a) Explain the distinctive features of the Division Filicinophyta.

- leaves are divided into leaflets.
- they use spores for reproduction.
- they have true vascular bundles.
- they are very short.
- spores are produced underside of the leaf.

(b) Draw a well labeled diagram of a fern plant.



6. (a) Describe the stages of human post-natal growth and development.

- The neonatal period extends from birth to one month. Infancy begins at one month and continues to two years of age.
- Childhood begins at two years of age and lasts until adolescence.
- Adolescence begins at around 12 or 13 years of age and ends with the beginning of adulthood.
- Adulthood, or maturity, includes the years between ages 18 to 25 and old age.
- Old age.

- (b) What do you understand by the term “Primary growth” in plants?
- Primary growth is the type of growth that leads to increase of roots and shoot apices.

7. (a) Briefly explain the process of menstruation in human beings.

Each month during the years between puberty and menopause, a woman's body goes through a number of changes to get it ready for a possible pregnancy. This series of hormone-driven events is called the menstrual cycle.

During each menstrual cycle, an egg develops and is released from the ovaries. The lining of the uterus builds up. If a pregnancy doesn't happen, the uterine lining sheds during a menstrual period. Then the cycle starts again.

- (b) Mention two types of the common disorders of human reproductive systems.

- prostate cancer
- importence
- cervical cancer.

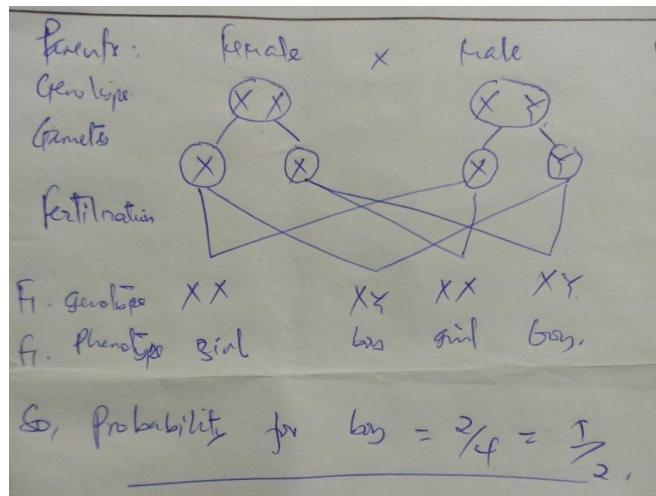
8. (a) List any four macro-elements in plant nutrition.

- magnesium
- potassium
- nitrogen
- oxygen
- sulphur.

- (b) Explain the causes of any three common disorders and diseases of the human digestive system.

- Stomach ulcers, caused by acid accumulation in the stomach leading to corrosion.
- dental carriers, caused by bacteria to damage teeth.

9. (a) A newly married couple expects a baby. Using a genetic cross, work out the probability of their first born child being a boy.



- (b) Give the meaning of the following terminologies as used in genetics:
- Sex linked genes
  - Sex determination
  - Phenotype.

#### ANSWERS

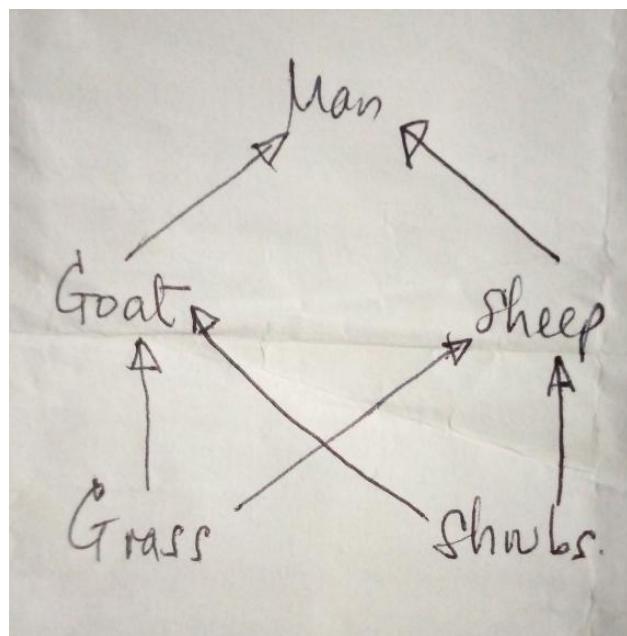
- Sex linked genes are genes that are in the sex chromosomes and that are therefore inherited differently between males and females.
- sex determination are contributing factors that determine sex of a baby.
- Phenotype is the physical appearance of an organism like tall, short, etc

10. (a) Give the meaning of the following Biological terms as used in the ecosystem:
- Biotic components
  - Abiotic components
  - Food chain
  - Food web.

#### ANSWERS

- Abiotic components are the non living components of the ecosystem.
- Food chain is the linear representation of flow of energy.
- food web (or food cycle) is the natural interconnection of food chains and a graphical representation (usually an image) of what-eats-what in an ecological community.

- (b) Construct a feeding relationship which accommodates the following organisms: Grasses, Goat, Sheep, Shrubs and Man.



### SECTION C (20 Marks)

Answer **one (1)** question from this section.

11. Elaborate four causes and five preventive measures of drug abuse.

#### **DRUG ABUSE**

Drug abuse is the use of illegal drugs or the use of prescription or over-the-counter medications in ways other than recommended or intended. It also includes intentional inhalation of household or industrial chemicals for their mind-altering effects.

##### **Causes of drug abuse**

- Depression and Mental Illnesses
- Stress and Inability to Cope
- Low Self-Esteem
- Social Pressures
- Lack of Parent-Child Communication
- prevention of drug abuse

##### **strategies to prevent teen drug abuse**

- Know your teen's activities.
- Pay attention to your teen's whereabouts.

- Find out what adult-supervised activities your teen is interested in and encourage him or her to get involved.
- Establish rules and consequences.
- Explain your family rules, such as leaving a party where drug use occurs and not riding in a car with a driver who's been using drugs. If your teen breaks the rules, consistently enforce consequences.
- Know your teen's friends. If your teen's friends use drugs, your teen might feel pressure to experiment, too.
- Keep track of prescription drugs. Take an inventory of all prescription and over-the-counter medications in your home.
- Provide support. Offer praise and encouragement when your teen succeeds. A strong bond between you and your teen might help prevent your teen from using drugs.
- Set a good example. If you drink, do so in moderation. Use prescription drugs as directed. Don't use illicit drugs.

12. With the aid of a well labelled diagram, describe the urinary system and explain the process of urine formation in human beings.

### **URINE FORMATION**

Urine is a waste byproduct formed from excess water and metabolic waste molecules during the process of renal system filtration. The primary function of the renal system is to regulate blood volume and plasma osmolarity, and waste removal via urine is essentially a convenient way that the body performs many functions using one process.

#### **Urine formation occurs during three processes:**

Filtration  
Reabsorption  
Secretion

#### **Filtration**

During filtration, blood enters the afferent arteriole and flows into the glomerulus where filterable blood components, such as water and nitrogenous waste, will move towards the inside of the glomerulus, and nonfilterable components, such as cells and serum albumins, will exit via the efferent arteriole. These filterable components accumulate in the glomerulus to form the glomerular filtrate.

#### **Reabsorption**

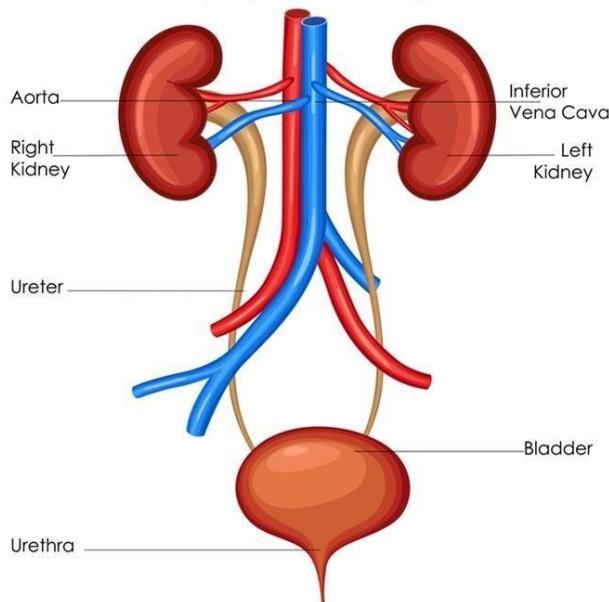
The next step is reabsorption, during which molecules and ions will be reabsorbed into the circulatory system. The fluid passes through the components of the nephron (the proximal/distal convoluted tubules, loop of Henle, the collecting duct) as water and ions are removed as the fluid osmolarity (ion concentration) changes. In the collecting duct, secretion will occur before the fluid leaves the ureter in the form of urine.

#### **Secretion**

During secretion some substances—such as hydrogen ions, creatinine, and drugs—will be removed from the blood through the peritubular capillary network into the collecting duct. The end product of all these processes is urine, which is essentially a collection of substances that has not been reabsorbed during glomerular filtration or tubular reabsorption.

Urine is mainly composed of water that has not been reabsorbed, which is the way in which the body lowers blood volume, by increasing the amount of water that becomes urine instead of becoming reabsorbed. The other main component of urine is urea, a highly soluble molecule composed of ammonia and carbon dioxide, and provides a way for nitrogen (found in ammonia) to be removed from the body. Urine also contains many salts and other waste components. Red blood cells and sugar are not normally found in urine but may indicate glomerulus injury and diabetes mellitus respectively.

Urinary System Diagram



13. Describe four evidences of organic evolution.

### EVIDANCES OF ORGANIC EVOLUTION

#### **Homologous Organs:**

The organs which developed or originated from a common structure but may function differently or attain different shapes for different functions in different groups are called homologous organs. Example: Fore limbs of different vertebrates

#### **Analogous Organs:**

The organs which perform same function in different groups of animals but do not show a common underlying plan of structure are called analogous organs.

Example:

- (i) The wings of bats and wings of insects,
- (ii) Eyes of octopus and that of mammals.

**Explanation:**

(i) The function of wings are same – it helps in flying in both bats and insects. But they do not possess common internal plan and these organs were not evolutionarily developed from the same organ.

(ii) Eyes help in vision in both the organisms i.e., in octopus and mammals, but they had different evolutionary origins since these two structures arose embryonically from two different tissues.

### **Vestigial Organs:**

Organs or structures of organism which appear to be small and functionless at present, but can be shown to be homologous with ancestral organs and structures that were larger and functional at one time are called vestigial organs.

**Example:**

(i) The rudimentary bones of former hind limbs in the whale and snakes (Fig. 4.8).

(ii) Muscles of external ears, reduced tail bones, the appendix of the cecum, rudimentary body hair, etc. are the vestigial organs of man.

**Explanation:**

All the present day vestigial characters were very much functional in the respective organism's ancestors. But the organs became rudimentary in their predecessors.

### **Fossil records.**

Palaeontology, the science of fossils, provides the strongest and direct evidence in support of the theory of organic evolution. Fossils are dead remains of plants and animals preserved in the rocks of the remote past.