Biology CSEE

Past Paper Questions and Answers By Topic

Contents

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4. Cell Structure and Organisation

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Multiple Choice Questions Section A

Form I

Introduction to Biology
Safety in Our Environment
Health and Immunity
Cell Structure and Organisation
Classification of Living Things

Form II
Classification of Living Things
Nutrition
Balance of nature
Transport of Material in Living Things
Gaseous Exchange and Respiration

Form III
Classification of Living Things
Movement
Coordination
Excretion
Regulation
Reproduction

Form IV
Growth
Genetics
Classification of Living Things
Evolution
HIV, AIDS and STIs

Biology Exam Marks per Question	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Q1 Multiple choice questions	10	10	10	10	10	10	10	10	10
Q2 Match phrases with list	10	10	10	10	10	10	10	10	5
Q3 – Q10 answer all	60	60	60	60	60	60	60	60	60
Q11- Q13	20	20	20	20	20	20	20	20	25
Total	100	100	100	100	100	100	100	100	100
Biology Exam Marks per Topic									
1. Introduction to Biology	8	8	6		6	8	8	6	6
2. Safety in Our Environment	8	8	20	8	8	8	8		6
3. Health and Immunity and HIV, AIDS and STIs		20	20	20 + 20	20 + 8	20	10	10	15
4. Cell Structure and Organisation	6								6
5. Classification of Living Things	10		10	20	8	8	20	8	10
6. Nutrition	5	8	8	8	8	8	20	8	6
7. Balance of Nature	8	6				8	8	8	
8. Transport of Material in Living Things	20	6	6	6	20	20	6	8	6
9. Gaseous Exchange and respiration		20	8	8		8	8		6
10. Movement	8	8			20	8	6		5
11. Coordination	20 + 7	20 + 10	8	10	8			20	6
12. Excretion								20	6
13. Regulation				8		20			6
14. Reproduction			20			8	8	6	6
15. Growth		8	8	8	10		20	8	
16. Genetics and Variation		8	8	8	6	10	8	8	10
17. Evolution			8	6				20	

1. Introduction to Biology

2019

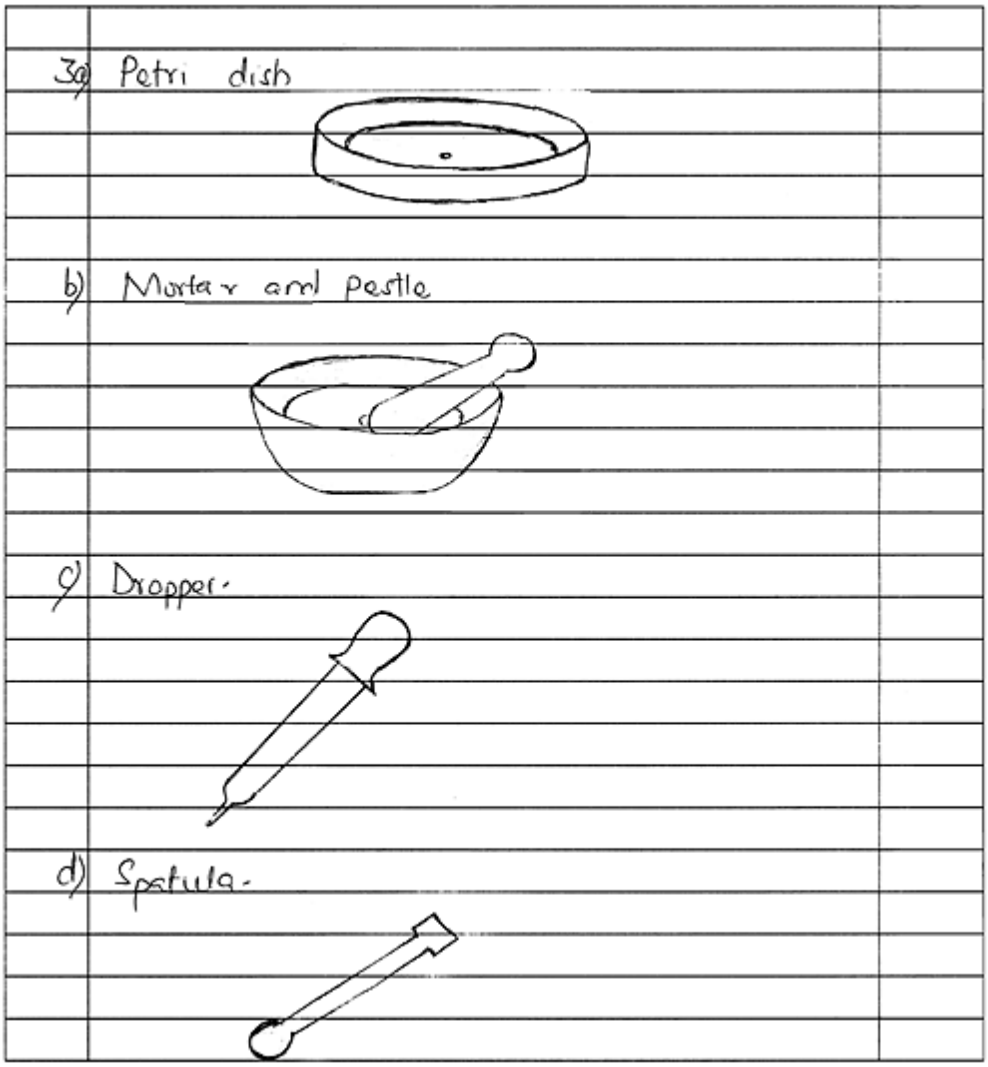
3. In the Biology laboratory there are different apparatuses and equipment used for conducting experiments. Draw the apparatus used for:

   (a) putting specimens for close observation.

   (b) grinding or crushing substances in the laboratory.

   (c) adding liquids during an experiment drop by drop.

   (d) scooping powder or crystalline substances.



The candidates performed well in this question. They correctly identified and drew the required apparatuses. This indicates that, the candidates had adequate knowledge on the topic of Introduction to Biology

2018

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

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

3 a) Biological apparatus are simply referred to as the tools and equipments needed or required inorder to study biology effectively WHILE Biology laboratory is a special room that is well designed and equipped to conduct biological experiments.

i) Toxic substances ; These substances are highly poisonous and can cause death to living things once inhaled or swallowed.

(ii) Highly flammable ; Just as the name suggests, these substances easily catch fire hence causing extreme fire hazards that poses a threat to human beings and causes destruction of properties.

(iii) Corrosive substances ; These substances causes the gradual wear out of substances in contact. They tend to wear out human skin causing excess pain and formation of wounds.

iv) Radioactive substances : These are materials that emit very harmful radiations to the surrounding environment. Such radiations have impacts to human beings including genetic mutation, cancer and wearing out soft tissues within the human body.

2017
8 marks

3. (a) Why schools should have a Biology laboratory? Give a reason.

(b) State six laboratory rules.

3 a) Reason for having biological laboritics
- To increase knowledge of what student learned in theory through real exercise or practicals

b) Laboratory rules
- Do not enter in the laboratory without permission from a teacher or laboratory technitians
- Do not drink or eat anything in the laboratory
- In case of any accident in the laboratory ask a teacher or laboratory guidance
- Do not touch any electrical source in the laboratory with wet hands
- Do not use broken equipment in the laboratory
- Do not use unlabelled chemicals until you ask or being labelled.

The candidates who performed well in this question had adequate knowledge on the importance of having Biology laboratory in a school and correctly stated six laboratory rules.

In part (b), the candidates were not able to state six laboratory rules. For example, one of the candidates wrote laboratory apparat such as *test tube*, *beaker, funnel,* and *test tube holder.* These responses indicate that the candidates failed to understand the demand of the questions. Furthermore, some of the candidates failed to give correct response due to language barrier as they were not able to express themselves in English. Some of the sentences were grammatically incorrect to the extent that the sentences lost the meaning. For example, some of the candidate wrote, *enter does not laboratory in the permission, eat does not laboratory in the permission, task or drinking water does not laboratory in the permission, biology practical laboratory in the permission*.

2016
8 marks

3. (a) Give the meaning of the term "laboratory."

(b) Describe three warning sign found on the laboratory containers.

2015

6 marks

3. (a) What do you understand by the following terms:
   (i) Biology
   (ii) Zoology

   (b) Why is it important to study Biology? Give four reasons.

3 a/
(i) Biology is the study of living organisms and life
(ii) Zoology is the study of animals.

b/
(i) Biology helps in classification of living organisms
(ii) Biology helps people to know the causes, symptoms, effects and preventive measures of diseases
(iii) Biology helps a country to control population through family planning methods
(iv) Biology is a source of employment for example people are employed as teachers, doctors and laboratory technician through studying biology

Most of the candidates who performed well had adequate knowledge, as they were able to give the correct meaning of Biology and Zoology. Also, they were able to give the correct reasons as to why it is important to study Biology.

Despite the good performance in this question, there were a few candidates who performed poorly. These candidates lacked knowledge on the concepts tested. It was observed that they failed to give the meaning of the given terms. For example, some candidates defined Zoology as “the branch of study that deals with the study of plants”, and others wrote Zoology is “the person who studies the animals”. Similarly, some candidates failed to distinguish between Zoology and Zoologist. This shows that, those candidates had inadequate knowledge on the topic of Introduction to Biology. However, Zoology is a branch of Biology dealing with the study of animals, while Zoologist is a person who studies animals only.

In part (b) of the question, some of the candidates showed lack of knowledge on the importance of studying Biology. For example, observation of the candidates’ scripts revealed such responses as “Biology helps to provide food to plants and animals”, “Biology helps to maintain peace and security” and “Biology can protect body temperature for human being”. All these responses and the like indicate that the candidates lacked knowledge on the concepts and terminologies of Biology.

2013
6 marks

3. (a) What do you understand by the term "Botany"?

(b) Briefly explain five characteristic of living things.

3. a) Botany – Is the branch of biology which deals with the study of plants.

b) The following are the characteristics of living organisms:-

i) Respiration – Is the process of breaking down food substance to produce energy which is required by an organism for different processes in the body.

ii) Reproduction – Is the process where an organism give rise to another organism (offspring) of its kind. Reproduction is important since maintain the existance of a given specie.

iii) Excretion – Is the process ~~where~~ of removing the by-products of metabolic activities from the body of an organism. Example of materials excreted are urine, carbondioxide and oxygen.

3(a) iv) Sensitivity and irritability – Is the ability of –

3.(a) iv) an organism to detect the changes in the environment and to respond to the changes. The changes in environment are called stimuli.

v) Nutrition – Is the process of taking in and processing food substance in a usable form for organism to survive. There are two types of nutrition which are autotrophic and heterotrophic nutrition.

The candidates who performed well had sufficient knowledge on concepts taught under the topic of Introduction to Biology as they managed to provide correct responses. They also understood the demand of the question and they demonstrated good command of English language.

2012

8 marks

3. (a) Outline four features which distinguish a Biology Laboratory from other school facilities.

(b) Outline four steps involved in using a microscope.

3 (a) The features are;

(i) Biology laboratory have microscopes while other school facilities have no microscopes.

(ii) Biology Laboratory have specimens.

(iii) Biology laboratory have Models. For example a model of human skeleton.

(iv) Biology laboratory have specific chemical reagents. For example the millon reagent, benedict solution, fechlin ~~III~~ and also Iodine solution.

3 (b) i) Put a specimen to be observed in the microscope stage.

ii) ~~Rotate~~ Replace the eye piece lens in position so as to have the focus of a specimen.

iii) Rotate/move the course adjustment knob in order to have a view of a specimen.

iv) Finally rotate/move the fine adjustment knob so ~~how~~ as to have a fine focus of a given specimen.

The candidate who outlined the four features which distinguish Biology laboratory from other school facilities clearly and correctly. The candidate also outlined correctly the four steps involved in using the microscope.

2011

9. (a) Mention any four laboratory safety rules.

(b) Some of the chemicals and apparatus used in Biology are harmful/dangerous.
In what way are the following substances harmful/dangerous?
(i) Toxic substances
(ii) Highly flammable substances
(iii) Corrosive substances
(iv) Radioactive substances
(v) Biohazards

(8 marks)

2. Safety in Our Environment

2019

4. It has been observed that some people dispose wastes around the lake which supplies water to the surrounding communities. Briefly explain three problems which are likely to happen to the area.

4. Three problems likely to happen are;
- Water contamination, since by disposing waste in the lake, it would promote rise of harmful bacteria and other dangerous microorganism that would destroy the biodiversity of that lake and also make the lake water unusable for domestic activities.

- Soil contamination, this is because the water from the lake to be used in agriculture or farming is toxified due to the waste disposed. Therefore such wastes dissolved may as well destroy plants or crops planted together with its useful nutrients.

- Outbreak of diseases, Due to water contamination diseases such as cholera, dysentry, typhoid or even bilharzia would arise since the lake may be used for domestic purpose or recreational or swimming, which such activities would transmit and cause infection to the people in the area. And such diseases may develop to be an epidemic disease to that area.

The candidates performed well in this question. These candidates correctly explained the problems which are likely to happen to the community which pollutes its water source. This shows that the candidates had adequate knowledge on the concept of wastes and wastes disposal.

2017
8 marks

4. (a) State two principles of waste disposal.

(b) Suggest three proper ways of waste disposal in the community.

4. (a)
i/ Reducing the amount of waste we produce
ii/ Reusing the items instead of throwing them

(b)
i/ Burrying.
-This can be done in two ways; Firstly through pit latrine whereby a hole is dug on the soil and wastes are disposed within it and then it is burried with sand after a huge accumulation of wastes. Secondly, through tipping and landfills. Tipping is done cohereby the truck collects the wastes from homes and land them on prepared disposing areas called landfills.

ii/ Incinerating
-This is the practice of burning something untill it is completely destroyed. It is by the means of special instrument called incinerator. This method is commonly used to dispose clinical wastes.

iii/ Recycling
-This is the practice of turning the waste products into useful products. For instance plastics can be used to make new bottles as well as old tyres are recycled to make the new ones hence helping in disposing the wastes.

the candidates who performed well in this question were able to state the principles of waste disposal. Furthermore, the candidates correctly suggested proper ways of waste disposal in the community. This implies that the candidates had sufficient knowledge about the subtopic of waste disposal taught under the topic of Safety in Our Environment

2016
8 marks

4. (a) State three basic principles of waste disposal.

(b) Why poor waste disposal at home is said to cause adverse effects?

2015

8 marks

4. (a) What do you understand by the term "First Aid"?

(b) State how you would render First Aid to a person who has been shocked by electric current.

4. (a) First Aid refers to an immediate assistance given to the patient before taking him/her to the hospital for further treatment.

(b) The following are the steps to render First Aid to a person who has been shocked by electric current:

(i) You have to identify the main switch and switch it off.

(ii) You have to remove the victim from the circuit by using a dry wooden stick.

(iii) You have to lay the victim down on his/her back.

(iv) Loosen any tight clothes and you have to remove the belt and shoes.

(v) You have to make sure that the place where the victim is laid has plenty oxygen and shaded area.

(vi) If the victim breaths with difficulty you have to use mouth to mouth ventilation so as to recover him/her.

(vii) You should not give the victim any cold water for it will draw the blood.

(viii) You have to check the frequency of pulse every time so as to avoid the death of the victim.

(ix) You have to make an immediate step to consult a doctor and send the victim to the hospital for further treatment.

The candidates who performed moderately in this question were able to provide the correct meaning of First Aid and managed to state a few correct procedures for rendering First Aid to a victim of electric shock. This implies that the skills on procedures of rendering First Aid to various victims, including electric shock, were not well understood by the candidates.

2014

8 marks

4. (a) Give the meaning of the following terms and identify two examples for each:
   (i) Waste
   (ii) An accident

   (b) Elaborate four procedures of giving First Aid to a person who has been injured in a bus accident and has severe bleeding.

2013

20 marks

11. Give four common accidents at home and school, for each case explain the causes and three prevention measures.

11 Accident is unexpected, unplanned occurance of an event which normaly produces unintended injury or death to an individual.

There are some accidents which can occur at home and school, some of these accidents are as follows.

Burns from fire; this is caused by falling in hot objects like hot water or porride, also when children plays with candles and matches, also can occur when a child touches an iron after it has been used

The event can be prevented by
- Keeping flammable substance away from childrens
- Not allowing children to go in the kitchen.
- To keep all hot objects away from children.

Electric shock: this can be caused by incorrect connection of the circuit, when a child with electronic components, poor arrangement of electronics.

This can be prevented by
- Regular repairing of house circuits
- Not allow children from using electronic components.

M - Using of underwall Connections of the circuit.

Drawning; this is the situation where by the body is drowing in water; it is Caused by improper swimming also Can be Caused by falling into Swimming pools.

The event Can be prevented by

- Covering the waterbodies like a well should be Covered.
- Avoid the Construction of large drains
- Children Should be admonished to go to play around waterbodies.

Cuts on hand or finguer; this Can be Caused when a child playing with sharp objects like bladder, Knife and others

The event Can be prevented by

- Not allowing children from using Sharp objects
- Keeping charp tools away from children
- Not allowing children from going in the kitchen.

candidates were able to give four common accidents at home and school and also in each case, the causes and prevention measures were well explained.

2012

8 marks

4. (a) Define the following terms as used in Biology:
   - (i) First Aid kit
   - (ii) Risks
   - (iii) An accident
   - (iv) Poisoning

   (b) Outline four procedures of giving First Aid to a person who has been stung by a bee.

4a/ i/ First Aid kit
Is the small box that contain all instrument used in first aid including antibiotic medicine and other necessary equipments such as bandage

ii/ Risks
- Is the behaviour that is not accepted by people in the society, this include alcoholism, drug abuse, prostitution.

iii/ An accident:
- Is a sudden injury that is unespectable to happen to a person, and it can not be prevented such as snake bite, bone dislocation, fire.

iv/ Poisoning.
- Is the action of hurmful chemical sobstance to have negative effect in the cell and may easly cause death.

b/ First Aid to a person who has been stung by a bee.

1/ Press around the stunge area with two fingers to remove the sting that has poison.

2/ Neutralize the stunged area by running Sodium hydrogen carbonate (Alkaline) to remove the poison for some seconds.

3/ Close/cover the wound with a pad acompanied with a pressed cold ice, in order to prevent further effect

4/ Take a person to the hospital for medical checkup if sign like vomiting and swelling appear on his/her body.

2011
8 marks

9. (a) Mention any four laboratory safety rules.

(b) Some of the chemicals and apparatus used in Biology are harmful/dangerous. In what way are the following substances harmful/dangerous?
(i) Toxic substances
(ii) Highly flammable substances
(iii) Corrosive substances
(iv) Radioactive substances
(v) Biohazards

3. Health and Immunity, Diseases, HIV, AIDS and STIs

2019

13. You are invited by a Fema CLub of a certain secondary school as a health officer. Explain how you will educate members of Fema Club on the cause, symptoms and transmission of HIV/AIDS. Give five symptoms and four ways of transmitting the disease. **(15 marks)**

13. HIV/AIDs is a pandemic diseases that only affects humans. The diseas AIDS is caused by a virus called Human immuno-deficiency virus (HIV). These virus usually attacks the helper T-cells thus lowering body defense system or body immunity. The following are the symptoms of a person suffering from HIV/AIDs:

Loss of appetite, this a situation where by the victim doesnot find any food appetizing. And if the victim doesnot eat food then his/her body would have no energy causing further deterioration of body immunity.

Prolonged coughing, also a victim of HIV/AIDs is likely to be attacked by insignificant diseases that can be vital such as cough and may be accompanied with blood sputum.

Severe diarrhoea, this is the passing of watery stool or feaces. This is due to the digestive system especificaly the colon being affected and unable to absorb water. This may lead to dehydration of the body.

Loss of weight, the victim of HIV/AIDs usually looses weight up to 5kg in a short time. This is accompanied by general body weakness.

Severe headache, this is the involuntary contraction of muscles around the head region. This may be influenced by factors like dehydration rise in body temperature and insufficient food.

13. The following are the ways in which HIV/AIDs can be transmitted from one to another;

Sharing of personal and sharp objects, through sharing razorblades and tooth brushes with an infected person there is a posibility that the objects may have traces of his blood with HIV thus transmitting the virus to the following user incase of cuts and gum bleed.

Blood transfusion, also HIV may be transmitted through blood transfusion of a HIV-positive person to another. The blood acts as a carrier that is why it is recomended for a thoroughly medical check up of blood donated by individuals.

Getting in contact with body fluids from an infected individual. This involves touching fluids such as blood on cuts and fluids on sores. This usuall happen where an individual is doing first aid to an infected victim. It is recomended to use gloves while performing first aid on any one.

Through sexual intercourse with an infected individual where the viruses is transmitted during sexual intercourse when the male reproductive parts meets the female reproductive parts. The fluids like semen and vaginal fluids usuall contain the virus. It is recomended to use condom during sex with a patner that you are unfamiliar with.

Lastly, we should take care of the victims in the society having HIV/AIDS by giving them balanced diet, connect with them socially and making sure that they take Anti-retrovial medication.

Candidates who performed well correctly explained five symptoms and four ways of transmitting the diseases. This reveals that, candidates had adequate knowledge on the concept of Human Immune Deficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS), Sexually Transmitted Infections (STDs) and Sexually Transmitted Diseases (STDs). They organized their responses in essays having introduction, main body and the conclusion. They also showed mastery of English through good writing skills.

2018

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

2017

10 marks

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
(i) A disease casued by flatworms known as schistosome.	A Malaria
(ii) A disease caused by a protozoan called *trypanosoma*.	B Syphilis
(iii) A tropical disease caused by *plasmodiun*.	C Bilhazia
(iv) A water bone disease casued by *entamoeba histolystica*.	D AIDS
(v) An outbreak disease caused by *vibrio cholerae*.	E Dysentery
(vi) A sexually transmitted disease caused by bacteria known as *treponema palladium*.	F Gonorrhoea
(vii) A communicable disease casued by *salmonella typhii*.	G Typhoid
(viii) A sexually transmitted disease caused by bacteria known as *Neisseria gonorrhoea*.	H Measles
(ix) A viral infection disease caused by HIV.	I Tuberculosis
(x) A disease caused by *micobacterium tuberculosis*.	J Cholera
	K Trypanosomiasis
	L Tetanus
	M Leprosy
	N Polimyelitis
	O Rabies

2016

20 marks

13. Write a descriptive report which you can use to educate the community about the mode of transmission, symptoms and prevention measure of malaria in Tanzania.

2015

8 marks

9. (a) Give the long meaning of the following abbreviation terms:
   (i) HIV
   (ii) STIs
   (iii) Tds

   (b) Briefly explain any two ways through which HIV is transmitted from one person to another.

9 (a)

(i) HIV - Human Immuno-defficiency Virus.

(ii) STIs - Sexually Transmitted Infections.

(iii) TDs - Transmitted Diseases.

(b) Ways through which HIV is transmitted from one person to another includes;-

(i) Unsafe sexual intercourse with an infected person; when you engage in unsafe sexual intercourse with an infected person without use of protective measures such as condoms, you are likely to be infected with HIV/AIDS during copulation.

(ii) Transfusion of unscreened blood from the donor to the receipient; whereby when you transfuse blood from one person to another without screening it, incase the donor is infected, also the receipient is likely to be infected as a virus causing HIV/AIDS stays in blood tissues.

The candidates who performed well in this question had sufficient knowledge on diseases and their transmission. They demonstrated their ability and understanding of the question by giving the correct long forms of the given terms. Also, different ways through which HIV could be transmitted from one person to another were well elaborated.

20 marks

12. Describe the symptoms of a person who is infected by Vibrio cholera and suggest six prevention measures and treatment for a cholera outbreak.

12 CHOLERA.

Cholera is an epidemic communicable disease that is caused by a bacteria called Vibrio cholerae and is transmitted through the consumption of contaminated foods and drinks containing the bacterium.

The main symptoms shown by a cholera victim are profuse vomiting and diarrhoea where by the colour of the waste resembles rice-water. A cholera victim also loses much of his or her weight due to the wastage of muscles. The victim becomes thin and thinner if not well treated.

The victim of cholera also experiences fatigue and sunken eyes and cheeks due to excessive loss of water through vomiting, diarrhoea and prolonged sweating. This causes dehydration and difficulty in movement due to lack of lubricating fluids in the joints.

The following are some of the preventive measures which can be taken to solve the problem of cholera outbreak.

Quarantine should be practised in all areas where there is a cholera outbreak. Quarantine involves preventing the free movement of people infected. This will enable the health experts to easily control and treat the disease since there wont be further spreading of the disease.

People should adopt the behaviour of washing hands and fruits before consuming them. After every visit to the toilet, individuals should wash their hands and before every meal so as to prevent themselves from consuming the bacteria. Fruits should be washed with clean boiled water to remove germs.

Treating and sterilizing beddings of the victims so as to kill the bacteria. The beddings used by the victims are contaminated with vomits and faeces which contain the bacteria. Treating and sterilizing these beddings ensures safety to the recovering victim and those helping.

12 Covering foods and drinking clean boiled water. This act will prevent vectors like houseflies from coming into contact with the foods we consume. Clean boiled water is free from bacteria and any other microorganism that may cause sickness to an individual.

Proper disposal of wastes and the use of latrines so as to avoid the contamination of water bodies. Wastes produced by a cholera victim should be properly disposed so as to ensure the bacteria dont spread. There should be latrines situated in various areas to avoid people from contaminating water bodies which is a source of drinking water to communities.

Provision of education to communities about the disease so as to create awareness about the cause of the disease, how it is transmitted, its symptoms, preventive measures to be taken and how the disease is treated. This education will enable the society members to think wisely before disposing wastes and before consuming any type of food.

Cholera is treated by the use of antibiotics like tetracycline and the use of rehydration drinks which replaces the water lost by the body when sweating, vomiting and diarrhoea.

Cholera is a deadly disease and it is normally caused by poor hygiene. However, cholera can be prevented if proper measures are taken to combat the disease. People should be aware of the disease and should take appropriate measures to protect themselves and the community so as to bring development in the community

The majority of the candidates who performed well in this question had adequate knowledge of the topic of Health and Immunity, particularly on diseases and infections. These candidates were able to present good essays describing the symptoms, prevention measures and treatment for cholera outbreak. Candidate who managed to explain the symptoms of cholera as vomiting and diarrhoea waste that resembles rice-water. He/she also, wrote prevention measures as quarantine, washing hands and fruits before eating, boiling drinking water, proper waste disposal and provision of education. Also the candidates suggested treatment by using the antibiotics, especially tetracycline.

2014

20 marks

11. Explain any four effects of irresponsible sexual behaviour and suggest five ways of eradicating those behaviours in the community.

20 marks

12. Describe how malaria parasites are transmitted, the sign developed to the host and give four ways which can help in combating malaria in the country.

2013

20 marks

12. Explain four ways of transmission, symptoms and treatment of HIV/AIDS.

12. HIV; Is the abbreviation of Human Immuno deficiency Virus, AID: Is the Acquired human Immune deficiency Syndrome. AID Is viral disease which Is caused by the HIV. the disease attack the immunity of the body and weakening the body cell. after the weakening of the body cell. the Human body is attacked by several disease such as Malaria, typhoid, Influenza and Sexual transmitted disease: The following are the ways of transmission

Blood transfusion; Is the process of given sick person or a person who lack enough blood another blood, the contaminated blood or the blood with HIV/AIDS can cause the unaffected person to be attacked by the HIV/AIDS. If and only if he or she gets the contaminated blood of HIV/AIDS.

Sexual intercourse; when unsafe sexual intercourse is done it can cause the sexual part to gets the injuries and finally leds to the occurance of the HIV AID example when the penis is inserted into the vigina of the female during the sexual intercourse the virus from the vagina fluid or from the male semen can cause the HIV/AIDS to the parter.

Sharing needles and personal instrument; example pins, razor blades they can cause the transmission of the HIV/AIDS from the sick or affected person to the another person this occured when the razor, pins used contain the blood of HIV/AIDS

12 During child delivery and Mouth to mouth Kissing and during baby feeding; the HIV/Aids passes from the mother to the children when the mother or pregnant mother deliver or give birth to her child if the baby is passed through the mother vagina the friction between the mother and children can cause the passage of the of the Virus from the mother to the baby.

The symptoms of the HIV/AID can be shown by the affected person through the following major symptoms.

Loss of the weight about 10%; the HIV/AID can leds to the person to loss the weigh about the ten per cent of the total body weight this is due to the weakening of the body tissue, cell, and white blood cell by the
12. attack of the other diseases.

Frequently fevers; example the Malaria, Influenza, typhoid, headache and the whole body become over tired: this is due to the failure of the white blood cells to fight against the Disease also due to the weakening of the body immunity system by the HIV virus leds to the Human body to be affected by the pathogen, due to the frequently fever the body of the person who is suffering from the HIV/AIDS always become tired.

12. Dirrhoea over a month, a pers on who is affected by the HIV/AID can be affected the Immune system, also the white blood cell fail to fight against the upcoming diseases Example the Malaria, headache, stomacheache, flue this leads to the Dirrhoea over the period of the one moth by the affed person. the Diarhoe leads to the decrease of the body water and power.

Over slim of the body, the HIV/AIDS leads to the over slim of the body this is due to the attacks of the Disease and the occurance of the body skin diseases; the weakening of the body Immune system, leads to the emergence of the HIV/AIDS and the body weight is low about 10%.

12. Treatment of the HIV/AID can be achieved by reducing the activity of the virus in the body of the affected person: but there is no special drug or medical for curing the disease and treatment is done the following.

By using ARV; the HIV/AIDS can be prevented and treated by the using the Anti Virus drugs which they help to speed down or to reduce the effects of HIV to the body of the living organism also They are provided in the health services centers and in the Hospital.

12. Getting balance diet; the HIV/AIDS can be prevented and reduced by the taking of the well-food diet example Eating of the fruits, protein therefore rich in Vitamins and drinking safe water can help to treat the disease;

Counselling and guidance; the person who is affected by the HIV/AID he/he is advised to follow the HIV/AIDS centre example "ANGAZA" in tanzania helpto advise the people who have affected with the HIV aids to live with hope.

Taking medical Assistance; the HIV AIDS can be cleared when the affected person should attend to the health services centers for him to get

12. the medical Assistance: example when a person is affected with the HIV/AIDS and other diseases such as Malari, Typhoid sexual transmitted diseases like syphilis, gonorrhea, he/she is supported to seek advice from the other professionals people who are responsible.

Therefore; HIV/AIDS has a bad effect to the society because leads to the death of the people, decrease of the Manpower also the HIV/AIDS leads to the increase in the number of the street children also the Decline of the Economic activities such as Agriculture, mining due to the Lack of the manpower.

The candidates who performed well in this question had good essay writing skills and good mastery of English language. They were able to write the causes of AIDS and managed to explain four ways by which HIV is transmitted from one person to another. The responses provided included contact with infected blood, sharing needle and cutting equipment, unsafe sex and mother to baby during uncontrolled birth and breast feeding. Moreover the responses provided for the symptoms and treatments of HIV/AIDS were correct.

2012

13. Explain five factors which contribute to irresponsible sexual behavior among young people and their effect in the community.

Lack of councelling and guidance in the society starting in the family level contributes into irresponsible sexual behaviour to be done by the young. Young people always needs support and to be guarded by the elder people in the society and since the lack this the engage themselves into these acts.

The irresponsible sexual behaviour always affects people who engage into these acts. The followings are the effects of irresponsible sexual behaviours.

Sexual transmitted disease such as syphillis and HIV/AIDS, ~~are~~ is the effect of engaging into irresponsible sexual behaviours such as having many sexual partners.

Lossing personality in the society is the result of engaging into irresponsible sexual behaviour like prostitution. The society does not like people who are engaging into evil acts so it degradate their personality.

Unwanted pregnancy is the ~~bad~~ big problem to many young people (girls) and it is the result of the irresponsible sexual behaviours as prostitution and having many sexual behaviour.

Conflicts ~~a~~ in the society can be caused by the irresponsible sexual behaviour, and these can even cause death. The behaviour such as taking another man's wife or another woman's husband ~~can~~ or another person's partener causes conflict and even can cause death.

Street children and orphans increase in the society due to the irresponsible sexual behaviour. The youth who are separate and one have no ability to feed children or death of all cause orphan to increase in the society.

~~Dro~~ Bad performance in school and even dropout from the school caused by irresponsible sexual behaviour to the young people who are in school. Many schools dislike evil sexual acts so the schools punish or remove those who engaging in these acts

Lastly, the cause of Underdevelopment within the society and country at large can be contributed by the irresponsible sexual behaviour. Since young people also can contribute in economic activities and raise the economy, but involving into sexual evil acts remove their part of contribute very small into raising development. But also due to the disease and death of young people their space in contributing into raising economy is empty and hence underdevelopment is unavoidable.

Conclusively, I advice the young people to avoid irresponsible behaviours because this affects themselves and also the nation. And to the society and government they should provide education, councelling the young people and guarding them to prevent them from the irresponsible ~~sexal~~ sexual acts. By considering this the young people will be saved and also society and the nation at large since the young people are the future builder of the nation.

Candidates who answered this question well were able to explain the factors which contribute to irresponsible sexual behaviour among young people and their effect in the community using clear language. The candidate started the essay with introduction and arranged the work in paragraphs. The candidate managed to explain the factors which contribute to irresponsible sexual behaviour among young people and their effect in the community using clear language.

2010

(b) Name four (4) human diseases caused by viruses.

2012

(iii) The following are examples of water-borne diseases:

A malaria and bilharzia
B yellow fever and typhoid
C diarrhoea and malaria
D cholera and plaque
E cholera and typhoid

(vii) Which of the following is a vector of sleeping sickness?

A House fly
B Mosquito
C Tsetse-fly
D Tick
E Cockroach

(ix) Which disease spread rapidly as a result of poor waste disposal?

A Anemia B AIDS C Cholera

D Leukemia E Small pox.

4. Cell Structure and Organisation

2019

10. (a) Give two differences between a cell membrane and a cell wall.

(b) Why is cell differentiation important to living organisms? Give a reason.

10.	a)	Cell membrane	Cell wall
		a) It is semi permeable membrane which allow specific substrate	It is permeable to everything such as water, mineral salts and other
		b) It contain living cell materials and protects the inner organelles	It contain non living materials and protect the whole organism

b) Cell differentiation is important to living organism as it helps in the specialization of the cell to its specific function and thus avoid interference between cell in a specific organism.

Candidates correctly gave two differences between cell membrane and cell wall in part (a). They also gave correct reason why cell differentiation is important to living organisms. These responses imply that, the candidates had adequate knowledge of the topic of Cell structure and Organization.

2011

3. (a) Identify structures found in plant cells only.

   (b) Describe the functions of each structure identified in 3(a) above.

(6 marks)

5. Classification of Living Things

2019

14. A majority of people believe that all fungi are harmful organisms. As a biologist, explain four ways in which fungi are beneficial to human beings. **(10 marks)**

14. Fungi are the organisms which are found in the ~~kind~~ kingdom fungi and their distinctive feature is the possession of hyphae and their body made of chitin materials. Fungi are among organisms which are very useful to human being, therefore the following are the ways in which fungi are beneficial to human being

Some of the fungi can be used as a source of food. Food is an important thing in life of a human being in the process of making him survive, therefore as some fungi can be source of food hence they will be as very important as other sources of food that provide nutrients to the human being to keep him alive. Hence fungi as a source of food to human being its the way to make it beneficial to human being. Example of Fungi that can be source of food are some mushrooms.

Some of the fungi can be used in brewing industries to ferment fruits ~~in~~ In the manufacture of alcohol fruits such as grapes which are used in making alcohol are supposed to be fermented in order for the alcohol to be made, so through the use of fungi a human being has been able to manufacture alcohol to satisfy his needs. hence fungi as a source of manufacture of alcohol in industries its the way to make it beneficial to human being.

They can be ~~used~~ used in baking to raise the doughs. In baking processes like bread baking

14 a dough is supposed to rise in order for it to be baked so through the use of Fungi example the use of yeast a dough can be rised to make it easy to be baked in the oven or else where. Hence Fungi are an important thing to raise the dough in baking breads it has made it to be beneficial to the human being.

They can be used in manufacturing of medicines for some diseases. Some fungi can be used to manufacture medicines that treat the human beings to make them healthy and free from diseases, therefore through the use of some fungi example penicillium medicines like penicillin have been manufactured through them. so ~~the~~ this is one among the ways that makes the fungi beneficial to human being as it helps them to get cured from diseases.

In Summary, The fungi are not only beneficial to the human being but they are also harmful to the human beings due to various reasons like some of the Fungi are poisonous, hence they are not edible and if they are eaten they might cause death to a person, also ~~fun~~ some fungi are causing food spoilage example of the fungi which cause food spoilage is Bread mould.

Candidates correctly explained four ways in which fungi are beneficial to human beings in an organized way: Introduction, Main body and Conclusion. This indicates that the candidates had adequate knowledge of the topic of Classification of Living Things specifically Kingdom Fungi.

2018

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

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

5. a) Division Filicinophyta has the following distinctive features :-

It consists of sori or sorus arranged in groups where spores are produced and are later dispersed to facilitate asexual reproduction and form the gametophyte generation.

It has a prothallus, this is a flattened structure which makes up the gametophyte generation. It consists of antheridium and archegonium which are responsible for sexual reproduction in fern plants of division filicinophyta.

It consists of leaflets called pinnae on their leaves or fronds which carry the sori that produce spores for asexual reproduction in the fern plant.

It consists of fiddle heads which are small and tiny as well as young fern plants that have not yet matured enough hence have no differentiated parts but are eaten by small insects as a source of food.

It has leaves called fronds whose structure is made of pinnae which are leaflets made of structures called sori or sorus which produce the pores for asexual reproduction

b)

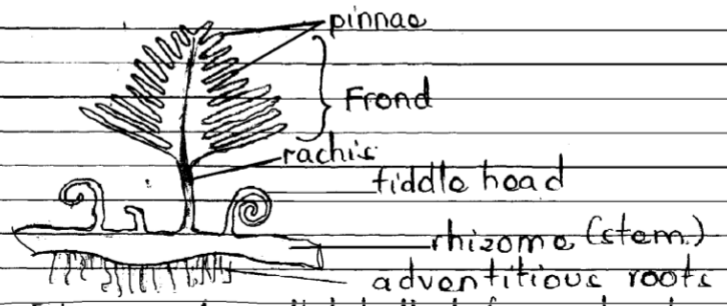


Figure: A well labelled fern plant

The candidates correctly explained the distinctive features of the division Filicinophyta in part (a) and were able to correctly draw a well labelled diagram of a fern plant. This implies that the candidates had adequate knowledge about division Filicinophyta which is taught under the topic of Classification of Living Things.

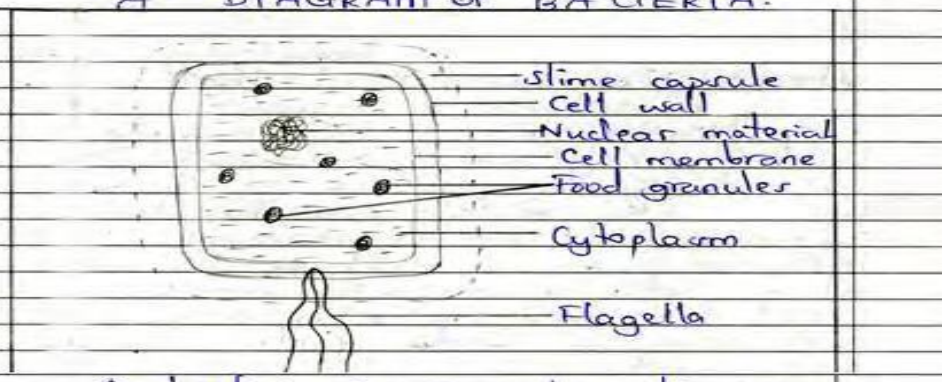
2017

20 marks

13. With the aid of a well labelled diagram, describe the structure of bacteria and give three advantages and disadvantages of bacteria in daily life.

SECTION C

13. A DIAGRAM OF BACTERIA.



13. A bacteria is a prokaryotic organism having nuclear material not bounded by nuclear membrane. They have both RNA and DNA in genetic materials.

It has cell wall which provide support and protection to the bacteria by providing a firm support. It also has cell membrane which is semipermeable to allow some of materials to pass.

It has slime capsule on the outer most which offers more protection to the bacteria and it has cytoplasm for different chemical processes to take place.

Bacteria has food granules to store food to be used when needed and also has a flagella which is a locomotory structure to enable the bacteria to move from one place to another.

The advantages of bacteria includes the following:-

Bacteria is used in sewage treatment to decompose wastes that could be harmful to human beings. For example saprophytic bacteria ~~are~~ are used for sewage treatment of wastes.

13. Also nitrifying bacteria are used to convert the atmospheric nitrogen into nitrates and nitrites ~~the~~ in the soil that are needed by plants for different purposes for example in roots of leguminous plants bacterias like Azotobacteria are found.

Bacteria are used in digestion of cellulose in herbivorous animals like ruminants. These bacterias are able to produce an enzyme called cellullase which digest cellulose fed by herbivorous. For example bacterias in gut of a cow and horse and rats.

Besides having advantages bacteria also are disadvantageous. The disadvantages of bacterias are as follows:

Some bacterias converts nitrates in the soil into atmospheric nitrogen. These bacterias are called denitrifying bacteria they cause loss of soil nitrogen which is essential for plant growth hence disadvantageous.

Bacterias cause diseases in plants and animals. Bacteria attack the living cell of organisms and produce toxins which cause diseases in man, and other organisms.

13. For example Vibrio cholerae causes cholera, salmonella typhii causes typhoid, treponema pallidum causes syphilis.

Also bacteria causes food spoilage. When bacteria attacks the food they produce toxins on it and causes it to go bad and becomes unfit for animals and when eaten it results into food poisoning. Thus disadvantage of bacteria.

Generally bacterial diseases can be treated by the use of antibiotics so as to reduce the effect of bacteria in the body, also food should be well preserved by removing moisture which makes bacteria to inhabit on the food this will help to reduce the expense incurred to buy another food.

Candidates who had good performance in this question succeeded in providing a detailed explanation of bacteria supported by the correct diagram with all parts labelled including the nuclear material, cytoplasm, plasmid, cell wall and cell membrane. Also, they recognised that bacteria have flagella for movement, and slimy outer layer or capsule which helps to protect them from predators. The advantages and disadvantages of bacteria in daily life provided were also correct. In addition, they showed good essay writing skills and good command of English Language. These responses reveal that the candidates had sufficient knowledge on the topic of Classification of Living Things.

2016

8 marks

6. (a) Define the terms "classification" and "Taxonomy".

(b) (i) List the types of classification systems.

(ii) Give two differences between the classification systems you have listed in (b)(i).

2015

8 marks

6. (a) List any three characteristics of the Phylum Arthropoda.

(b) (i) Mention the Classes of the Phylum Arthropoda

(ii) Name one representative member for each Class you have mentioned in 6(b)(i).

6 (a) Characteristics of Phylum Arthropoda

- They are covered with an Exoskeleton which is made up of chitin. They periodically shed their Exoskeleton through the process of Moulting / Ecdysis to promote their growth.
- They have jointed appendages.
- Their body is segmented.

(b) i Classes of Phylum Arthropoda.

- Chilopoda
- Crustacea
- Arachnida
- Insecta
- Diplopoda

(c) Chilopoda - Centipede
Crustacea - Crab
Arachnida - Scorpion
Insecta - Ant
Diplopoda - Millipede.

Candidates who scored good marks in this question were able to correctly list the characteristics of the Phylum Arthropoda, name the five Classes of Phylum Arthropoda and give examples of representative organism in each Class. These candidates were knowledgeable about the topic of Classification of Living Things.

2014

20 marks

13. Explain two differences between artificial and natural classification systems and indicate the two merits and demerits for each system..

2013

10 marks

2. Match the responses in **List B** with the phrases in **List A** by writing the letter of the correct response from **List B** beside the item number of **List A** in your answer booklet. Each choice in column B may be used once, more than once or not at all.

LIST A	LIST B
(i) Pair of compound eyes raised on stalks	A. Diplopoda
(ii) Numerous segments each bear one pair of legs	B. Coelenterata
(iii) Numerous segments each bear two pairs of jointed legs	C. Leech
(iv) Have well defined head, thorax and abdomen	D. Arachnida
(v) Consists of organisms which give birth to young ones	E. Liver flukes
(vi) Have four pair of jointed appendages	F. Mammal
(vii) Phylum which consists of Earthworm	G. Insecta
(viii) Phylum consisting of elongated round worm with pointed ends	H. Nematoda
(ix) Phylum consisting of endoparasites which have suckers and hooks on proscolex	I. Platyhelmenthis
(x) Endoparasites which have thin and leaf-like body	J. Chordata
	K. Arthropoda
	L. Chilopoda
	M. Annelida
	N. Crustacea
	O. Vertebrata

2011

10. (a) (i) List the five kingdoms into which orgamisms are placed.
    (ii) List the distinctive features of members of the kingdom to which a malaria vector belongs.
    (b) (i) Identify by using common name, two types of flat-worm found in the alimentary canal of a living organism.
    (ii) To which kingdom does organism in (b)(i) belong?

(10 marks)

2010

(vii) Reptiles differ from birds because:

A Reptiles do not lay eggs while birds do
B Reptiles have a backbone while birds do not
C Reptiles have scales while birds do not
D Reptiles are cold blooded while birds are warm blooded
E Reptiles have moist skin while birds have dry skin

(vii) The taxonomic category of organisms belonging to the same class but not the same family is:

A Species B Genus C Order
D Phylum E Kingdom

6. Nutrition

2019

6. Jairus complains of having burning sensation around the chest region.

(a) What digestive disorder is he facing?

(b) Give five measures he should take to treat the disorder.

6. a) Heart burn.

b) – Use of anti-base such as ashes
– Avoid taking in foods which contain and accelerate production of hydrochloric acid.
– Eating foods which are basic in nature to neutralize the acid produced in stomach
– Avoid taking cold foods
– Take in alot of water to stop this condition.

Candidates correctly identified the disorder in part (a) and wrote correct measures that should be taken to treat the disorder. This indicates that the candidates had adequate knowledge about the topic of Nutrition.

2018

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

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

8. a.) i.) Nitrogen
ii.) Phosphorus
iii.) Potassium.
iv.) Sulphur

b.) i.) Ulcers.
This is a condition of having sores (painful sores) on the stomach lining. This is caused by a bacteria known as helicobacter pylori as well as high acid content in the stomach with little mucus on stomach walls causing corrosion hence sores.

ii.) Flatulence
This is a disorder which involves having excessive gas in the stomach or alimentary canal. It is caused by eating foods which result into production of gases in the stomach. The partial opening of cardiac sphincter causes its removal by belching. It is also caused by swallowing large amount of air.

iii.) Constipation
This is the decreased frequency of passage of stool or passing very hard stool painfully. It is caused by excessive absorption of water from food in the colon causing the passage of hardened stool with pain or sometimes impossible to pass.

Candidates were able to list macro-elements in plant nutrition and correctly explained the causes of common disorders and diseases of the human digestive system.

2017
20 marks

11. Describe the types of macronutrients needed in human body. In each type identify the source and function of food substances in human body.

11. MACRONUTRIENTS IN THE HUMAN BODY

Macronutrients are the nutrients needed in large quantity. Nutrients are the food substances absorbed by the body for use. The following are the macronutrients needed in the body..

Protein. protein is a macronuttient, it can be essential or non-essential. Essential are the one which weare supposed to take in. Non-essential are the ones formed by the body itself. The following are the sources of protein; milk, eggs, chicken, beaf, beans, and soya. It has many functions in the body such as repairing worn out tissue, promote growth, a constituent in formation of cell membrane, a source of energy when carbohydrate isn't enough in the body and formation of different tissues such as hormone and enzymes.

Carbohydrates. Carbohydrates are mostly energy giving foods. Sources of Carbohydrates are maize, wheat, cassava, rice, millet and sorghum. Carbohydrates is needed in large quantity thus it has important function in the body. It provides energy, It is stored in the body as glycogen and also essential in making the cell membrane.

Lipids. There also essential thus it is important to take them as food. But also the body makes its own. Lipids can be fats

11. in solid state and oil in liquid state. Sources of lipids are cooking oil, avocados, groundnuts and castor seeds. Lipids have different function in the body, thus the produce heat for the body, are a constituent in cell membrane, provide energy when carbohydrate is not enough or glucose and act as shock absorber in some organs such as the heart.

Conclusively it is important for all human beings to have macronutrients in there diet. Also micronutrients are essential for some of there function are of great help for having a health body. Forexample Vitamins are a source of immunity and Minerals strengthen bones such as calcium.

The candidates who performed well in this question demonstrated good understanding of the topic of Nutrition, particularly food nutrients as they were able to identify the types of macronutrients their sources and function of each food substances in the human body. For the candidates who scored average marks, either the sources or functions on food substances were not correct.

2016

8 marks

8. (a) (i) What are the raw materials for photosynthesis?
(ii) List two products of photosynthesis.

(b) State how the ileum is adapted for absorption function.

2015

8 marks

5. (a) Define the terms "digestion" and "feeding" as used in Biology.

(b) Explain why during digestion the food is:
(i) Alkaline when in the mouth.
(ii) Acidic when in the stomach.
(iii) Alkaline when in the ileum.

5 a) i) Digestion is the process whereby food substances are broken down from large molecules into smaller molecules so that it can be easily absorbed and used by the body.

ii) Feeding is the process ~~which~~ whereby organisms take in nutrients which are to be assimilated by the body.

b) i) Food is alkaline when in the mouth so as to favour the salivary amylase enzyme which functions properly in an alkaline medium and in fact the alkalinity is brought by presence of Calcium and Sodium salts in the Saliva

ii) Food is acidic when in stomach due to presence of hydrochloric acid in the gastric juice which is secreted in the stomach. This medium of acidity helps enzymes in the stomach which are rennin and pepsin to function properly as they can't function best in alkaline medium.

iii) Food is alkaline in the ileum due to the presence of bile salts which accompany food digested in the duodenum. This alkaline medium enables enzymes in the ileum in a juice ~~to~~ called Succus entericus to function properly since they can't work best in acidic medium.

The few candidates who performed well in this question had adequate knowledge on Human Nutrition; thus, they were able to correctly define the given terms and explain why the food is alkaline when in the mouth, acidic when in the stomach and alkaline when in the ileum.

2014

8 marks

9. (a) Draw a large and neat labelled diagram of the villus found in the digestive system.

   (b) (i) Name the digestive juice which is produced by the liver.

   (ii) State the function of the substances contained in the digestive juice named in b (i).

2013

8 marks

8. (a) What is the meaning of the terms:
   (i) Digestion
   (ii) Malnutrition
   (iii) Balanced diet
   (iv) Nutritional disorder

   (b) Outline four types of nutritional deficiency disorders in human beings.

2011

4. (a) (i) What do you understand by the term peristalsis?
   (ii) Suppose the peristalsis stops. What problems would and animal face?

   (b) Describe the kind of food which should be added to a meal in order to improve peristalsis.

(5 marks)

2012

8 marks

9. The diagram in Figure 1 is the alimentary canal of a human being. Study the diagram and answer the questions that follow:

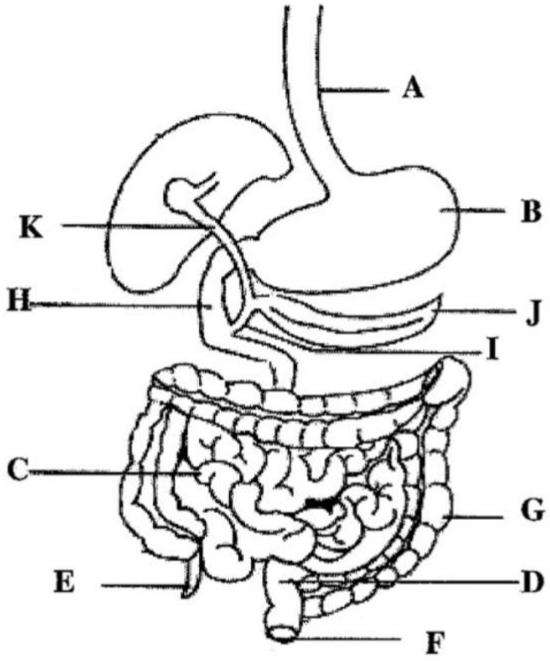


Figure 1

(a) Name the parts labelled A – K.

(b) (i) Name the digestive juice which is produced in organ labelled B.

(ii) Mention the substances contained in the digestive juice named in (b) (i) above.

9 (a) A – Oesophagus

B – stomach

C – Ileum (small intestine)

D – Rectum

E – Appendix

F – Anus

G – Colon (Large Intestine)

H – Duodenum

I – Pancreatic duct

9 (a) J – Pancreas

K – Bile duct

(b) (i) Gastric juice

(ii) – Pepsin (enzyme digest protein to peptides)

– Mucus

– Hydrochloric acid and

– Water.

The candidate had enough knowledge about the question and provided correct spelt labels to all parts of the alimentary canal with correct spellings. This candidate was able to correctly name the digestive juice which was produced in organ labelled B in (i) correctly that was “gastric juice, as well as the substances contained in the digestive juice named in (b)(i) above, which were pepsin, mucus and hydrochloric acid.

7. Balance of Nature

2018

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

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

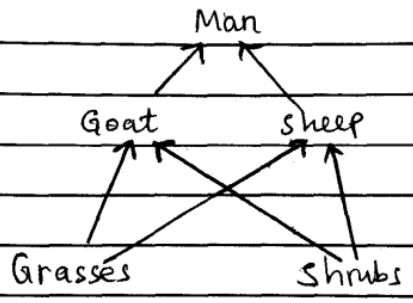
10(a)(i) Biotic components are living components of the environment this involves all living organisms such as people, animals, plants, insects and other living things.

(ii). Abiotic components are non-living components of the environment. This involves mountains, stones, water bodies and other non-living things.

(iii). Food chain refers to the series of organisms aranged in such a way that the first organism is eaten by the next one in the same series. Eg grasses → goat → Lion → Bacteria

(IV). Food web is the interconnection of food chains from low level (primary producer) to the final consumer.

10(b).



Candidates correctly gave the meaning of the given terms as used in the ecosystem. They also managed to construct a correct feeding relationship. Such correct responses imply that, these candidates had sufficient knowledge on the topic of Balance of Nature.

2017

8 marks

10. (a) With examples, state the meaning of "abiotic" and "biotic" factors of the environment.

(b) (i) Differentiate the terms "food chain" from a "trophic level".

(ii) Construct a food chain by using organisms named in the following list: Grass, Bacteria, Lions and Zebra.

10. (a)

Abiotic factors of the environment

-These are conditions resulted from non-living things in bringing or influencing the ecosystem of a given environment

eg: Temperature, Salinity, Soil, Rainfall.

Biotic factors of the environment

-These are environmental conditions resulted from living things which tend to influence the ecosystem of a given environment

eg: Availability of food, Predators, Parasites and competition over resources.

(b) i/

Food chain is the sequence which shows the feeding relationship between various organisms whereby organisms are separated by arrow which means it is eaten by the next organism eg: grass → grasshopper → bird

WHILE

Trophic level is the position occupied by an organism in a food chain eg: Producers, Consumers or Decomposers.

ii/

Grass → Zebra → Lions → Bacteria

The candidates who performed well had adequate knowledge as they were able to state the meaning of "abiotic and "biotic components of the environment with examples. They also correctly stated the meaning of the food chain and trophic levels. Moreover, they managed to construct the food chain with arrows pointing to the correct direction from the lowest trophic level, the Grass to the Zebra to Lion and finally to Bacteria. Such correct responses imply that, these candidates had sufficient knowledge on the topic of Balance of Nature.

2016

8 marks

5. (a) Briefly explain the following terms:
   (i) Trophic level.
   (ii) Food chain.
   (iii) Food web.

   (b) With example, briefly explain how the following interactions of living organism take place.
   (i) Predation
   (ii) Parasitism.

2012

6 marks

5. (a) Describe the following ecological terms:
   (i) Decomposers
   (ii) Producers
   (iii) Parasites

   (b) With example, briefly explain how comparative embryology supports the idea of organic evolution.

5(a) I. Decomposer are organism in the ecosystem which break down the dead organic matter.

II. Producers are organism in the ecosystem which manufacture their own food by using simple substance like carbondioxide and water in the presence of sunlight. Normally are green plants.

III Parasites are organism which depend on the tissue of another organism to get its basic needs like food and shelter e.g Tapeworm

5(b) Comparative ~~embry~~ embryology is the evidence which use the growth of embryo to support the idea of organic evolution.

During the embryo stage, all embryo of chordata are similar but have gill cleft and anal tail.

But when the growth continue the differences start to be observed in other organism like man the gill cleft and anal tail start to disappear.

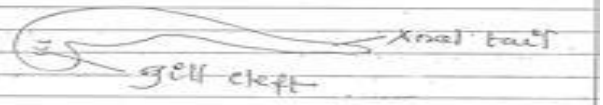
But other like cow remain with anal tail together with fish which remain with gill cleft.

This is the evidence that once upon organism was the same. And also proof that these organism have the same origin.

But due to organic evolution appear different as shown in the growth of embryo.

STRUCTURE OF EMBRYO:

Man



whale

The candidate had adequate knowledge about the question and good understanding of the question demand, therefore described the ecological terms provided correctly and provided correct explanations on evidence of organic evolution.

2011

6. (a) With example, explain the meaning of the following:
   (i) Renewable natural resource?
   (ii) Non-renewable natural resource?

   (b) (i) What is the importance of recycling of the resources?
   (ii) Name the carbon cycle processes which are likely to affect the oxygen concentration in the atmosphere.

(8 marks)

8. Transport of Material in Living Things

2019

8. Ringing in plants involves removal of the bark of the tree. This hinders communication between the upper and lower parts of the plant. In three points, briefly elaborate the impact of ringing on the stem of a hibiscus plant.

8. (i) Ringing the bark of a hibiscus plant involves the removal of a vascular tissue called phloem tissue from the plant.

(ii) The removal of phloem tissue prevents the transport of manufactured food from the leaves to lower parts of the plant.

(iii) The lack of food in lower parts of the plant causes the death of the whole plant due to absence of food to storage organs and growing regions

2018

4. (a) Give the meaning of the following terms as used in Biology:
   (i) Blood transfusion.
   (ii) Blood compatibility.

   (b) (i) State two advantages of blood transfusion.
   (ii) Outline four precautions to be taken during blood transfusion.

4a i) Blood transfusion is the process of transferring blood from one person (the donor) to another (the recipient). For blood to be transferred, the blood groups of the two must match.

ii) Blood compatibility is the condition where the blood of two people (the donor and the recipient) can mix without agglutination. Agglutination is the clumping together of the blood cells, since they do not match.

b i) - It enables a patient to get more blood in severe cases of blood loss in the body
- It can be used to treat diseases or infections to the body, such as poisons or sickle cell anaemia.

ii) During transfusion the blood of the donor should be screened, so as to ensure that it is free from infections or diseases that would cause more effects to the donor.
- During transfusion the blood of the donor and the recipient should match, so as to prevent agglutination that would cause adverse effects in the recipient's body that may lead to death.
- The blood to be transfused should not be stored for more than 21 days then transferred to the recipient. The blood stored for more than 21 days is not fit for blood transfusion
- Blood transfusion should be done only when it is severely needed, and not anyhow or at anytime.

The candidates gave correct responses in all parts of the question. These candidates correctly gave the meaning of the terms (i) Blood transfusion and (ii) Blood compatibility in part (a). Also they correctly stated two advantages and outlined four precautions to be taken during blood transfusion. These responses show that candidates had adequate knowledge about blood groups and blood transfusion which is taught under the topic of Transport of Materials in Living Things.

2017

6 marks

9. (a) List any two types of blood cells.

(b) Give two differences between arteries and vein.

9	a) Types of blood cells	
	- White blood cells	
	- Red blood cells	
	b) Difference between arteries and veins	
	- Arteries has narrow lumen while veins has	
	wide lumen	
	- All arteries transport oxygenated blood except	
	pulmonary artery while all veins transport	
	deoxygenated blood except pulmonary vein	
	which transport oxygenated blood.	

The data shown in Figure 9 signify that the general performance of the candidates in this question was good as more than half (70.34%) of the candidates scored 30 percent and above of the total marks allocated to this question. The candidates who performed well in this question had adequate knowledge on the topic of Transport of Materials in Living Things as they managed to list the types of blood cells and to comprehend the differences between arteries and veins.

2016
20 marks

11. With the aid of a well labelled diagram, describe the internal part of the mammalian heart.

2015
20 marks

11. Explain how parts of the mammalian heart are adapted to their function.

11 Heart is an organ which ~~b~~ pump blood in the body of an organism. Heart helps in the supplying of oxygenated blood in the body and thus helps proper functioning of other body parts. Heart has many parts which adapt it to its functions. The following are among the adaptations of the heart to its functions.

The presence of cardiac muscles, this muscles works all the time as a person is living and they never become fatigue and this helps heart to continue working all the time.

The presence of coronary vessels, these vessels carry blood towards and away from the heart as they supply oxygen to the heart for respiration process to provide energy and remove waste products from the heart.

The presence of thick wall on the left ventricle this is so because left ventricle pumps blood to all parts of the body except lungs while right ventricle pumps blood to lungs only.

11 The presence of semilunar valves, these valves are found in aorta and in pulmonary artery, whose function is to prevent back flow of blood to the heart when it is leaving the heart.

The presence of septum, septum is a wall which separates right from left side and its main function is to prevent mixing up of oxygenated and deoxygenated blood.

The presence of Tricuspid and Bicuspid valves, this valves are found in right and left side of the heart and its main function is to prevent backflow of blood into right and left ventricles.

The presence of thin layer of endomentium, this layer is smooth thus makes blood to flow smoothly in the heart.

All in all, without heart, a person will no longer be alive so we should not take food with much oil and we should exercise our body as without that we will be creating dangerous environment to our bodies.

Few candidates who attempted this question, there were candidates who performed well by giving clear explanations on the parts of a mammalian's heart and the way, they are adapted to their function. These candidates had sufficient knowledge of the topic of Transport of Materials in Living Things.

2014

6 marks

6. (a) Explain the functions of the vascular system in plants

(b) State three importance of transportation of materials in living things.

2013

6 marks

6. (a) Give the meaning of osmosis and diffusion.

(b) Briefly explain how the following illustrates osmosis.
   (i) Shrinking of a cell when immersed in a high concentrated solution.
   (ii) Bursting of red blood cell when immersed in dilute solution.

6. a. i. Osmosis.
- Is the process whereby water molecules move from a weak/dilute solution to a concentrated solution through a semi-permeable membrane.

ii. Diffusion.
- Is the process where molecules move from a region of high concentration to a region of low concentration.

b. Explanation of;

i. Shrinking of a cell when immersed in a high concentrated solution.
- The high concentrated solution than the solution of the cell is called hypertonic solution. The reason behind the shrinking of the cell is the water molecules move from the solution of the cell to the hypertonic solution surrounding it. The cell therefore shrinks because of loss of water

ii. Bursting of red blood cell when immersed in a dilute solution.
- The dilute solution than the solution of the cell is called hypotonic solution. The reason behind the bursting of the red blood cell is that water molecules move from the hypotonic solution to the solution in the red blood cells. The cell therefore bursts when it can no longer hold the water within it.

The candidates who performed well had enough knowledge on the topic of transportation of materials in living things especially osmosis and diffusion. These candidates were able to correctly define the term osmosis and diffusion. In addition, they showed good command in English language as their responses were clear and well organized.

2012

6 marks

6. (a) Outline three factors affecting transpiration.

(b) State three significance of transpiration.

6 (a) – Humidity
– Temperature and
– Size of the leaf

(b) – To regulate the amount of water in the body of plants
– To cool the plant
– To increase water vapour in the atmosphere which can be a source of rain formation (rain fall)

The candidate was brief and precise in providing the demanded points. For example, factors which affect transpiration were humidity, temperature and size of the leaf in part (a); In part (b) the candidate managed to state well the significance of transpiration.

2011

20 marks

11. Write an essay on transportation in plants using the following guidelines:
    (a) Meaning of transportation
    (b) The importance of transpiration
    (c) The adaptation of features which enable plants to reduce water loss

2011

20 marks

12. With the aid of a diagram, describe the structure and function of blood tissue.

9. Gaseous Exchange and Respiration

2018

9. How are the respiratory surfaces adapted to their role? Give four points.

9.	i.) They are highly supplied with blood cappilaries so as to enable gasses to diffuse into the blood stream to all parts of the body and back.	
	ii.) They are thin to reduce the diffusion distance of gases.	
	iii.) They are moist to dissolve gasses so as they can diffuse in solution form.	
	iv.) They are highly branched and folded to increase surface area for the diffusion of gases.	

Candidates correctly explained how the respiratory surfaces are adapted to their role. This implies that the candidates had adequate knowledge of the gaseous exchange in mammals.

2017

8 marks

5. (a) (i) What do you understand by the term respiration?
(ii) Name the two types of respiration.

(b) Explain how gaseous exchange occurs across the aveolus.

5 (a) i. Respiration is a chemical breakdown of food to release energy. There are two types of respiration such as aerobic and anaerobic respiration. Respiration can be affected by age, level of activity and health status.

ii Types of respiration include the following
Aerobic respiration, this is the type of respiration which occurs in the presence of oxygen and in this type of respiration alot of energy is used.
Anaerobic respiration, this is the type of respiration which occurs in the absence of oxygen. It takes place in the cytoplasm of a cell. In animals its by-product is Lactic acid and in plants its by-product is alcohol.

(b) Gaseous exchange is the exchange of respiratory gases such as carbondioxide and oxygen across the respiratory surface.
In the alveolus the air which is taken in enters and fill the alveoli, the oxygen present in air diffuses in haemoglobin of the blood to form oxy-haemoglobin, the oxy-haemoglobin is passed through the blood capillaries then it is broken down to oxygen and haemoglobin.
The haemoglobin present in the blood then react with the carbondioxide which is then forming carbaminohaemoglobin which is then sent to the respiratory surface and broken down to carbondioxide and hamoglobin thus they exchange carbondioxide which diffuses in the alveoli and then allowed to escape.

Candidates who had average performance were able to give correct explanation on the term respiration and correctly named the two types of respiration. Also, they explained how gaseous exchange occurs across the alveolus, but their explanation lacked clarity which led to loss of some marks. The candidates who scored full marks managed to give correct answers in all parts of the question.

2016

8 marks

9. (a) Explain how anaerobic respiration is applied in a real life situation.

(b) List the organs responsible for gaseous exchange in the following organisms:
(i) Goat
(ii) Grasshopper
(iii) Frog
(iv) Tilapia.

2014

8 marks

10. (a) Differentiate the following:
(i) Breathing and respiration
(ii) Inhalation and exhalation

(b) Briefly describe the following phenomenon:
(i) A person breathes more when running fast.
(ii) The ribs move outwards and upwards while the diaphragm flattened when air enters the lungs.

2013

8 marks

10. (a) Explain two factors affecting gaseous exchange in animals.

(b) Why does a fish die when taken out of water to land while a frog survives in both water and on land?

10 a) i) Age – The age of an organism affect the rate of gaseouse exchange ~~sm~~ such young organism respire faster than old organism this due fact that young organism are in a process of growth so need high energy for growing but growing has ceased in old organism so the rate of gases exchange is slow.

ii) Physical ~~exerser~~ activity – The physical activities increase the rate of gases exchange in an organism but when the organism is rest the rate of gases exchange is slow.

10 b) Fish dies when taken out of water this is because fish use only gills for gases exchange and it use the ~~a~~ oxygen dissolve in water for gaseous exchange while frog survive in both water and on land, This is because frog use gills and also use lug, skin and mouth for gaseous exchange this enable it to live in water because ~~they~~ use gill when it ~~they~~ in water and use lug for gaseous exchange when ~~they~~ it on land, This make easy for frog to live in both water and on land.

The candidates who performed well adhered to the question demand and they managed to explain the factors that affect gaseous exchange in animals and managed environment. Furthermore, most of them had good mastery of English language as they were able to provide answers that were clear and well organized.

2012

20 marks

11. Describe the mechanism of breathing in human beings. Diagrams are not necessary.

11- Breathing is the act of taking in and out of air into the lungs and out of the lungs. Breathing enables exchange of gases in the respiratory surfaces in which through breathing in oxygen from the environment is taken into the lungs and in breathing out carbondioxide is removed from the lungs to the environment. The mechanism of breathing in man involves inhalation and exhalation in which there are different ~~events~~ changes which facilitate the two process. These process and changes that occur are described as follows

The following changes occur during inhalation

The external intercostal muscle contracts: These muscles are found in between the ribs in which they contract so as to allow movement of the ribs so as to allow air to enter the lungs.

Relaxation of the internal intercostal muscles: These work antagonistic with the external intercostal muscles so as to also allow movement of the ribs so as to allow air to enter the lungs.

The diaphragm contracts and flatters: This is because of the extension of the ribs outwards and so help to increase the area in the thoracic cavity so as to allow air to enter the lungs.

Ribs move upward and outwards: This movement of the ribs enables to provide a large area for air to enter the lungs in which it is aided by the contraction and relaxation of the intercostal muscles both external and the internal.

The volume of the thoracic cavity increases. This is due to the movement of air in the lungs in which the pressure in the lungs decreases due to the increase in volume.

11. And finally air particularlly oxygen enters the lungs, and so the process of breathing in is achieved through that manner to enable the whole process of respiration inorder to release energy

The process of breathing out in man is aided by the following changes in the respiratory surpaces:

Relaxation of the external intercostal muscles: The relaxation enables the ribs to move inwards and downwards thus enabling air particulary carbondioxide to be removed from the lungs that is exhaled.

The internal intercostal muscles contract: These ~~ale~~ muscles also enables the ribs to move inwards and downward inorder to facilitate the exhalation of carbondioxide. These 2 muscles work in ~~wa~~ pair antagonistic so as to allow movement of the ribs.

Ribs move downward and inwards: This is aided by the contraction and relaxation of the ~~in~~ intercostal muscles in which they allow carbondioxide to move out from the lungs.

Diaphragm relaxes and moves to it is original shape Through the relaxation of the diaphragm air which is carbondioxide will be forced to move from the lungs.

Volume of the thoracic cavity decrease thus leading to the increase of pressure inside the lungs and so due to this carbondioxide is forced out of the lungs.

And finally carbondioxide is expelled from the lungs to the atmosphere whereby it is then used by plants to manufacture their own food

11. In general breathing in human beings facilitates the exchange of gases for effective functioning of the body because of the removal of waste gases like carbondioxide so that it can not interfere the normal functioning of the body, and also getting oxygen which is used for respiration

The candidate had good knowledge about the question and managed to describe the mechanism of breathing in humans. The candidate used clear language and cited relevant points that enable him/her to score all the 20 marks allocated to the question.

2010

8 marks

3. (a) For each of the following processes, state the site of the process, the raw materials, important products and by-products.
   (i) Photosynthesis
   (ii) Aerobic respiration

   (b) Give reasons why it is healthier tobreath through the nose than through the mouth.

(vi) A grasshopper ventilates its gaseous exchange surfaces by

A moving the diaphragm
B beating of cilia
C rhythmic body movement
D opening of spiracles
E moving its rib cage

(vi) Which of the following structures is a site of respiration?

A Chloroplast
B Ribosome
C Nuclear
D Nucleic acid
E Mitochondrion

(iv) The main product of anaerobic respiration process in plants is

A uric acid
B lactic acid
C alcohol
D water
E oxygen.

Multiple Choice Questions
Section A 10 Marks

2019

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) What is the aim of doing an experiment when conducting a scientific investigation?
A Identifying a problem
B Finding a solution
C Testing a hypothesis
D Gathering information
E Recording results

(ii) Why is it advised to build an incinerator in every hospital and health centre?
A for collecting wastes.
B for disposing gaseous wastes.
C for disposing liquid wastes.
D for burning hazardous wastes.
E for disposing plastic wastes.

(iii) Mrs. Juma's child has protruding stomach and swollen lower limbs. What type of food should she give to her child to overcome the problem?
A Starch
B Lipids
C Proteins
D Minerals
E Vitamins

(iv) In the food chain: Grass → Zebra → Lion. A lion is
A a primary consumer.
B a secondary consumer.
C a producer.
D a tertiary consumer.
E a decomposer.

(v) Water from the roots of flowering plants is transported up to the plant by different forces. Which of the following forces initiates and raises water to the least height?
A Root pressure
B Transpiration pull
C Cohesion forces
D Adhesion forces
E Capillarity

(vi) A patient has been diagnosed with low level of blood sugar. Which hormone would you recommend to regulate the victim's sugar?
A Insulin
B Glucagon
C Antidiuretic
D Aldosterone
E Testosterone

(vii) Which one is the feature of aging in human beings?
A Shorter reaction times
B Strong bones
C Strong muscles
D Body increases in size
E Wrinkling of the skin

(viii) What is the role of node of ranvier in a neurone?

A To transmit the impulses away from the cell body.
B To insulate the axon and speed up transmission of impulses.
C To transmit nerve impulses from one nerve to another.
D To speed up the transmission of nerve impulses.
E To transmit the nerve impulses towards the cell body.

(ix) What is variation as applied to genetics?

A Differences among individuals of the related species.
B Differences among individuals of the same species.
C Differences among individuals of different species.
D Differences among individuals of unrelated species.
E Differences among individuals of the expected species.

(x) Which one is correct about Cosmozian theory of origin of life?

A Life was brought in this Earth from elsewhere.
B Life arose according to physical and chemical laws.
C Living organisms arose from non-living materials
D The Earth and all organisms on it were created by God.
E The planet Earth and all the organisms have always been there.

2018

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 commensalisms D mutualism
E endoparasite.

2017

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) Goitre is a deficiency disease caused by lack of which element in the diet?
A Carbohydrate B Iodine C Vitamin E
D Vitamin C E Protein.

(ii) Tongue rollers in genetics is an example of
A gametogenesis B continuous variation C swallowing
D lubricating food E discontinuous variation.

(iii) Which food substance is investigated in the biuret test procedur?
A Carbohydrate B Lipids C Protein
D Starch E Reducing sugar.

(iv) The product of anaerobic respiration process in animals is
A lactic acid B carbondioxide C alcohol
D water E oxygen.

(v) A phylum consisting of species with jointed appendages and exoskeleton is known as
A Chordata B Anelida C Arthropoda
D Platyhelminthesis E Nematoda.

(vi) Which part of the flower receives pollen grain during pollination?
A Petal B Stigma C Stamen
D Style E Ovary.

(vii) A rapid growth in plants is mainly taking place in
A leaves B cambium C roots
D shoots and root tips E stem.

(viii) Which of the following is NOT a component of First Aid Kit?
A Razor blade B Panadol C Bandage
D Soap E Microscope.

(ix) Which disease spread rapidly as a result of poor waste disposal?
A Anemia B AIDS C Cholera
D Leukemia E Small pox.

(x) A voluntary muscle that is capable of relaxing continuously and do not fatigue easily is known as
A skeletal muscle B biceps C triceps
D cardiac muscle E smooth muscle.

2016

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) Caridac muscle can be found in which part of the animal body?
A Skull B Heart C Small intestine
D Limbs E Head.

(ii) The kidney in animals is mainly responsible for
A excretion B digestion C transportation
D respiration E absorption.

(iii) The aim of experiment in the scientific investigation is to
A identify the problem B test the hypothesis C confirm the problem
D predict the results E collect data.

(iv) The main product of anaerobic respiration process in plants is
A uric acid B lactic acid C alcohol
D water E oxygen.

(v) Which of the following parasitic organisms is typicall ectoparasite?
A Tick B Tapeworm C Plasmodium
D Round worm E Lichen.

(vi) Which of the following is a seed bearing plant?
A Liverwort B Prothallus C Fern
D Sisal E Moses.

(vii) A part of an onion bulb which is important for vegetative propagation is
A scale leaves B foliage leaves C terminal buds
D roots E stem.

(viii) Which of the following is NOT a component of blood?
A Erythrocyte B Platelets C Leucocyte
D Plasma E Vein.

(ix) Which food substance can be tested by using iodine solution?
A Protein B Starch C Carbohydrate
D Non reducing sugar E Reducing sugar.

(x) The offspring produced by mating the F1 generation is konwn as
A F3 generation B F1 products C F2 generation
D New generation E Genetic generation.

2015

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

(i) Bowman's capsule is found in which of the following organs?

A Liver B Pancreas C Kidney
D Spleen E Heart

(ii) Which of the following processes is involved in the regulation of body temperature in human beings?

A Urination B Painting C Deamination
D Sweating E Detoxification

(iii) A structure that allows air to enter the trachea and prevents food from entering the wind pipe is known as

A glottis B tongue C soft plate
D mouth E epiglottis

(iv) Study the following sequence of organisms:
Grass → Rabbit → Wolves → Fleas
The sequence is an example of

A food web B ecosystem C a pyramid
D food chain E abiotic

(v) Lipase enzymes are mainly contained in which digestive secretions?

A Hydrochloric acid B Gastric juice C Saliva
D Intestinal juice E Pancreatic juice

(vi) A person who is admitted in the hospital after an operation will most likely be fed on food rich in:

A vitamin C B vitamin A C protein
D lipids E water

(vii) Which of the following is a vector of sleeping sickness?

A House fly B Mosquito C Tsetse-fly
D Tick E Cockroach

(viii) The outer most living structure that identifies a plant cell is the presence of

A cytoplasm B vacuole C cell wall
D nuclear membrane E cell membrane

(ix) One of the most distinctive features used to place organisms in the Kingdom Fungi is the presence of

A gill structures B hyphae C cellulose
D cap E exoskeleton

(x) Which of the following represent the organisms with homologous structures?

A Wings of Birds and Butterfly
B Forelimbs of Bird and Bat
C Tail of Rat and Scorpion
D Sting of Honey bee and Mosquito
E Beak of Duck and Hen

2014

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

(i) A term which best describes a condition of a plant cell that has lost too much water is

A haemolysis B turgidity C creanation
D plasmolysis E osmosis

(ii) Bowman's capsule in the kidney functions as a

A filter B sanction pump C transmitter
D sponge E absorber

(iii) A structure which controls the body balance in humans is located in the

A outer ear B eardrum C inner ear
D middle ear E inner membrane

(iv) The main product of photosynthesis process is

A sunlight energy B carbohydrate C carbon dioxide
D water E oxygen

(v) Species with cellulose in their cells are formally placed in

A Kingdom Monera B Kingdom Fungi C Kingdom Animalia
D Kingdom Plantae E Kingdom Protista

(vi) Fertilization process is defined as

A formation of new cells B union of an egg and sperm
C implantation of a zygote D fusion of eggs in the uterus
E cell division in the oviduct

(vii) Mutual interaction between two species is described by which of the following characteristic

A Both live as parasite B Both may be harmed
C Both benefit and flourish D One is harmed and the other benefits
E Both neither benefits for is harmed

(viii) One of the characteristics used to identify producers in the ecosystem is

A feeding on ready-made food B growing in fertile soil
C feeding on other organisms D making their own food
E adding organic matter in the soil

(ix) The role of the optimum temperature in cellular activities is to

A change the chemical reactions
B balance the equilibrium of the reactions
C destroy many enzymes at once
D speed up the rate of chemical reaction
E create favourable environment for enzymes

(x) Rise of body temperature in the human body is corrected mainly by

A Dilating the skin arteries and sweating
B Constricting the skin arteries and shivering
C Dilating the skin veins and sweating
D Constricting the skin veins and shivering
E Dilating of arteries and shivering

2013

1. For each of the items (i) – (x), choose the correct answer from among the given alternatives and write letter beside the item number.

(i) Animals which are able to maintain fairly constant body temperature are described as

A poikilothermic
B hydrostatic
C sympathetic
D symbiotic
E homoiothermic

(ii) Night blindness in the human body is avoided by eating

A oranges
B carrot
C red meat
D green vegetables
E chicken

(iii) A blood vessel which conveys deoxygenated blood away from the heart is called

A capillaries
B artery
C vein
D pulmonary vein
E pulmonary artery

(iv) The function of cones in the human eye is to

A sense light
B sense colour
C cover the eye
D reflect light
E protect the eye

(v) A term used to identify an individual animal having both male and female sex organs is

A unisexual
B hermaphrodite
C asexual
D dioecious
E monoecious

(vi) Which of the following structures is a site of respiration?

A Chloroplast
B Ribosome
C Nuclear
D Nucleic acid
E Mitochondrion

(vii) The structures found in bacteria are

A plasmid, flagella and cilia
B cytoplasm, cilia and pastids
C cell wall, plasmid and flagella
D cell membrane, flagella and hairs
E plasmid, capsule and cilia

(viii) The by products in the photosynthesis process are

A carbohydrate and water
B carbon dioxide and oxygen
C oxygen and water
D carbohydrate and carbon dioxide
E oxygen and air

(ix) The factors which contribute to the spread of dental cavities in human being include

A prolonged exposure to cold water
C prolonged exposure to warm water
E prolonged exposure to sugary foodstuff
D prolonged exposure to bitter food
E prolonged exposure to hard water

(x) The main feature observed in prokaryotic is that they

A have genetic materials not enclosed by nuclear membrane
B have genetic material enclosed by nuclear membrane
C have no genetic material in their nuclear
D have more than one nucleic acid in their nuclear
E have genetic material enclosed by two membranes

2012

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

(i) The joint in the human body which allows movement in all directions is known as

A pivot
B hinge
C double hinge
D ball and socket
E peg and socket

(ii) Which of the following is a metabolic waste product?

A Tears
B Saliva
C Mucus
D Faeces
E Urine

(iii) The following are examples of water-borne diseases:

A malaria and bilharzia
B yellow fever and typhoid
C diarrhoea and malaria
D cholera and plaque
E cholera and typhoid

(iv) One of the distinctive features of kingdom Fungi is possession of:

A plasma membrane
B cytoplasm
C chitin materials
D cell membrane
E cellulose material

(v) The regions of most active growth in plants are found mainly in the

A axillary buds and flowered
B stems and leaves
C stems and root hairs
D leaves and flowers
E stem and root apices

(vi) A grasshopper ventilates its gaseous exchange surfaces by

A moving the diaphragm
B beating of cilia
C rhythmic body movement
D opening of spiracles
E moving its rib cage

(vii) The taxonomic category of organisms belonging to the same class but not the same family is:

A Species
B Genus
C Order
D Phylum
E Kingdom

(viii) The breakdown of glycogen into glucose in the body is due to the action of:

A insulin
B adrenaline
C secretion
D glucagon
E gastric

(ix) The function of sunlight energy in the human skin is the stimulate the synthesis of

A vitamin A
B vitamin C
C vitamin D
D vitamin K
E vitamin B

(x) A rise in the temperature of a human body is corrected by

A construction of the skin arteries and sweating
B construction of the skin arteries and shivering
C dilation of the skin arteries and sweating
D dilation of the skin arteries and shivering
E shivering and sweating

2011

1. For each of the items (i) – (x) choose the correct answer from among the given alternatives and write its letter beside the item number.

(i) How many gametes are produced from one cell during meiosis?
A Two B Four C Six
D Eight E Ten

(ii) Which of the following is not an excretory product in plants?
A Tannins B Carbon Dioxide C Urea
D Calcium oxalate E Latex

(iii) Why are skeletal muscles usually found in opposing pairs?
A One muscle alone cannot extend a joint
B Muscles can only work by contraction
C One muscle alone cannot flex a joint
D Paired muscles are stronger
E Muscles normally work in antagonistic fashion

(iv) Which of the following bests defines allergy?
A Body reaction to antigen
B Body reaction against a specific drug
C Body reaction against a disease-causing micro-organism
D Accumulation of mucus caused by inhaling dust particles
E Formation of rash caused by eating specific foods

(v) When students were conducting private study at night, lights went off completely. Which of the following changes occurred in the eyes of the students?
A The lens became thicker B The pupil became larger
C The ciliary muscle relaxed D The lids close
E The eyes opened wider

(vi) Select the item that indicates the best match in vitamin-deficiency:
A Vitamin A ..... dry scaly skin
B Vitamin B ..... loss of appetite and yawning
C Vitamin C ..... anemia and high blood pressure
D Vitamin D ..... soft deformed bones
E Vitamin K ..... poor night vision

(vii) Which of the following is formed immediately after fertilization?
A A placenta B An embryo C A foetus
D Amniotic fluid E A zygote

(viii) The human ovary secretes hormones known as:
A Oestrogen and testosterone
B Progesterone and testosterone
C Oestrogen and lactogen
D Oestrogen and progesterone
E Follicle stimulating hormone and progesterone

(ix) The offspring of crosses between red flowered and white flowered plants were always found to be pink. This is an example of:

A Crossing over B Mutation
C Co-dominance D Incomplete dominance
E Natural selection

(x) At early stages of development of the human zygote which organ develops first?

A Liver B Heart C Kidney
D Eyes E Notochord

2010

1. For each of the items (i) – (x) choose the correct answer from among the given alternatives and write its letter beside the item number.

(i) Which of the following is common to both plants and animals?

A Respiration
B Digestion
C An excretory system
D Chloroplasts
E Starch grains

(ii) A flower which possesses both stamens and carpels is said to be

A Unisexual
B Hermaphrodite
C Monoecious
D Zygomorphic
E Polymorphic

(iii) Useful substances are retained in the kidney by

A Filtration
B Osmosis
C Selective reabsorption
D Osmo-regulation
E Diffusion

(iv) The Monera are also referred to as Prokaryotes. This means having:

A No nucleus
B Membrane bounded organelles
C Simple structures
D Reduced nucleus
E Circular nucleus

(v) Which of the following is a characteristic of wind-pollinated flowers?

A They have large brightly coloured petals
B They produce a small number of pollen grains
C They have small anthers situated inside the flower
D They do not have nectarines
E They have large, sticky or spiky pollen grains

(vi) Food is moved along the oesophagus by a process known as:

A Assimilation
B Chewing
C Egestion
D Peristalsis
E Churning

(vii) Reptiles differ from birds because:

A Reptiles do not lay eggs while birds do
B Reptiles have a backbone while birds do not
C Reptiles have scales while birds do not
D Reptiles are cold blooded while birds are warm blooded
E Reptiles have moist skin while birds have dry skin

(viii) Removal of predators in the ecosystem will result in:

A Decrease in the number of producers
B Increase in the number of producers
C Decrease in the number of prey
D An increase in the number of decomposers
E No significant change

(ix) A bean plant can either bear terminal or axial flowers. When a terminal flowered plant (T) is pollinated with an axial flowered plant (t), the offspring produced were 200 terminal flowered and 210 axial flowered. Which of the following represents the genotypes of the parents?

A TT x Tt
B Tt x Tt
C TT x tt
D Tt x tt
E T x t

(x) What does selective breeding mean?

A Only pure stock should be inbred
B The parents are chosen to produce desired offspring
C The encouragement of out breeding
D The parents are chosen carefully
E The offspring are like parents

2008

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

(i) Having a swollen painful lymph node under the armpit is a sign of
A a septic wound on the arm
B building immunity against diseases
C a septic wound in any part of the body
D a septic wound on a leg
E building immunity on a leg.

(ii) A reproductive cell which develops in a new organism without fertilization is called
A sporophyte B gamete C gametophyte
D sporangia E spore.

(iii) When a baboon stretches out its fore arm to pick mango fruits from a tree, the motion of the arm is brought about by
A contraction of the biceps and relaxation of triceps
B contraction of triceps and relaxation of biceps
C relaxation of both biceps and triceps
D contraction of both flexor and extensor muscles
E relaxation of the biceps and contraction of triceps.

(iv) During a Biology practical session form four students classified whale as a mammal, although it lives in water and swims like fish. Which of the following features guided them to place whale in that group?
A Presence of mammary glands, shows parental care, and has lungs.
B Possession of mammary glands, diaphragm and placenta.
C Presence of gills, lungs and different kinds of teeth.
D Suckle their young, have tail, and lungs.
E Have mammary glands, fins and body covered with fur.

(v) A farmer observed excessive elongation in peas after the plants were treated with a certain chemical. The chemical might have possessed
A cytokinin B auxins C ethylene
D gibberellins E abscisic acid.

(vi) If you look at cells in rat muscles, you will observe that they contain nuclei but lack chloroplast. The statement that rat muscle cells contain nuclei but no chloroplast is termed as
A a hypothesis
B an assumption
C conclusion
D an experiment
E observation.

(vii) All body metabolic activities carried out within the body of living organisms use ATP as a source of energy instead of glucose. Why is this so?

A Less energy is produced from glucose.
B Glucose has to undergo further digestion processes.
C Glucose is not available in the body of most organisms.
D ATP produces more energy.
E ATP is a free energy which is readily available.

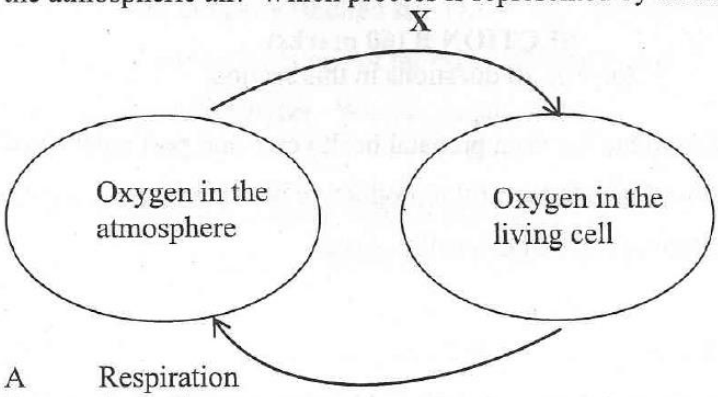
(viii) A student took a blood smear from her finger tip and examined it under a microscope. Which was the most abundant cell type that she observed?

A Thrombocytes.
B Leucocytes.
C Phagocytes.
D Erythrocytes.
E Macrophages.

(ix) Mama Sikujua delivered four children in four years of her marriage time, which were not twins. What are the consequences of this?

A She becomes economically unproductive, weak and psychologically stressed.
B She becomes, weak, unhappy and lazy.
C She gets older, psychologically stressed and miserable.
D She becomes economically unproductive, poor health and lonely.
E She will be unhappy, poor and lonely.

(x) Figure 1 below shows a cyclic movement of oxygen between a living organism and the atmospheric air. Which process is represented by an arrow labelled X?



A Respiration
B Excretion
C Photosynthesis
D Transpiration
E Evaporation

Biology CSEE

Past Paper Questions and Answers By Topic

Contents

10. Movement

11. Coordination

12. Excretion

13. Regulation

14. Reproduction

15. Growth

16. Genetics and Variation

17. Evolution

Multiple Choice Questions Section A

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Introduction to Biology
Safety in Our Environment
Health and Immunity
Cell Structure and Organisation
Classification of Living Things

Form II
Classification of Living Things
Nutrition
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Transport of Material in Living Things
Gaseous Exchange and Respiration

Form III
Classification of Living Things
Movement
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Form IV
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Biology Exam Marks per Question	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Q1 Multiple choice questions	10	10	10	10	10	10	10	10	10
Q2 Match phrases with list	10	10	10	10	10	10	10	10	5
Q3 – Q10 answer all	60	60	60	60	60	60	60	60	60
Q11- Q13	20	20	20	20	20	20	20	20	25
Total	100	100	100	100	100	100	100	100	100
Biology Exam Marks per Topic									
1. Introduction to Biology	8	8	6		6	8	8	6	6
2. Safety in Our Environment	8	8	20	8	8	8	8		6
3. Health and Immunity and HIV, AIDS and STIs		20	20	20 + 20	20 + 8	20	10	10	15
4. Cell Structure and Organisation	6								6
5. Classification of Living Things	10		10	20	8	8	20	8	10
6. Nutrition	5	8	8	8	8	8	20	8	6
7. Balance of Nature	8	6				8	8	8	
8. Transport of Material in Living Things	20	6	6	6	20	20	6	8	6
9. Gaseous Exchange and respiration		20	8	8		8	8		6
10. Movement	8	8			20	8	6		5
11. Coordination	20 + 7	20 + 10	8	10	8			20	6
12. Excretion								20	6
13. Regulation				8		20			6
14. Reproduction			20			8	8	6	6
15. Growth		8	8	8	10		20	8	
16. Genetics and Variation		8	8	8	6	10	8	8	10
17. Evolution			8	6				20	

10. Movement

2019

2. Match the functions of components of the skeleton in **List A** with their corresponding components of the skeleton in **List B** by writing the letter of the correct response beside the item number in the answer booklet provided.

LIST A	LIST B
(i) Axial component which protects the delicate internal organs such as lungs and the heart.	A Pivot
(ii) Axial component which protects the brain and provide area for attachment of the neck.	B Vertebral column
(iii) Appendicular component which provides a large surface area for muscle attachment and a base for articulation with hind limbs.	C Lumbar
(iv) Axial component which protects the spinal cord.	D Pelvic girdle
(v) Appendicular component which provides a large surface area for muscle attachment and a base for articulation with upper arm bones.	E Cervical
	F Rib cage
	G Skull
	H Pectoral girdle

2017

6 marks

8. (a) Name three type of muscles found in mammals.

(b) Briefly explain how muscles are adapted to their role. Give three points.

8. a) i) Smooth muscle.
ii) Skeletal muscle
iii) Cardiac muscle,

8. b) i) They are elastic, This hele to contract and relax without fatigue cardiac muscle
ii) They have myogenic, This help to relax and contract without nervous stimullation.
iii) They have mitochondria, This help to produce energy for muscle contraction in pumping.

Candidate with adequate knowledge in the topic of *Movement* was tested in this question. However, the responses of the candidates who scored average marks on the adaptations of the muscles to their roles were not detailed enough to indicate how the structures in a muscle relate to the function performed by that muscle.

2016

8 marks

7. (a) (i) Name three types of muscles found in mammals.
   (ii) Which one of the muscle named in (a)(i) is a voluntary muscle?

   (b) Briefly explain the functions of the following component of the skeleton:
   (i) Skull
   (ii) Ribs
   (iii) Vertebral column
   (iv) Pelvic girdle.

2015

20 marks

13. Explain the functions of the major components of the human skeleton and their adaptations.

13.

Human Skeleton this is the structure which consist of bones and cartilages this means that there are hard bones and soft bones. The Human skeleton have many major components with their function to the body. The following are the components of human skeleton and their functions:

Skull: the skull is one of the component of the human skeleton and the skull is very hard. The skull have many function which involve protecting of smooth organs such as eyes, brain and also the skull give the head its shape. So these are the function of the skull as one of the component of the human skeleton.

Vertebral Column: The vertebral column is also one of the major component of human skeleton. The vertebral column have the vertebra. The function of the vertebral column is to protect the spinal cord from being damaged and also vertebral column allow the human being to bend down because of the vertebral's which have space from one to another.

Joints: also the human skeleton have joints. In human skeleton there are many joints which have their main function of allowing the movement. So movement is the main function which is allowed by the presence of joints in the human skeleton. So this also is one of the component of human skeleton.

Scapular: this is the large bone in the structure of the human skeleton. The scapular is ~~bone~~ the bone which also have several function like attaching the shoulders and also the scapular have the large surface which increase the area for the attachment of muscles. So this also

u the Component of the human Skeleton.

Ribs the ribs have Important role in the human Skeleton System because they almost prevent many parts of the body from being damaged. These parts Include the heart, lungs kidneys, liver, pancreas and many other thing which are within the ribs. So ribs is one of the mayor Components of the human Skeleton.

Cartilage; this is also one of the mayor Components of the human Skeleton because Cartilage this are the Spongy bone or Soft bone and they are mostly found at the end of the bones which means on the joints and the function of this Cartilages is to reduce friction within the joints so the Cartilage also have the Important role in the human Skeleton.

Pectoral girdle; this also is One of the Component of the human Skeleton. The pectoral girdle is attached by the ribs and the function of the pectoral girdle is to attach the Shoulders as you know that there is the ball and Socket joint in the pectoral girdle So also pectoral girdle give the body is Shape.

Pelvic girdle; this also is one of the Components of the human Skeleton. The pelvic girdle also functions as the pectoral girdle but the pelvic girdle attach the Limbs / the hind limbs / Legs. Also in the pelvic girdle there is the protection of Smooth organ Such as anus and Vagina in woman. So this also have Sockets which help the human to excrete Unwanted materials from the body.

In Conclusion, these are the mayor Component of the human Skeleton and their function as they mentioned the Skull, Vertebral Column, Joints, Scapular, Ribs, Cartilage pectoral girdle, pelvic girdle. These are the Components of the human Skeleton and their function to the body and all things which they Support and protect.

The candidates who performed well in this question met the demand of the question as they were able to provide clear explanations on the major components of the human skeleton and their adaptations. In addition to that, they demonstrated good skills in essay writing and good mastery of English language. This indicates that the candidates had adequate knowledge on the topic on Movement.

2012

8 marks

10. (a) Briefly explain three importance of movement in plants and animals.

(b) State any five functions of the skeleton.

10. a) - It brings both plants and Animal to a good site of breeding (mating).
- it directs the plants towards unilateral stimuli like photosynthesis, Phototropism.
- it helps plants and Animals to move away from negative stimuli For instance the area of shortage of water.

b) - it protects vital organs like Heart and brains.
- it used to store minerals like potassium and calcium
- It is used in Formation of cells For example Red blood cells in the bone marrows.
- it gives support in movement by attachment of other bones
- it gives definite shape of the body, example Compact shape of the human body.

2011

7. (a) Name two types of girdles found in the skeletal system.

(b) (i) Describe the three main functions of limb girdles.
(ii) State the type of joint formed at the girdles.

(8 marks)

11. Coordination

2019

5. What are the differences between the nervous system and endocrine system? Give three points.

5. Differences between nervous system and endocrine system.

Nervous system	Endocrine system
i) Electrical impulse evoke a response in nervous system.	- Hormones evoke a response in endocrine system
ii) Electrical impulses are transported through neurons in the nervous system.	- Hormones are transported through the bloodstream in the endocrine system.
iii) The response is short-lived in the nervous system.	- The response is long-lasting in the endocrine system.

Candidates correctly explained the differences between nervous system and endocrine system. This indicates that the candidates had adequate knowledge of the topic of Coordination.

2018

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

11. Drug abuse is the misuse of drugs for own personal purposes without any doctor's restrictions. Drug abuse affect most of youth's lives due to brain damage, loss of man power, the problem of fertilization in both men and women.

The following are the causes of drug abuse;

Peer pressure; this causes a person to engange his/her self in drug abuse, peer pressure like bad friends in school or streets can influence other people or friends to engage in drug abuse, thus a person being addicted to the use of drugs abuse.

Bad parental care; this is most in single parent - families where the is only parent. This make easy a child to engage in drug abuse because only one parent like is not capable enough to handle the children in her own. So if the child lacks that good parental care of both two parents (father and mother) it may find him/her easy to engage in drug abuse. Therefor bad parental care cause drug abuse.

Ignorance; A person ignorance and inability to know the effects of drug abuse lead a person to engage in drug abuse. Therefore ignorance of people cause drug abuse.

Stress; Someone's stress may cause drug abuse. Since a person has Many stress of life like being jobless, hurt in Love, having conflict with others then think that engaging in drug abuse will help them to overcome and forget their stresses, therefore stress causes drug abuse.

The following are the preventive measures of the drug abuse;

Provision of good parental care; through this, will help to prevent the usage of drug abuse becau

11. fe. the good parent care lead the children to proper behaviour that is morally acceptable by members of family, society and community at large. A good parental care help in insuring children's good behaviour and not to engage in bad behaviours. Therefore; good parental care prevents drug abuse.

Provision of education to drug users; Education should be provided to people who are using drug abuse on the effects of drug abuse so that they can not and understand that drug abuse has great negative impact to the people and the country at large.

Keeping one self busy; this is another way to prevent one self from drug abuse. If a person is busy he/she will not think of using drug other than doing other activities. So keeping one self busy help to prevent drug abuse.

Avoiding peer pressure like bad friends; this will help to prevent drug abuse, because bad friends in schools, streets like to influence other friend to engage themselves in bad behaviour like drug abuse, so Avoiding peer pressure prevents drug abuse

Law enforcement; this may be through punishment to law breakers like drugs user. All drugs users should be punished so as other drug users may get scared of continue using drugs; thus law enforcement prevent drug abuse.

Generally, the usage or misuse of drugs for personal use with any doctor's restriction has great impact to people life especially health like brain damage, it low body immunity and may cause death to people if the users are highly addicted to drugs.

Candidates correctly elaborated four causes and five preventive measures of drug abuse and organized their essays having introduction, main body and the conclusion. They also show mastery of English through good writing skills.

2015

8 marks

7. The diagram in Figure 1 represents an eye of a human being.
Study the diagram and answer the questions that follow:

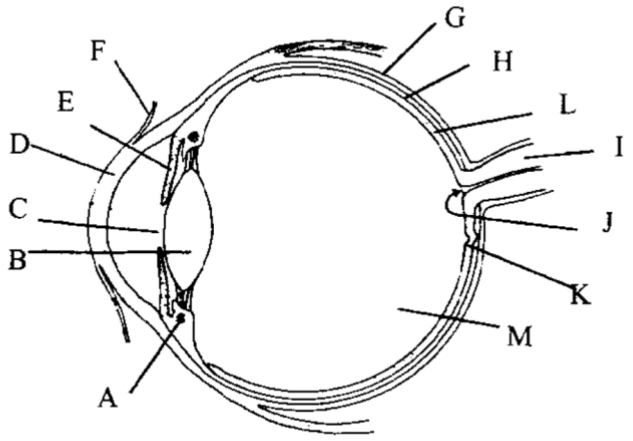


Figure 1

(a) Name the labeled parts A – L.

(b) What will happen in part C if someone suddenly faces:
(i) the dim light.
(ii) bright light.

7. a) A is ciliary body
B is lens
C is pupil
D is Cornea
E is Iris
F is Conjuctiva.
G is Sclera.
H is Choroid layer
I is Optic nerves
J is Blind spot
K is Fovea
L is Retina

b). i/ When someone faces dim light part C increases in size to allow more light to pass through

ii/ When someone faces bright light part C decreases in size to allow only little amount of light to pass through

Candidates were able to write the names of the parts labelled in the diagram of the human eye. Also, the had knowledge on how the pupil responds to stimulus (light intensity) in part (b). This indicates that the candidates in this category had enough knowledge on the topic of Coordination.

2014

10 marks

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

LIST A	LIST B
(i) Receives impulses and gives appropriate response to stimuli.	A. Synapse
(ii) A gap through which impulses pas when traveling from one neuron to another.	B. Effectors
(iii) Receives impulse from the external stimuli and transmits it to the spinal cord.	C. Hypothalamus
(iv) Controls and coordinates body balancing organs, thus making accurate movement possible.	D. Biceps Muscles
(v) The nervous pathway taken by an impulse in a reflex action.	E. Motor neuron
(vi) Transmits impulse away from the spinal cord.	F. Peripheral nervous system
(vii) Controls involuntary actions such as heart beats, breathing, sneezing and swallowing.	G. Central nervous system
(viii) Transmits impulses within the spinal cord.	H. Medulla oblongata
(ix) Concerned with reasoning, intelligence and judgment.	I. Reflex arc
(x) Controls the pituitary gland.	J. Reflex neuron
	K. Cerebellum
	L. White matter
	M. Cerebrum
	N. Sensory neuron
	O. Affector

2013

8 marks

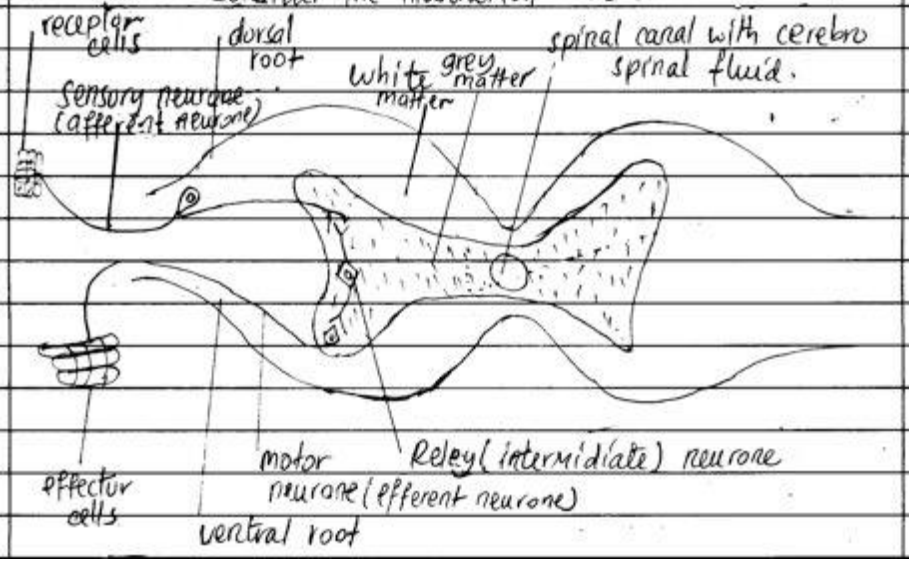
5. (a) Define the term "irritability."

(b) Describe the neuronic pathway taken by reflex actions in human being.

5. (a) irritability is the ability of an organism to detect the stimulus and give responce to it.

b) The neuronic pathway taken by the reflex action is called the reflex arc which begins in the receptor cells when an organism detects stimulus then the sensory nervers transmit the information (impulses) to the relay neurones in the spinal cord which then via the motor neurone send information to the effectors which intiate a responce.

Consider the Illustration below.



The candidates who performed well adhered to the demand of the question. They demonstrated enough knowledge on the topic of coordination as they managed to provide correct responses. Furthermore, the candidates had good drawing skills and their responses were illustrated by clear and well-organized diagram of a reflex arch.

2012

10 marks

2. Match the responses in **List B** with the phrases in **List A** by writing the letter of the correct response from **List B** beside the item number of **List A** in your answer booklet. Each choice in column B may be used once, more than once or not at all.

LIST A	LIST B
(i) The layer of cells sensitive to light	A. Aqueous humour
(ii) Lacks light intensity cells	B. Cornea
(iii) Cells sensitive to light of low intensity	C. Iris
(iv) Cell sensitive to coloured light intensity	D. Eyebrow
(v) Control the intensity of the light entering the eye	E. Retina
(vi) Control the shape of the lens	F. Rods
(vii) Correct short sight	G. Blind spot
(viii) Reduce reflection of the light within the eye	H. Cones
(ix) Helps to refract the light into the eye	I. Eyelash
(x) Cause refraction of the light in the eye	J. Choroids
	K. Ciliary body
	L. Diverging lens
	M. Fovea
	N. Pupil
	O. Eyelids

2012

20 marks

12. Elaborate the causes of drug abuse to young people and advise the Tanzanian Government on the ways of combating drug abuse in the country.

12. Commercial advertisements aiming at the promotion of certain drugs such as nicotine, caffeine may influence some people to take drugs. Some advertisements of certain drugs may motivate people especially young people to become drugs abusers.

Some take people take drugs inorder to as a matter of curiosity. They take drugs inorder to know the effects and reaction such drugs in their body. This may lead to drug abuse as well.

Others to Drug abuse can also be caused as a result of taking drug inorder to avoid obey the rules of certain group. This is common to many youth, they take drug so as to follow the rules of a certain group, in many cases these are illegal groups. e.g.

Peer pressure may also be one of the causes of drug abuse. Many youths are motivated by others so that they may engage in illegal activities such as drug abuse.

Weak family structure may also be a cause of drug abuse. Unproper upbringing of children may cause children to engage in immoral acts, on of them being drug abuse; due to lack of proper morals.

Some of ways in which I would advise the Tanzania Government inorder to combat the drug abuse in the country are:-

Enactment of strict laws by the government as well as punishments inorder to restrict the problem of drug abuse in the country. Laws should enacted and enforced inorder to limit the drug abusers as well as to stop drug abuse in the country.

12. Mass education is also important inorder to fight against drug abuse. The government as well as other institutions and NGO's (Non-Governmental Organizations) should educate the mass on the imp effects of drug abuse.

Young people (youth) should in other be encouraged by the government to engage in different productive activities. The government should also diversificate the economy and provide employment opportunities to people inorder to keep them busy and not to remain idle and engage in drug abuse

Crops producing drugs such as tobacco should strictly prohibited by the government of Tanzania inorder to stop the production of harmful drugs which may lead to drug abuse.

The government should open up rehabiliation centre for those who are already involved in drug abuse activities a inorder to stop the spread of drug abuse. effect.

These are some of the causes as of drugabuse as well as the ways in which the government can use to combat the problem of drug abuse. At lower level like at family level proper upbringing of the children is very important as well.

Candidates had enough knowledge to explain the causes of drug abuse such as social pressure, weak family structure, to get relief from anxiety, mismanagement of drugs, curiosity, Globalization, and lack of education. They were also able to explain the ways of combating such as providing education, drugs management, to enforce the laws, involving the community and establish youth centres.

2011

5. (a) Define the term "irritability" in living organisms.

(b) How does each of the aspects below illustrate the phenomena in 5(a) above?
(i) Germinating seeds
(ii) A potted hibiscus plant growing near a window
(iii) A zebra sniffing the air with a predator nearby.

(7 marks)

20 marks

13. (a) State the function of the following parts of the brain:
(i) Medulla oblongata
(ii) Hypothalamus
(iii) Cerebellum
(iv) Cerebrum

(b) (i) Define the term "drug use"
(ii) Explain three effects of drug abuse
(iii) Explain two ways in which drug abuse can be controlled

2010
20 marks

12. The brain is the largest portion of the nervous system and very important for controlling activities in the body. With the aid of a diagram, describe the functions of the different parts of the human brain. Explain why only humans are said to be intelligent.

12. Excretion

2019

11. Consider that you are a medical doctor and you have received a patient whose investigation has diagnosed kidney stones. Suggest to the patient three possible causes and three control measures for kidney stones.

11. The causes of kidney stones are:-
- Eating too salty foods frequently.
- Not drinking enough water.
- Excessive drinking of alcohol and intake of some drugs

The control measures are:-
- Drinking alot of water.
- Reduce intake of salty foods.
- Reduce the intake of alcohol and unnecessary drugs.

Candidates correctly suggested three possible causes and three control measures of kidney stones. This shows that the candidates had adequate knowledge of the complications and disorders of the excretory system.

2018

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

12. Urinary system is the system that deal with excretion. Excretion is the process of remove of metabolic waste product from the body. The main organ that help in urine formation is kidney. The urinary system is made up of the kidney, ureter, urinary bladder and urethra. Urine formation is in three stages. the following are the processes of urine formation in human beings:-

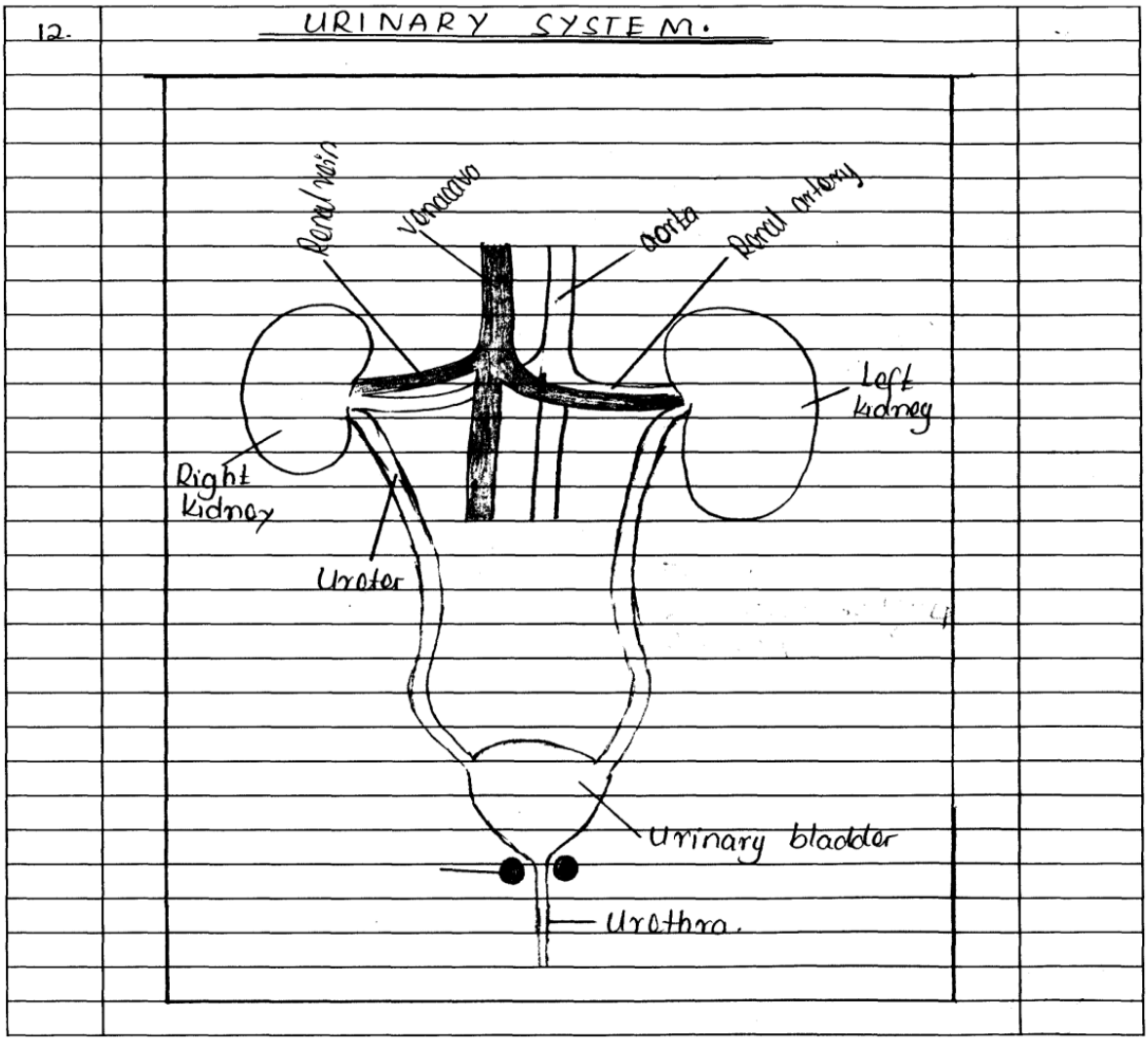
Ultra filtration. This is the first stage of Urine formation it takes place in the kidney. In the kidney there are numerous structures known as nephrons. The nephrons is made up of glomerulus, Bowman's capsule and renal tubule. At the glumerulus is where ultra filtration takes place. Glomerul is the network of blood vessels. As blood enter the glomerulus through afferent vessel which is wide it circulate in the glomerulus as it leave it find the efferent vessel narrow so pressure is created and some of the particles are filtered and some remain because they are large molecules. The filtrate is known as glomerulus filtrate composed of water, glucose, mineral salt, urea and uric acid.

Reabsorbtion. This is the stage where the useful materials which were filtered and taken back to the body. Reabsorbtion takes place in the renal tubule. Glucose reabsorbtion is the first stage which takes place in the proximal convulated tubule. At this place the filtered glucose is taken back in the body by diffusion. Water are reabsorbed in loop of Henle by

12. the help of ADH hormone Reabsorption of water is facilitated by the hormone. The last reabsorption to take place is salt which takes place at the distal convulated tubule. This reabsorption is stimulated by aldolestorone hormone which function under aldronal gland. After the reabsorption process what is left is waste product known as urine

Removal of urine. After the reabsorbtion the left is the waste known as urine which is directed to the collecting duct which transfer it to the ureter. where by the ureter take the urine to the urinary bladder which act as temporary storage of urine. When the urinary bladder is full the sphincter muscles relax and the urine is released from the urinary bladder by urethra. The process is urine release is known as urination.

To sum up, the urinary system help the body to remove the waste which could en danger it due to accumulation. The functional part of urine formation is the nephrone which are numerous in the kidney.



The candidates who performed well in this question had adequate knowledge on the topic of Excretion as they correctly described the urinary system with the aid of a well labelled diagram, and were able to explain the process of urine formation in human beings.

13. Regulation

2019

12. Reptiles are organisms whose body temperature is affected by environmental temperature. Briefly explain three ways that help reptiles to survive in different weather conditions.

12: The ways which help reptiles to survive in different weather conditions involves:

(01) Hibernation

- This is a process whereby some reptile go into a deep sleep during the cold weather conditions. Reptiles do hibernate and reduce their metabolic activities so as to survive during the cold weather conditions.

(02) Aestivation.

- This is the process whereby some reptile go into a deep sleep in the burrows during the hot weather conditions. The reptile aestivate so as to escape from very hot conditions which lead death of a reptile.

(03) Basking in the sun

In case that the temperature level decreases in the environment the reptiles move from the burrows and expose themselves to the directly sun so as to increase their temperature for metabolic activities.

Candidates correctly explained three ways that help reptiles to survive in different weather conditions. This indicates that these few candidates had adequate knowledge about temperature regulation in animals.

2016

20 marks

12. Explain how mammals regulate their internal body temperature in response to external environmental changes.

2015

8 marks

10. (a) Define the term "osmoregulation".

(b) Briefly explain the mechanisms of regulating sugar level in the blood.

10

(a) Osmoregulation is the maintainance of relatively constant of osmotic pressure of the blood

(b) → The mechanism of regulating sugar level in the blood is as follows:

– when the sugar level in the blood is above normal pituitary gland is stimulated. The pituitary gland stimulates pancreas to produce Insulin. Insulin is transported into the blood where it converts Glucose into glycogen which is stored in the liver, therefore the amount of glucose is reduced in the blood to the required level.

– when the sugar level in the blood is below normal the pituitary gland is stimulated which orders pancreas gland to produce glucagon hormone. Glucagon hormone helps to convert glycogen in the liver into glucose, in this way the level of glucose in the blood is increased up to normal level / range.

— Through this mechanisms the body is able to keep the blood sugar level in the blood relatively constant.

The candidates who did well in this question were able to define the term osmoregulation and to explain the mechanisms of regulating sugar level in the blood. This implies that the candidates had adequate knowledge on osmoregulation and blood sugar regulation.

2014

8 marks

3. (a) State three actions which take place in the human body in response to each of the following conditions:
   (i) When the temperature of the surroundings is low.
   (ii) When the body temperature rises due to increase in the surrounding temperature.

   (b) Briefly explain why people look pale when they feel cold.

14. Reproduction

2019

7. **Figure 1** represents an external structure of a hibiscus flower. Study it carefully and answer the questions that follow:

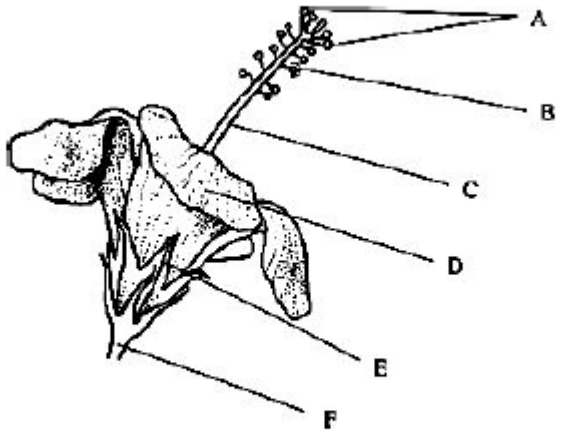


Figure 1

(a) Name the parts labeled **A**, **B**, **C**, **D**, **E**, and **F**.

(b) What are the functions of the parts labeled **B**, **D** and **E**?

7. a) A - Stigma.
B - Stamen.
C - Stamen tube.
D - Petals.
E - Sepals.
F - Flower stalk.

b) Part B.
Used in the production of pollen grains

Part D.
- Have a bright colour to attract insects
- It encloses the ovary.

Part E.
- It prevents the ovary from external damage

Candidates managed to name the parts of the flower accordingly and the functions of the labelled parts. This shows that the candidates had adequate knowledge of the structure and function of the flower parts.

2018

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

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

7 (a) Menstruation is the shading out of blood from the female reproductive system which comes out through the vagina. Menstruation occurs when the egg (ovum) that had been released from the ovary through ovulation passes through the oviduct without being fertilized. Therefore no implantation takes place and it is taken out in form of blood. it is normally accompanied by several contractions of the uterine walls hence painful. it lasts for 3 to 5 days in most women

(b) Common disorders in human reproductive system

(i) prostate cancer

(ii) cervical cancer.

The candidates performed well in this question. These candidates correctly explained the process of menstruation in human being and mentioned two types of common disorders of human reproductive system.

2017

8 marks

7. (a) Explain the process of fertilization in flowering plants.

(b) Briefly explain how you would identify an insect pollinated flower.

7a) The process of fertilization in flowering plants begins by the deposition of pollen grain on the stigma of the flower whereas the pollen grain will absorb nutrients from the stigma then the tube nucleus will initiate the formation/growth of the pollen tube down the hollow style. As it grows the generative nucleus undergoes mitosis to form two male nuclei which follow behind the pollen tube. As the pollen tube reaches the micropyle of the ovule the tube nucleus disintegrates and the end of the pollen tube bursts. The first male nuclei fuses with the functional egg nucleus to form a zygote which is the fertilization process. The second male nuclei fuses with the polar body to form an endosperm which acts as the food store for the developing embryo.

b) An insect pollinated flower can be identified using its special characteristics, such as; presence of nectaries at the base of the style having a nice scent, having large and brightly coloured petals to attract the insects and to provide a landing platform for the insects, having a sticky stigma so as to trap effectively the pollen grain from the insects.

Candidates were able to explain the process of fertilization in flowering plants as a double fertilization process. They were also able to comprehend the features of an insect pollinated flower and responded correctly. This implies that the candidates had adequate knowledge on the topic of Reproduction.

2016

8 marks

10. (a) Give the meaning of the following terms:
    (i) Vegetative propagation.
    (ii) Gamete.

    (b) Explain the merits and demerits of asexual reproduction in plants.

2013

20 marks

13. Describe four similarities and seven differences between insect and wind pollinated flowers.

13. Flowers is the modified part of the plant. This part is responsible for the reproduction. Flowers have different structures, some are unisexual while others are bisexual. Also flowers are categorized into two forms: the first is wind pollinating flowers and insects pollinating flowers. These flowers have the following summarities.

Both wind pollinates flowers and insect pollinated flowers are the reproductive organ of the plant. They are capable to develop into seed which can reproduce and growing to new individual

Both wind pollinated flowers and insect pollinated flowers have the pistil (carpel). This is the female flowering part. It consists of stigma style and the ovary which contains ovules.

Both wind pollinated flowers and insect pollinated flowers have stamen. Stamen is the male part of the flower. This part consists of ~~stamens an~~ filaments and anthers which produces pollen grains (& male gametes).

Both wind pollinated flowers and wind pollinated flowers, their ovary develops into fruits while ovules develops into seeds.

Also wind pollinated flowers and insect pollinated flowers have the

following differences:-

Insect pollinated flowers are attractive or their ~~sepals~~ petals have attractive colours. They have attractive coloured petals because of attracting insects for pollination while wind pollinated flowers are dull.

Insect pollinated flowers produce nectar while wind pollinated flowers do not. Insect pollinated flowers produce nectar inorder to attracts insect for pollination.

Insect pollinated flowers have sweet smell while wind pollinated flowers do not. They produce sweet smell inorder to attracts insect for pollination.

Wind pollinated flowers have long style inorder to exposure stigma out of petals while insect pollinated flowers do not. They exposure stigma out of petals inorder to allow free attachment of pollengrains (gametes) to the stigma.

Wind pollinated flowers have filaments attached loosely while insect pollinated flowers do not. Insect pollinated flowers have firmly attached filament inorder to allow/support weight of the insect while wind pollinated flowers have filament attached loosely to allow wind to distribute pollen grains and transfer to the stigma.

Wind pollinated flowers produce many pollen grains while insect pollinated wind do not. They produce many pollen grains since their is no guarante that all pollen grains may land on the stigma.

Wind pollinated flowers produces small and light pollen grains while insect pollinated wind produces slightly large and heavy. They produce small and light pollen grains so as to be carried easily by wind to the stigma.

The above differences based on adoptation to its mode of pollination. But all of them have the same function ~~of repro~~ in reproduction.

2012

20 marks

13. Explain five factors which contribute to irresponsible sexual behavior among young people and their effect in the community.

Lack of councelling and guidance in the society starting in the family level contributes into irresponsible sexual behaviour to be done by the young. Young people always needs suppert and to bo guarded by the elder people in the society and since the lack this the engage themselves into these acts.

The irresponsible sexual behaviour always affects people who engage into these acts. The followings are the effects of irresponsible sexual behaviours.

Sexual transmitted disease such as syphillis and HIV/AIDS, ~~are~~ is the effect of engaging into irresponsible sexual behaviours such as having many sexual partners.

Lossing personality in the society is the result of engaging into irresponsible sexual behaviour like prostitution. The society does not like people who are engaging into evil acts so it degradate their personality.

Unwanted pregnancy is the ~~bad~~ big problem to many young people (girls) and it is the result of the irresponsible sexual behaviours as prostitution and having many sexual behaviour.

Conflicts ~~or~~ in the society can be caused by the irresponsible sexual behaviour, and these can even cause death. The behaviour such as taking another man's wife or another woman's husband ~~can~~ or another person's partener causes conflict and even can cause death.

Street children and orphans increase in the society due to the irresponsible sexual behaviour. The youth who are separate and one have no ability to feed children or death of all cause orphan to increase in the society.

~~Dro~~ Bad performance in school and even dropout from the school caused by irresponsible sexual behaviour to the young people who are in school. Many schools dislike evil sexual acts so the schools punish or remove those who engaging in these acts

Lastly, the cause of underdevelopment within the society and country at large can be contributed by the irresponsible sexual behaviour. Since young people also can contribute in economic activities and raise the economy, but involving into sexual evil acts remove their part of contribute very small into raising development. But also due to the disease and death of young people their space in contributing into raising economy is empty and hence underdevelopment is unavoidable.

Conclusively, I advice the young people to avoid irresponsible behaviours because this affects themselves and also the nation. And to the society and government they should provide education, councelling the young people and guarding them to prevent them from the irresponsible ~~sexal~~ sexual acts. By considering this the young people will be saved and also society and the nation at large since the young people are the future builder of the nation.

The candidate started the essay with introduction and arranged the work in paragraphs. The candidate managed to explain the factors which contribute to irresponsible sexual behaviour among young people and their effect in the community using clear language.

2010

20 marks

13. Write an essay on birth control methods which do the following:

(a) Suppress the formation and/or release of gametes.

(b) Prevent the union of gametes in fertilization.

(c) Prevent the implantation of fertilized egg.

15. Growth

2018

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

(b) What do you understand by the term "Primary growth" in plants?

6 The following are the post natal growth stages in humans

i/ Childhood.

This is a stage of development from birth through infancy to before puberty. It is usually from 0 to about 11 years. Babies grow from being infants until childhood. During this stage, the baby develops both physically and mentally and learn by imitating what their elders do. They begin talking, and are later able to walk. At an age of about 6 years, they can be taken to school and in this stage, they need proper care and teaching as well as nutrition

ii/ Adolescence.

This is a developmental stage from childhood to adulthood. During this stage, girls and boys develop physically and sexually into becoming adults. It range from 11 to 16 in girls and 14 to 18 years in boys. They develop secondary sexual characteristics and are more attracted to members of the opposite sex. It is an important stage and may be dangerous if girls and boys are not taught what to do since they are usually willing to test everything.

iii/ Adulthood.

This is an important stage including members of the age from 18 to 45 years or above.

This stage, people are able to work and are matured enough to make their own families and have children. They can make proper decisions and ensure development of themselves.

6 a/ iv/ Old age

This ranges from the age of 45 to about 60 years in this stage, people start getting old, their ability to do work also falls and that is why 60 years of age usually mean retiring time People of this age need care and support as they can't do many hard tasks. In males, it may be characterized by reproductive system disorders.

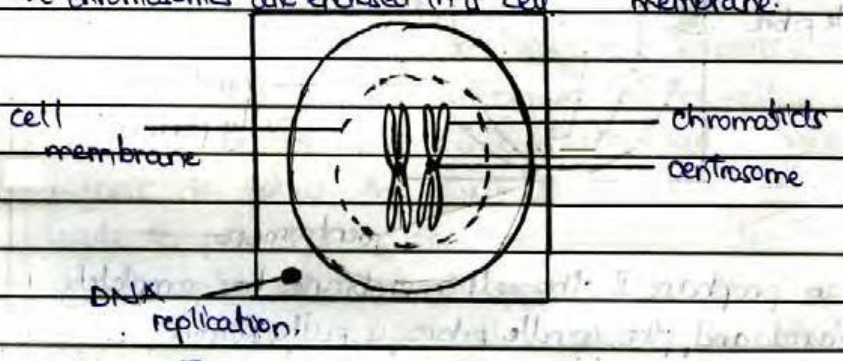
b/ Primary growth in plants is the increase in length and height of varian parts of the plant for example; roots and shoots.

2017
20 marks

12. With the aid of illustrations, discuss the stages of mitosis.

12. Mitosis is the type of cell division in which it involves the body cells to form an identical daughter cell. The daughter cell formed is a haploid cell. Mitosis has many importance in human body as it allows growth and repairs the worn out cells in the body. Mitosis happens in stages and the following are the stages of mitosis.

Interphase. This is the stage of mitosis in which their is replication of the body cells thus the DNA replicates and the chromosomes are very thin thus they are not seen well. The cells continues with its normal functioning without and cell division. The chromosomes are enclosed in a cell membrane.

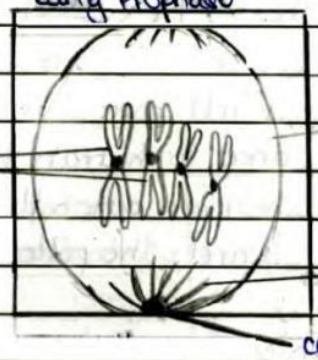


Prophase, This is the stage of mitosis which occur in stages thus early Prophase and late Prophase in early Prophase. The chromosomes can be seen clearly and the cell membrane starts to disappear, there is DNA replication in the chromosomes so as each cell can have similar characteristics and in early Prophase the spindle fibre is started to be formed.

In late Prophase, the cell membrane disappears compeletely and spindle fibre are fully formed which attaches the chromosomes to the centromere. Thus, the spindle fibre are formed from the centromere in which the chromosomes attaches itself using the centrosome.

12.

early Prophase

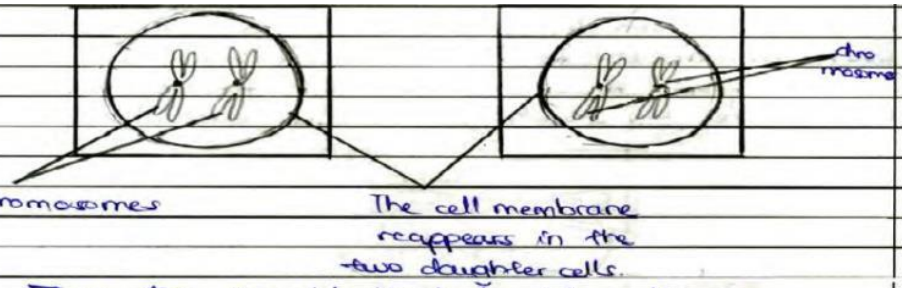


late Prophase

Thus in prophase the cell membrane has completely disappeared and the spindle fibre is fully formed.

Metaphase, This is the second stage of mitosis in which the chromosomes and spindle fibre are fully attached to each other and the chromosomes are aligned in the equator of the cell, thus in the middle of the cell. and there is no a cell membrane.

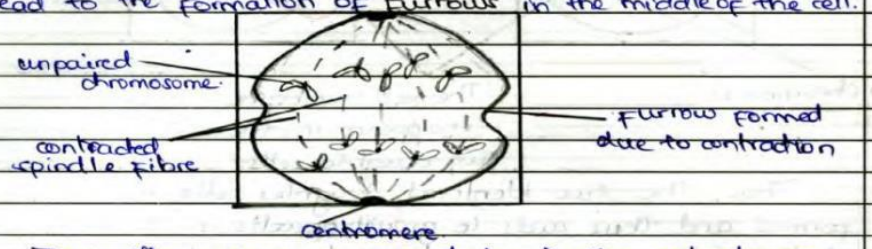
12.



Thus, the two identical daughter cells are formed and thus aids to growth of cells in the body and this process goes on continuously in the body cells.

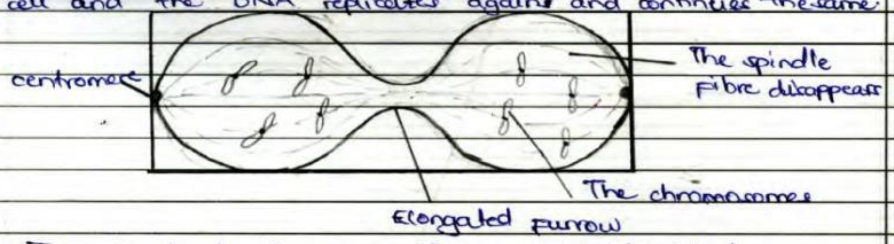
In conclusion, Mitosis aids to growth of cells in the body and thus exhibits growth of human bodies. It also repairs the worn out cells of the body and replaces them with new cells. Thus, mitosis is a very important process in the body of living organisms.

1 Anaphase, This is the Third stage of mitosis in which the spindle fibre stretches and contracts where by the chromosomes are divided into two and are being pulled towards the centromere. and this lead to the formation of furrows in the middle of the cell.



Thus, the furrow is formed due to the contraction of spindle fibre and the chromosomes are unpaired and are pushed towards the centromere. in the cell.

Telophase. This is the last stage of mitosis in which the furrow elongates further and leads to formation of the two daughter cells. The spindle fibre starts to disappear. Then this leads to the reappearance of the cell membrane in each daughter cell and the DNA replicates again and continues the same.



This leads to the formation of two identical daughter cells as seen below and thus the cell membrane reappears and the process undergoes on continuously in the body cells.

Candidates who performed well recognised the fact that mitosis is a type of cell division where there is replication of the nucleus resulting in two identical daughter nuclei/cells each with a diploid number of chromosomes. The candidates were also able to comprehend that mitosis is a process consisting of four phases starting from prophase, metaphase, anaphase and finally telophase. They also used relevant diagram to illustrate the stages**.** These responses indicated that the candidates had adequate knowledge on Mitosis.

2015

10 marks

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.

LIST A	LIST B
(i) A stage of growth in humans, characterised by rapid growth and a lot of physical and mental changes.	A. Meiosis
(ii) A type of seed germination whereby cotyledons are pushed above the ground.	B. Metamorphisis
(iii) The ability of seeds to germinate	C. Radicle
(iv) The region of most active growth in plants.	D. Plumule
(v) A type of seed germination whereby cotyledons remain beneath in the ground.	E. Hypogeal germination
(vi) A pore which allows water into a seed during germination.	F. Adulthood
(vii) Inability of a seed to germinate.	G. Dormancy
(viii) Prevents a viable seed from germinating.	H. Epigeal germination
(ix) A stage of family formation and parenthood in growth and development.	I. Adolescent
(x) A type of cell division whereby the number of chromosomes is maintained from parent cell to daughter cell.	J. Cotyledon
	K. Mitosis
	L. Micropyle
	M. Hard seed coat
	N. Stem and root apices
	O. Viability

2014

8 marks

8. (a) Define the following terms:
   (i) Meiosis
   (ii) Mitosis
   (iii) Growth

   (b) (i) Explain the significance of mitosis in growth
   (ii) State three factors affecting growth in humans.

2013

8 marks

4. (a) State the conditions necessary for seed germination and briefly describe how they facilitate germination.

(b) Differentiate epigeal germination from hypogeal germination.

4 a) The condition necessary for germination and descriptions on how they facilitate germination are the following.

i) Water or Moisture: Moisture is required during the process of germination in order to soften the testa so as to allow the radicle and plumule to emerge. Also water is needed to activate protoplasm, and acts as the medium for all enymatic reaction necessary for germination to occurs in seeds.

ii) Temperature: Optimal temperature is required during the process of germination so as to maintain ezymatic reaction that takes place within the seeds during germination.

iii) Oxgen gas: During germination respiration takes place for the purpose of realising energy necessary for germination. So oxygen is needed during respiration so as to oxidize glucose to realise energy for germination of the seed into seedlings.

b) Epigeal germination is the type of germination in which the cotyledon are carried above the soil. For example germination of beans seeds.

Hypogeal germination is the type of germination in which the cotyledon remain under the ground and not carried above the soil. For example germination of maize seeds.

Candidates performed well as they were able to meet the demand of the question and they had adequate knowledge on the topic of growth specifically on seed germination. These candidates managed to give correct responses on the conditions necessary for seed germination. They also managed to differentiate epigeal germination from hypogeal germination.

2012
8 marks

8. (a) Define the following terms:
   (i) Growth
   (ii) Intercalary growth

   (b) Briefly explain three factors that affect growth and development in humans.

16. Genetics and Variation

2019

15. Why is the study of genetics important in our daily life? Explain by giving four points.

(10 marks)

15 Genetics is the study of hereditary and variations in organisms. Hereditary is the passing of traits from parents to offsprings and variaton is the difference which occur between parents and offsprings. A basic unit of genetics is a gene which determine the trait or characteristics of an individual, a gene has ribonucleic acid (RNA) and deoxyribonucleic acid (DNA). The following are the importance of studing genetics in our daily lives:-

It helps in genetic counselling. Genetic counselling involves giving advice to the partners and explaining on the diseases which can be transmitted to their offsprings through a gene for example, haemophilia, colour blindness and albinism so that they can avoid it if they are carriers.

It helps in genetic engineering. Genetic engineering is the alteration and isolation of genes in an organism. Through genetic engineering scientists or genetic engineers have been able to produce insulin from bacteria which can be inserted to a person with insulin deficiency.

15. It helps in blood transfusion. Blood transfusion is the transfer of blood from the donor to the recipient, genetics is applied to check the blood groups of individuals wether is group A^+, A^-, B, AB or O so that during blood transfusion agglutination which is the clamping of blood cells can be avoided so as to save the life of an individual who receive the blood from the donor.

It helps in plant and animal breeding. Breeding involves production of new ones. Genetics is used to produce breeds of high quality by selecting organisms which will be interbreeded, the organisms chosen have good qualities hence the offspring produced after the breeding process is viable, strong and resistant to diseases and harsh conditions hence getting good yields and in plants, plants from different places can be crossed together to produce high-resistant plant.

To conclude the discovery of genetics has enabled man to know different structures and processes which occur in the body of an organism, some scientists include Mendel studied genetics and he is called the father of genetics, he discovered about the basic structure called a gene which easen study of genetics till today, even machines have been discovered so as to easen the study of genetics, therefore genetics is very important in our daily lives.

2018

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:
(i) Sex linked genes
(ii) Sex determination
(iii) Phenotype.

9a) Note that;

It is well known that the sex chromosomes for a male individual is 'XY' and that of a female individual is 'XX'. Hence; By Genetic cross.

Parental phenotype — Male X Female

Parental genotype — XY XX

Meiosis

Gametes — X Y X X

Fertilization

F1 genotype — XX XX XY XY

F1 phenotype — Female Female male male

Thus, probability = $\frac{\text{Number of Events}}{\text{Number of sample}}$

= $\frac{2 \text{ boys}}{4 \text{ children}}$

Probability = 1/2 or 50%.

∴ The probability of the newly wedded couple to get a boy child as their first born is 50% or 1/2.

9b i) Sex linked genes: These are simply referred to as the genes that are carried by the sex chromosomes. Such genes give rise to characters or disorders such as haemophilia and colour blindness.

ii) Sex determination; Is simply referred to as the pairing of either 'XX' or 'XY' chromosome of an individual to determine whether it is male or female.

iii) Phenotype is the outward appearance of an individual. For example a person might look tall, white, etc.

Candidate had adequate knowledge on the concept of Mendelian inheritance in the topic of Genetics. They correctly carried out the genetic cross and worked out the probability of the first-born child. Also, they correctly gave the meaning of the terms sex linked genes, sex determination and phenotype.

2017

8 marks

6. (a) Differentiate complete dominance from incomplete dominance.

(b) In a laboratory experiment, tall pea plants were crossed wiht dwarf pea plants. F_1 plants were then selfed to produce $\mathbf{F_2}$ generation.

(i) Using appropriate symbols, work out a genetic cross for $\mathbf{F_1}$ generation.

(ii) Give the phenotypic and genotypic ratio of F_1 generation.

6. (a)

Complete dominance	Incomplete dominance
- Is the situation whereby the dominant genes hinder completely the expression of other recessive genes when crossed together eg: Tallness is dominant over shortness	- Is a situation whereby the dominant genes have equal expression over each other leading into blending of different character to the offspring. example: Red flower and white flower cross to form pink flower

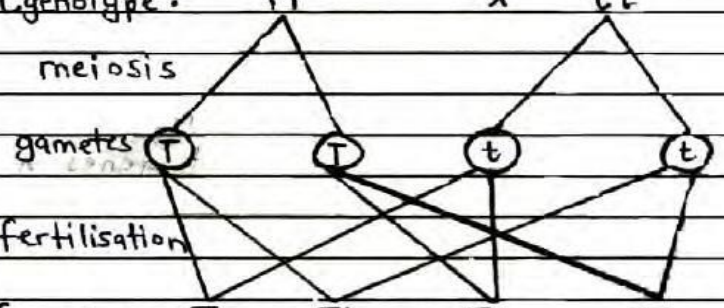
(b) i/

Solution

Let T = Dominant gene for tallness

t = Recessive gene for shortness (dwarfism)

parents { phenotype: Tall pea plants X Dwarf pea plants
genotype: TT x tt



F_1 individuals { genotype --- Tt Tt Tt Tt
phenotype --- All Tall pea plants.

fig: genetic cross.

ii/

Genotypic ratio: All are Tt

Phenotypic ratio: All are tall pea plants.

The candidates who performed well in this question had adequate knowledge about Mendelian inheritance. These were able to differentiate complete dominance from incomplete dominance and, work out the genetic crosses for F_1 generation. They also correctly gave the phenotypic and genotypic ratios of F_1 generation.

2016

10 marks

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 the answer booklet provided.

List A	List B
(i) External appearence of a given characteristic as a result of influence by a gene.	A Mutation
(ii) Genetic disorder characterised by failure of blood clotting.	B Sex linked character
(iii) A sudden genetic change which can be inherited.	C Genotype
(iv) Characteristics that can pass on from parent to offspring through sexual reproduction.	D Dominant gene
(v) The possession of the characteristics which are different from those of the parents and other offspring.	E Variation
(vi) A gene that influences characteristics over another gene when in heterozygous state.	F Albinism
(vii) A cross between individuals with homozygous parents.	G Phenotype
(viii) A unit of inheritance which determins a specific characteristic.	H Test cross
(ix) Genetic makeup of a given gene which determines a given characteristic.	I Loci
(x) A disorder resulting from lack of melanin pigments.	J Haemophilia
	K Homozygous
	L Backcross
	M Recessive
	N Gene
	O Co-dominance

2015

6 marks

8. (a) Define the term "gene" and "genetics".

(b) Give two differences between Deoxyribonucleic Acid (DNA) and Ribonucleic Acid (RNA).

8 (a) (i) Gene is a basic unit of inheritance in living organisms.

(ii) Genetics is the branch of Biology dealing with the study of heredity and variations.

(b) Differences

Deoxyribonucleic acid (DNA)	Ribonucleic acid (RNA)
(i) It has a double strand	(i) It has a single strand
(ii) It contains deoxyribose sugar	(ii) It contains ribose sugar

The candidates who performed well in this question had enough knowledge on this topic, particularly on hereditary materials as they were able to provide correct definitions of the term's gene and genetics. In addition, they were able to correctly present the differences between DNA and RNA with all spellings correctly written.

2014

8 marks

7. (a) In the experiment conducted on single factor inheritance, individuals which were male homozygous tall married a female who was homozygous dwarf. The gene for tall was dominant over dwarf. Use the crosses to find out the possibility of the phenotypic results and the ratio in the first filial generation.

(b) Give the meaning of the following:
(i) Test cross
(ii) Back cross
(iii) Trait

2013

8 marks

9. (a) Give the meaning of the following:
(i) Continuous and discontinuous variations.
(ii) Inherited and acquired variations.

(b) Briefly explain how mutation and nutritional factors cause variation among organisms.

9. a(i) Continuous variation is the type of variation where there is no clear cut distinction among the member of a given spicies or is the variation with intermediate form. For example height

Discontinous variation is the variation where there is clear cut distinction among the members of organisim which do not show intermedial e form. Forexample, Tong rollers and Non-tong rollers, Blood group and sex.

ii) Inherited variations are the observable difference among the member of the spicies and the parents resulted from the ~~genetic~~ changes of the genetic make up of organisim. For example Down's Syndrome.

Acquired variations are the observable differences among the member of the spicies and the parents in which an organism acquires during its life time and are not transmitted to the offsprings For example fatness.

b) To briefly explain how mutation and nutritional factors cause variation among organisim

Mutation : Mutation is the sudden change in the genetic make up that can be inherited. mutation results in the alteration of the genotype of an organism as the results leads to the formation of abnormal organism difference from the parent and other members of the spicies. For example Down's syndrome.

Nutritional factors : lacks of nutritional food substance makes an organism looks difference from others organism of a given spicies. For example lacks of protein leads to kwashiakor a condition that makes a person looks difference from the rest human beings.

Candidates who performed well in this question provided clear explanations with all necessary key words, good mastery of English language and well-organized flow of ideas on how mutation and nutritional factors cause variation among organism. This indicated that the candidates in this category had sufficient knowledge in the topic of Genetics.

2012

8 marks

7. (a) The laboratory technician at Mtakuja secondary school performed an experiment with the aim of proving the Mendelian experiment on single factor inheritance for a coat colour in mice. In the experiment, pure-breed (homozygous) black fur mouse (male) was mated with a pure-breed brown fur mouse (female). The gene for black fur colour was dominant over the gene for brown fur colour. Use crosses to show the possibilities of the results in the first filial generation.

(b) Explain the meaning of the following:
(i) Gene
(ii) Recessive
(iii) Phenotype

(x) The offspring produced by mating the F1 generation is konwn as
A F3 generation B F1 products C F2 generation
D New generation E Genetic generation.

2010

20 marks

11. Genetics is a branch of Biology dealing with heredity. How can this field of Biology be applied to everyday life?

(ix) A bean plant can either bear terminal or axial flowers. When a terminal flowered plant (T) is pollinated with an axial flowered plant (t), the offspring produced were 200 terminal flowered and 210 axial flowered. Which of the following represents the genotypes of the parents?

A TT x Tt
B Tt x Tt
C TT x tt
D Tt x tt
E T x t

(x) What does selective breeding mean?

A Only pure stock should be inbred
B The parents are chosen to produce desired offspring
C The encouragement of out breeding
D The parents are chosen carefully
E The offspring are like parents

2011

(ix) The offspring of crosses between red flowered and white flowered plants were always found to be pink. This is an example of:

A Crossing over
B Mutation
C Co-dominance
D Incomplete dominance
E Natural selection

(ii) Tongue rollers in genetics is an example of

A gametogenesis
B continuous variation
C swallowing
D lubricating food
E discontinuous variation.

17. Evolution

2018

13. Describe four evidences of organic evolution.

13. Organic evolution is the gradual change in or development of organisms from simple to complex stage over the course of time. Organic evolution has become the most common explanation or accepted theory towards explaining the origin of life. It is a testable theory due to vivid evidences that have been provided to support it, these include:-

Comparative embryology, this is the process of making comparison or comparing the embryos of living organisms. This evidence has been clearly observed among the embryos of almost all chordates. Their embryos have alot of similarities such as presence of a notochord, tail and gill slits in embryos of humans, fish, birds, reptiles and other chordates. This has proved evolution due to recent change or variation but from a common body plan which might have resulted from environment adaptation hence proving evolution.

Comparative anatomy and physiology, is the comparison of body structures as well as their functions. This proves organic evolution due to the discovery of presence of body structures of similar origin but differ in function due to evolution. For example fore limbs of birds and animals. Some features in animals have also been observed to perform same function in humans despite difference in outward appearance. For example insulin

13. of cows performs same function as insulin in humans, analogous structures of wings of bats and of insects shows evolution.

Cell Biology, this is the study of the cell, its functioning and all organelles present. This proves organic evolution since it shows how living things have evolved from common cell plan and structure through identifying organelles similar in structure and function. For example the mitochondria, ribosomes in protoctists, birds and humans are of same kind and function proving organic evolution that various organisms have the same basic cellular composition nature.

Fossil Records, this refers to data on the remains of once lived plants and animals. Discovered fossils have greatly helped to prove organic evolution since the discovered fossils showed a close relationship between man and apes like gorillas during early stages of evolution. These organisms commonly known as hominids gradually developed into humans through evolution after environment changes starting for example from Homo habilis, Homoerectus, to Homo sapiens the modern man of today thus proving organic evolution in mammals and humans.

Therefore, organic evolution is of great importance since it has enabled scientists to understand evolution in germs and pathogens and hence research on alternative ways to cure diseases to promote better health to all human beings and fight all diseases. Therefore, everyone everyone should be fully educated on organic evolution to understand the origin of life on earth.

2014

6 marks

5. (a) What do you understand by the following terms:
   (i) Evolution
   (ii) Acquired characteristics

   (b) Outline merits and demerits of Lamerck's theory of evolution.

2013

8 marks

7. (a) Name and explain any four theories of the origin of life.

   (b) Outline two ideas of Darwin theory.

7 a) The theories of origin of life include:

- The Theory of Creation: this theory states that life begun here on earth as a result of creation of every kind of organism by a Supernatural being called God that ever existed. This theory affirms that this Being God, created all the universe and all it's contents within 7 (seven) days. This theory is extracted from religious books like the Bible and Quran.

- The Steady-state theory: This theory states that life was always there on ~~ear~~ Earth and it has no origin. ~~At~~ It affirms that all the organisms had always been there and there is no a definite cause of life.

- The Cosmozoan Theory: This theory states that life came on Earth from other planets. It affirms that life exists elsewhere ~~of~~ in the universe and it just happed to come here on Earth from elsewhere in the universe.

- The Spontaneous evolution theory: This theory states that life just arouse from non-living components in the world. It insists that every living organism evolved from a particular non-living component.

7 b) The ideas of Darwin in his theory are:

- Survival for the fittest is Competition among members of the same species for existence. This ~~theory~~ idea states that only the individuals who are best suited for obtaining the it's necessities in life is the one which will survive
- Overreproduction and presence of limiting factors. Organisms have a tendency to overreproduce but however, not all the offsprings will manage to reach maturity due to presence of limiting factors like predators, food.

The candidates who performed well in this question were able to name and explain the theories of origin of life. They also managed to outline the ideas of Darwin's theory indicating that they had sufficient knowledge on Organic evolution.

Multiple Choice Questions
Section A 10 Marks

2019

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) What is the aim of doing an experiment when conducting a scientific investigation?
A Identifying a problem
B Finding a solution
C Testing a hypothesis
D Gathering information
E Recording results

(ii) Why is it advised to build an incinerator in every hospital and health centre?
A for collecting wastes.
B for disposing gaseous wastes.
C for disposing liquid wastes.
D for burning hazardous wastes.
E for disposing plastic wastes.

(iii) Mrs. Juma's child has protruding stomach and swollen lower limbs. What type of food should she give to her child to overcome the problem?
A Starch
B Lipids
C Proteins
D Minerals
E Vitamins

(iv) In the food chain: Grass → Zebra → Lion. A lion is
A a primary consumer.
B a secondary consumer.
C a producer.
D a tertiary consumer.
E a decomposer.

(v) Water from the roots of flowering plants is transported up to the plant by different forces. Which of the following forces initiates and raises water to the least height?
A Root pressure
B Transpiration pull
C Cohesion forces
D Adhesion forces
E Capillarity

(vi) A patient has been diagnosed with low level of blood sugar. Which hormone would you recommend to regulate the victim's sugar?
A Insulin
B Glucagon
C Antidiuretic
D Aldosterone
E Testosterone

(vii) Which one is the feature of aging in human beings?
A Shorter reaction times
B Strong bones
C Strong muscles
D Body increases in size
E Wrinkling of the skin

(viii) What is the role of node of ranvier in a neurone?

A To transmit the impulses away from the cell body.
B To insulate the axon and speed up transmission of impulses.
C To transmit nerve impulses from one nerve to another.
D To speed up the transmission of nerve impulses.
E To transmit the nerve impulses towards the cell body.

(ix) What is variation as applied to genetics?

A Differences among individuals of the related species.
B Differences among individuals of the same species.
C Differences among individuals of different species.
D Differences among individuals of unrelated species.
E Differences among individuals of the expected species.

(x) Which one is correct about Cosmozian theory of origin of life?

A Life was brought in this Earth from elsewhere.
B Life arose according to physical and chemical laws.
C Living organisms arose from non-living materials
D The Earth and all organisms on it were created by God.
E The planet Earth and all the organisms have always been there.

2018

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 commensalisms D mutualism
E endoparasite.

2017

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) Goitre is a deficiency disease caused by lack of which element in the diet?
A Carbohydrate B Iodine C Vitamin E
D Vitamin C E Protein.

(ii) Tongue rollers in genetics is an example of
A gametogenesis B continuous variation C swallowing
D lubricating food E discontinuous variation.

(iii) Which food substance is investigated in the biuret test procedur?
A Carbohydrate B Lipids C Protein
D Starch E Reducing sugar.

(iv) The product of anaerobic respiration process in animals is
A lactic acid B carbondioxide C alcohol
D water E oxygen.

(v) A phylum consisting of species with jointed appendages and exoskeleton is known as
A Chordata B Anelida C Arthropoda
D Platyhelminthesis E Nematoda.

(vi) Which part of the flower receives pollen grain during pollination?
A Petal B Stigma C Stamen
D Style E Ovary.

(vii) A rapid growth in plants is mainly taking place in
A leaves B cambium C roots
D shoots and root tips E stem.

(viii) Which of the following is NOT a component of First Aid Kit?
A Razor blade B Panadol C Bandage
D Soap E Microscope.

(ix) Which disease spread rapidly as a result of poor waste disposal?
A Anemia B AIDS C Cholera
D Leukemia E Small pox.

(x) A voluntary muscle that is capable of relaxing continuously and do not fatigue easily is known as
A skeletal muscle B biceps C triceps
D cardiac muscle E smooth muscle.

2016

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) Caridac muscle can be found in which part of the animal body?
A Skull B Heart C Small intestine
D Limbs E Head.

(ii) The kidney in animals is mainly responsible for
A excretion B digestion C transportation
D respiration E absorption.

(iii) The aim of experiment in the scientific investigation is to
A identify the problem B test the hypothesis C confirm the problem
D predict the results E collect data.

(iv) The main product of anaerobic respiration process in plants is
A uric acid B lactic acid C alcohol
D water E oxygen.

(v) Which of the following parasitic organisms is typicall ectoparasite?
A Tick B Tapeworm C Plasmodium
D Round worm E Lichen.

(vi) Which of the following is a seed bearing plant?
A Liverwort B Prothallus C Fern
D Sisal E Moses.

(vii) A part of an onion bulb which is important for vegetative propagation is
A scale leaves B foliage leaves C terminal buds
D roots E stem.

(viii) Which of the following is NOT a component of blood?
A Erythrocyte B Platelets C Leucocyte
D Plasma E Vein.

(ix) Which food substance can be tested by using iodine solution?
A Protein B Starch C Carbohydrate
D Non reducing sugar E Reducing sugar.

(x) The offspring produced by mating the F1 generation is konwn as
A F3 generation B F1 products C F2 generation
D New generation E Genetic generation.

2015

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

(i) Bowman's capsule is found in which of the following organs?

A Liver B Pancreas C Kidney
D Spleen E Heart

(ii) Which of the following processes is involved in the regulation of body temperature in human beings?

A Urination B Painting C Deamination
D Sweating E Detoxification

(iii) A structure that allows air to enter the trachea and prevents food from entering the wind pipe is known as

A glottis B tongue C soft plate
D mouth E epiglottis

(iv) Study the following sequence of organisms:
Grass → Rabbit → Wolves → Fleas
The sequence is an example of

A food web B ecosystem C a pyramid
D food chain E abiotic

(v) Lipase enzymes are mainly contained in which digestive secretions?

A Hydrochloric acid B Gastric juice C Saliva
D Intestinal juice E Pancreatic juice

(vi) A person who is admitted in the hospital after an operation will most likely be fed on food rich in:

A vitamin C B vitamin A C protein
D lipids E water

(vii) Which of the following is a vector of sleeping sickness?

A House fly B Mosquito C Tsetse-fly
D Tick E Cockroach

(viii) The outer most living structure that identifies a plant cell is the presence of

A cytoplasm B vacuole C cell wall
D nuclear membrane E cell membrane

(ix) One of the most distinctive features used to place organisms in the Kingdom Fungi is the presence of

A gill structures B hyphae C cellulose
D cap E exoskeleton

(x) Which of the following represent the organisms with homologous structures?

A Wings of Birds and Butterfly
B Forelimbs of Bird and Bat
C Tail of Rat and Scorpion
D Sting of Honey bee and Mosquito
E Beak of Duck and Hen

2014

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

(i) A term which best describes a condition of a plant cell that has lost too much water is

A haemolysis B turgidity C creanation
D plasmolysis E osmosis

(ii) Bowman's capsule in the kidney functions as a

A filter B sanction pump C transmitter
D sponge E absorber

(iii) A structure which controls the body balance in humans is located in the

A outer ear B eardrum C inner ear
D middle ear E inner membrane

(iv) The main product of photosynthesis process is

A sunlight energy B carbohydrate C carbon dioxide
D water E oxygen

(v) Species with cellulose in their cells are formally placed in

A Kingdom Monera B Kingdom Fungi C Kingdom Animalia
D Kingdom Plantae E Kingdom Protista

(vi) Fertilization process is defined as

A formation of new cells B union of an egg and sperm
C implantation of a zygote D fusion of eggs in the uterus
E cell division in the oviduct

(vii) Mutual interaction between two species is described by which of the following characteristic

A Both live as parasite B Both may be harmed
C Both benefit and flourish D One is harmed and the other benefits
E Both neither benefits for is harmed

(viii) One of the characteristics used to identify producers in the ecosystem is

A feeding on ready-made food B growing in fertile soil
C feeding on other organisms D making their own food
E adding organic matter in the soil

(ix) The role of the optimum temperature in cellular activities is to

A change the chemical reactions
B balance the equilibrium of the reactions
C destroy many enzymes at once
D speed up the rate of chemical reaction
E create favourable environment for enzymes

(x) Rise of body temperature in the human body is corrected mainly by

A Dilating the skin arteries and sweating
B Constricting the skin arteries and shivering
C Dilating the skin veins and sweating
D Constricting the skin veins and shivering
E Dilating of arteries and shivering

2013

1. For each of the items (i) – (x), choose the correct answer from among the given alternatives and write letter beside the item number.

(i) Animals which are able to maintain fairly constant body temperature are described as

A poikilothermic
B hydrostatic
C sympathetic
D symbiotic
E homoiothermic

(ii) Night blindness in the human body is avoided by eating

A oranges
B carrot
C red meat
D green vegetables
E chicken

(iii) A blood vessel which conveys deoxygenated blood away from the heart is called

A capillaries
B artery
C vein
D pulmonary vein
E pulmonary artery

(iv) The function of cones in the human eye is to

A sense light
B sense colour
C cover the eye
D reflect light
E protect the eye

(v) A term used to identify an individual animal having both male and female sex organs is

A unisexual
B hermaphrodite
C asexual
D dioecious
E monoecious

(vi) Which of the following structures is a site of respiration?

A Chloroplast
B Ribosome
C Nuclear
D Nucleic acid
E Mitochondrion

(vii) The structures found in bacteria are

A plasmid, flagella and cilia
B cytoplasm, cilia and pastids
C cell wall, plasmid and flagella
D cell membrane, flagella and hairs
E plasmid, capsule and cilia

(viii) The by products in the photosynthesis process are

A carbohydrate and water
B carbon dioxide and oxygen
C oxygen and water
D carbohydrate and carbon dioxide
E oxygen and air

(ix) The factors which contribute to the spread of dental cavities in human being include

A prolonged exposure to cold water
C prolonged exposure to warm water
E prolonged exposure to sugary foodstuff
D prolonged exposure to bitter food
E prolonged exposure to hard water

(x) The main feature observed in prokaryotic is that they

A have genetic materials not enclosed by nuclear membrane
B have genetic material enclosed by nuclear membrane
C have no genetic material in their nuclear
D have more than one nucleic acid in their nuclear
E have genetic material enclosed by two membranes

2012

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

(i) The joint in the human body which allows movement in all directions is known as

A pivot
B hinge
C double hinge
D ball and socket
E peg and socket

(ii) Which of the following is a metabolic waste product?

A Tears
B Saliva
C Mucus
D Faeces
E Urine

(iii) The following are examples of water-borne diseases:

A malaria and bilharzia
B yellow fever and typhoid
C diarrhoea and malaria
D cholera and plaque
E cholera and typhoid

(iv) One of the distinctive features of kingdom Fungi is possession of:

A plasma membrane
B cytoplasm
C chitin materials
D cell membrane
E cellulose material

(v) The regions of most active growth in plants are found mainly in the

A axillary buds and flowered
B stems and leaves
C stems and root hairs
D leaves and flowers
E stem and root apices

(vi) A grasshopper ventilates its gaseous exchange surfaces by

A moving the diaphragm
B beating of cilia
C rhythmic body movement
D opening of spiracles
E moving its rib cage

(vii) The taxonomic category of organisms belonging to the same class but not the same family is:

A Species
B Genus
C Order
D Phylum
E Kingdom

(viii) The breakdown of glycogen into glucose in the body is due to the action of:

A insulin
B adrenaline
C secretion
D glucagon
E gastric

(ix) The function of sunlight energy in the human skin is the stimulate the synthesis of

A vitamin A
B vitamin C
C vitamin D
D vitamin K
E vitamin B

(x) A rise in the temperature of a human body is corrected by

A construction of the skin arteries and sweating
B construction of the skin arteries and shivering
C dilation of the skin arteries and sweating
D dilation of the skin arteries and shivering
E shivering and sweating

2011

1. For each of the items (i) – (x) choose the correct answer from among the given alternatives and write its letter beside the item number.

(i) How many gametes are produced from one cell during meiosis?
A Two B Four C Six
D Eight E Ten

(ii) Which of the following is not an excretory product in plants?
A Tannins B Carbon Dioxide C Urea
D Calcium oxalate E Latex

(iii) Why are skeletal muscles usually found in opposing pairs?
A One muscle alone cannot extend a joint
B Muscles can only work by contraction
C One muscle alone cannot flex a joint
D Paired muscles are stronger
E Muscles normally work in antagonistic fashion

(iv) Which of the following bests defines allergy?
A Body reaction to antigen
B Body reaction against a specific drug
C Body reaction against a disease-causing micro-organism
D Accumulation of mucus caused by inhaling dust particles
E Formation of rash caused by eating specific foods

(v) When students were conducting private study at night, lights went off completely. Which of the following changes occurred in the eyes of the students?
A The lens became thicker B The pupil became larger
C The ciliary muscle relaxed D The lids close
E The eyes opened wider

(vi) Select the item that indicates the best match in vitamin-deficiency:
A Vitamin A ..... dry scaly skin
B Vitamin B ..... loss of appetite and yawning
C Vitamin C ..... anemia and high blood pressure
D Vitamin D ..... soft deformed bones
E Vitamin K ..... poor night vision

(vii) Which of the following is formed immediately after fertilization?
A A placenta B An embryo C A foetus
D Amniotic fluid E A zygote

(viii) The human ovary secretes hormones known as:
A Oestrogen and testosterone
B Progesterone and testosterone
C Oestrogen and lactogen
D Oestrogen and progesterone
E Follicle stimulating hormone and progesterone

(ix) The offspring of crosses between red flowered and white flowered plants were always found to be pink. This is an example of:

A Crossing over B Mutation
C Co-dominance D Incomplete dominance
E Natural selection

(x) At early stages of development of the human zygote which organ develops first?

A Liver B Heart C Kidney
D Eyes E Notochord

2010

1. For each of the items (i) – (x) choose the correct answer from among the given alternatives and write its letter beside the item number.

(i) Which of the following is common to both plants and animals?

A Respiration
B Digestion
C An excretory system
D Chloroplasts
E Starch grains

(ii) A flower which possesses both stamens and carpels is said to be

A Unisexual
B Hermaphrodite
C Monoecious
D Zygomorphic
E Polymorphic

(iii) Useful substances are retained in the kidney by

A Filtration
B Osmosis
C Selective reabsorption
D Osmo-regulation
E Diffusion

(iv) The Monera are also referred to as Prokaryotes. This means having:

A No nucleus
B Membrane bounded organelles
C Simple structures
D Reduced nucleus
E Circular nucleus

(v) Which of the following is a characteristic of wind-pollinated flowers?

A They have large brightly coloured petals
B They produce a small number of pollen grains
C They have small anthers situated inside the flower
D They do not have nectarines
E They have large, sticky or spiky pollen grains

(vi) Food is moved along the oesophagus by a process known as:

A Assimilation
B Chewing
C Egestion
D Peristalsis
E Churning

(vii) Reptiles differ from birds because:

A Reptiles do not lay eggs while birds do
B Reptiles have a backbone while birds do not
C Reptiles have scales while birds do not
D Reptiles are cold blooded while birds are warm blooded
E Reptiles have moist skin while birds have dry skin

(viii) Removal of predators in the ecosystem will result in:

A Decrease in the number of producers
B Increase in the number of producers
C Decrease in the number of prey
D An increase in the number of decomposers
E No significant change

(ix) A bean plant can either bear terminal or axial flowers. When a terminal flowered plant (T) is pollinated with an axial flowered plant (t), the offspring produced were 200 terminal flowered and 210 axial flowered. Which of the following represents the genotypes of the parents?

A TT x Tt
B Tt x Tt
C TT x tt
D Tt x tt
E T x t

(x) What does selective breeding mean?

A Only pure stock should be inbred
B The parents are chosen to produce desired offspring
C The encouragement of out breeding
D The parents are chosen carefully
E The offspring are like parents

2008

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

(i) Having a swollen painful lymph node under the armpit is a sign of
A a septic wound on the arm
B building immunity against diseases
C a septic wound in any part of the body
D a septic wound on a leg
E building immunity on a leg.

(ii) A reproductive cell which develops in a new organism without fertilization is called
A sporophyte B gamete C gametophyte
D sporangia E spore.

(iii) When a baboon stretches out its fore arm to pick mango fruits from a tree, the motion of the arm is brought about by
A contraction of the biceps and relaxation of triceps
B contraction of triceps and relaxation of biceps
C relaxation of both biceps and triceps
D contraction of both flexor and extensor muscles
E relaxation of the biceps and contraction of triceps.

(iv) During a Biology practical session form four students classified whale as a mammal, although it lives in water and swims like fish. Which of the following features guided them to place whale in that group?
A Presence of mammary glands, shows parental care, and has lungs.
B Possession of mammary glands, diaphragm and placenta.
C Presence of gills, lungs and different kinds of teeth.
D Suckle their young, have tail, and lungs.
E Have mammary glands, fins and body covered with fur.

(v) A farmer observed excessive elongation in peas after the plants were treated with a certain chemical. The chemical might have possessed
A cytokinin B auxins C ethylene
D gibberellins E abscisic acid.

(vi) If you look at cells in rat muscles, you will observe that they contain nuclei but lack chloroplast. The statement that rat muscle cells contain nuclei but no chloroplast is termed as
A a hypothesis
B an assumption
C conclusion
D an experiment
E observation.

(vii) All body metabolic activities carried out within the body of living organisms use ATP as a source of energy instead of glucose. Why is this so?

A Less energy is produced from glucose.
B Glucose has to undergo further digestion processes.
C Glucose is not available in the body of most organisms.
D ATP produces more energy.
E ATP is a free energy which is readily available.

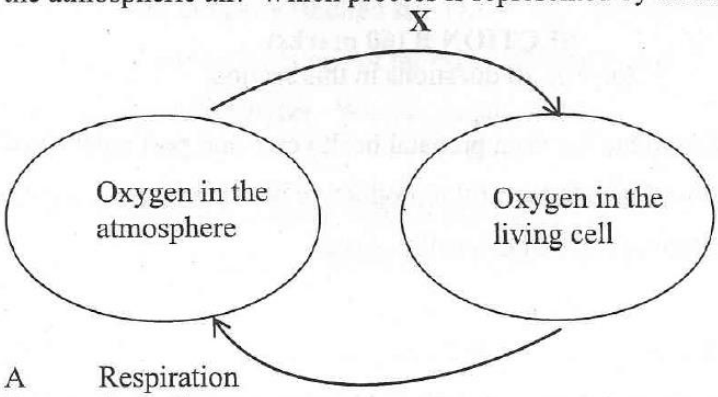
(viii) A student took a blood smear from her finger tip and examined it under a microscope. Which was the most abundant cell type that she observed?

A Thrombocytes.
B Leucocytes.
C Phagocytes.
D Erythrocytes.
E Macrophages.

(ix) Mama Sikujua delivered four children in four years of her marriage time, which were not twins. What are the consequences of this?

A She becomes economically unproductive, weak and psychologically stressed.
B She becomes, weak, unhappy and lazy.
C She gets older, psychologically stressed and miserable.
D She becomes economically unproductive, poor health and lonely.
E She will be unhappy, poor and lonely.

(x) Figure 1 below shows a cyclic movement of oxygen between a living organism and the atmospheric air. Which process is represented by an arrow labelled X?



A Respiration
B Excretion
C Photosynthesis
D Transpiration
E Evaporation