PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENTS
SAME AND MWANGA SECONDARY SCHOOLS EXAMINATION SYNDICATE
(SAMWASSES)

FORM SIX PRE-MOCK EXAMINATIONS-2020
BIOLOGY 2
MARKING SCHEME

1. a) The distinctive features of Eubacteria

   i. They lack true nuclei (02 *marks*)

   ii. Have strong and rigid cell wall containing a polysaccharide called murein linked by short chains of amino acids (02 *marks*)

   iii. They have a variety of shapes ranging from spherical, rod-like and spiral or comma-shaped (02 *marks*)

   iv. Have simple circular DNA which is not associated with proteins to form chromosomes. (02 *marks*)

   v. They use chromosomes for respiration. (02 *marks*)

   b) Some taxonomists consider Protoctista as obsolete Kingdom because Protoctists have many organisms that are related to other kingdoms of animals, plants and fungi. Protists is a word that is known used as an "eukaryote that a plant, animal or fungi" (02 *marks*)

   c) Bacteria are said to be successful colonizers because;

   i. They were the first cellular life-forms on the planet, they are primary biomass on the planet, they are most prevalent cell type in and on the human body outnumbering our own cells (02 *marks*)

   ii. They have rigid evolution leading to adoptability (02 *marks*)

   iii. They divide rapidly leading to high/large number of bacteria over a short period of time. (02 *marks*)

   iv. They are able to inhabit all parts of the planet from hot springs to the Antarctic, from mountain tops to the bottom ocean. (02 *marks*)

2. a)

- During summer water lost through evaporation i.e sweating
- Blood of someone become more negative (more concentrated)
- Osmoreceptors in the hypothalamus detect the situation of blood by having more solute than water.
- Osmoreceptors set up nerve impulse to host terior pituitary gland to release ADH.
- ADH hormones travel in the blood to kidney where it increases permeability of distal convoluted tube and collecting dust to water channels in the membrane lining of the tubule
- Hence much wate in re-absorbed back to blood stream and little water allow passing out as urine and finally more concentrated urine will be produced.

(12 *marks*)

b) i) Kidney stones

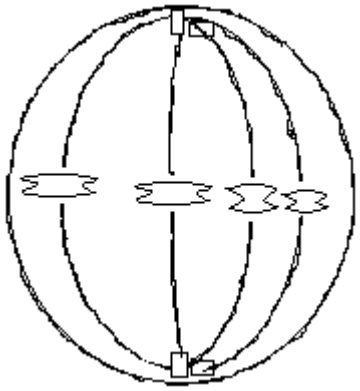
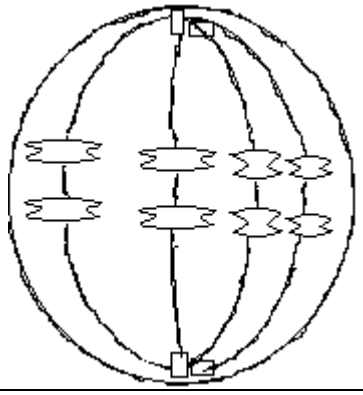
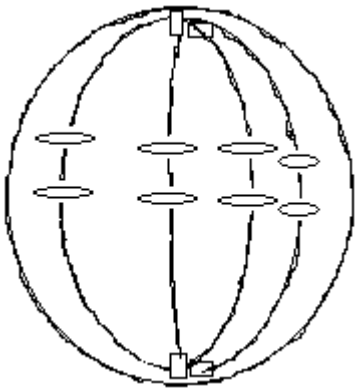
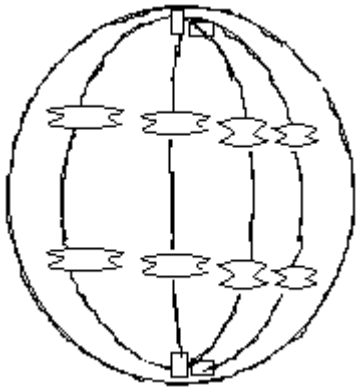
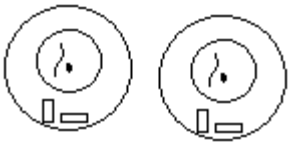
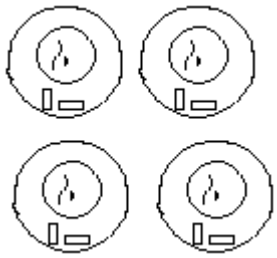
- This urinary disorder caused by concentrated of mineral and organic matter that form in the kidneys which result into small particles called “stones”
- These stones become too large, hence impairing the normal renal function
- Such stones give rise to severe colic pain starting in the back and down to the front of testicle or vulva
- Best way to prevent most of kidney stones is to drink enough fluid every day.

(04 *marks*)

ii) Urinary tract infection;

- It is disorder caused by invasion of microorganism (bacteria) into urethra and bladder.
- Urinary tract infection may affect either urinary bladder or urethra
- The infection may result into either minor or major illness which is characterized by frequent and painful urination.
- The preventive measures include drinking plenty of liquid like water. (04 *marks*)

3. a)

Mitosis	Meiosis
i. Metaphase -In mitosis chromosomes arrange along the equator but from a single raw 	-In meiosis chromosomes arrange along the equator but form two rows 
ii. Anaphose - Chromosome divide along the centromere and move to the opposite pole 	- Chromosome move as whole to the opposite pole 
iii. Telophase - Chromatids reach the opposite pole - two daughter cells are obtained 	- chromosome reach to opposite pole - Four daughter cells obtained  (12 *marks*)

b) Primary seed dormancy: It is the type of seed dormancy caused by factor which are intrinsically sources are seeds

Factors cause Primary seed dormancy.

i. Hardness of seed testa
ii. Immaturity of seed dormancy embryo

Secondary seed dormancy: is the one which is caused by factors which found outside the seeds

Factors caused secondary seed dormancy

i. Lack of oxygen
ii. Lack water
iii. Lack of optimum temperature
iv. Chemical inhabitants (08 *marks*)

4. a) To identify rats of same species, the following should be done;

i. To allow interbreeding
   - Rats of the same species will interbreed to produce fertile offspring
   - Rats of the same species will either fails to interbreed or if they will interbreed the products so produced will be non-fertile (02 *marks*)

ii. Chromosomal analysis
   - The rats of the same species will have the same number of chromosomes
   - The rats of different species will have different number of chromosomes (02 *marks*)

b) The evidences to support the idea that hereditary materials are located in the nucleus.

i. Universal occurrence of the nucleus
   - In most living cells at some stages of life cycle it revealed that, has essential roles of control heredity. This shows that the living cell possess (contain) heredity. These materials are passed from one generation to another (04 *marks*)

ii. Evidence from fertilization
   - During fertilization the nuclear of the paternal and material gametes fuse to form zygote. Later the zygote develops into an Individual organism. This shows that the fusion of nuclear of gametes involves the union of heredity materials from both materials was results of transmission of features from parents to the offspring. (04 *marks*)

iii. Evidence from nuclear division
   - One of the significance of meiosis is that, it brings variation among the living organisms of the same or different species. The occurrence of variation among the cells or organisms is controlled by heredity materials which found within the cells. Therefore, manipulation of the heredity materials in the nucleus of the cells bring about variation (04 *marks*)

c) DNA is the most favorable genetic materials because;

i. It is double stranded (helix)

ii. It is occurring naturally
iii. It is chemically stable
iv. It is large molecule
v. It stores genetic information needed for inheritance
vi. It is a permanent compound $(Any\ four\ points\ @\ 01\ mark = 04\ marks)$

5. a) i) Microevolution – is simply a change in gene frequency within a population. Evolution at this scale can be observed over a short period of time. For example, between one generation and the next, frequency of gene for pesticide resistance in a population of crop pests increases. $(02\ marks)$

ii) Selection pressure –is an agent of differential mortality or fertility that tends to make a population change genetically. The rate of change is controlled by the environment. Examples of selection pressure include; competition, predation, land decrance, pollutants, disease and illness, climatic change and parasitism. $(02\ marks)$

b) Mechanisms which contribute to the creation of new species include;

i. Mutation
- Is the sudden change in the genetic constitution of organism
- Normally of mutation is beneficial make organism best adapted to their environment, may survive and result the formation new species
- But if mutation involves sexes (reproductive cells) or gametes of living organisms, it can be passed on the next generation. Hence all organism which have been resulted from mutation finally undergo changes in the genetic constitution (make up) $(04\ marks)$

ii. Genetic recombination
- This is the process whereby traits (character) from different organisms are combined to give one particular traits.
- The mixture of traits formed may be good from organisms to adapt its environment. This is then passed on the next generation.
- The organisms formed by natural selection are naturally selected to survive and produce other new species which have traits suit to the environment.
- Other organisms which have no genetic recombination die out. $(04\ marks)$

iii. Natural selection
- This is the mechanism which keeps species on changing without being completed in order to match the need of the environment.
- In this case, nature select only the best traits(organisms) whose better adapted to the environment and whose able to live (survive) in that environment
- This implies that in a population their different organisms which possess different traits. But some of them are good and others are bad. Due to nature selection, finally the populations end up with those organisms that have good

traits (which are naturally selected hence new species of such characters are formed) (04 *marks*)

iv. Production isolation

- Isolation is the process of separating on species to another species. The separation of species by geographical isolation results to undergo change rather than when not separated.

- When these organisms mate in the same genetic pool results in breeding and new species formed.

- Reproductive isolation operates under two mechanisms;
  I. Pre-zygotic mechanisms
  II. Post-zygotic mechanisms (04 *marks*)

I. <u>Pre-zygotic mechanisms</u>

- This interferes with the process of reproduction before the formation of zygote. They include:
  i. Ecological isolation
  ii. Behavioral isolation
  iii. Incompatibility
  iv. Seasonal isolation

II. <u>Pre-zygotic mechanisms</u>

- It operates after fertilization takes place. It involves three factors;

  i. Hybrid invisibility - hybrid is produced by fail to mature
  ii. Hybrid sterility – hybrid fail to produce functional gamete.
  iii. Hybrid breakdown –the first hybrid is viable and fertile but the second generation hybrid, parent stocks and back across hybrid fail to develop or are infertile.

6. a) i) Gross primary (GPP) – is the rate at which solar energy is captured in sugar molecules during photosynthesis (energy captured per time). Producers such as plants use some of this energy for metabolism/cellular respiration and some for growth. (Building tissues) (02 *marks*)

   ii) Respiratory loss-is the loss of energy and biomass at each successive tropic level or is defined as the loss of fluids and electrolytes through the act of breathing (02 *marks*)

   b) i) Fishing: Foristance dynamite fishing like use of explosion kill aquatic organisms**.** (02 *marks*)

ii) Agricultural activities: Foristance use of acidic or pesticides kill both animals and plants and destroy all nutrients found in the soil. $(02\ marks)$

iii) Poaching or Hunting is the act of man to hunt and kill animals specially in the game reserve most for economic reasons
- Extreme poaching results in to removal of almost primary consumers such as zebra, elephant. This disturb ecosystem. $(02\ marks)$

iv) Mining- Result into clearing of land for mine activities hence disturbs both animal and plants in an ecosystem. $(02\ marks)$

v) Trading: some land is cleared for trading Centre or facilities also disturb the ecosystem. $(02\ marks)$

vi) Live stoke keeping: - foristance keeping large number of livestock resulting into clearing of almost all primary producers. Thus disturb ecosystem. $(02\ marks)$

c) Difference between;

S – shaped growth curve	J – shaped growth curve
- Characterized by limited resources	- Characterized by abundant of resources
- Population never reaches carrying capacity	- Population exceeds carrying capacity
- Seldom decline in population	- Mass mortality leads to population decline.
- Four phases curve: lag phase ,stationary phase and decline phase	- Two phases curve :log and lag curve
- Examples :Common curve : members of wildlife	- Example: Algae bloom, lemming