MARKING GUIDE BIOLOGY PAPER

SECTION.A

1.D	11.D	21.D
2.C	12.A	22. D
3.C	13.B	23.A
4.A	14.C	24.B
5.D	15.D	25.B
6.B	16.B	26.D
7.D	17.A	27.C
8.A	18.C	28.D
9.B	19.D	29.B
10.C	20.Free	30.A

SECTION.B

31 (a) **Description of graph**,

At the PH of 6.0, there was no rate of reaction

From PH of 6.0 to 6.5 the rate of reaction of active substance x increased gradually from 0 mg/cm3 to 4 mg/cm3.

From PH of 6.5 to 7.5, the rate of reaction of the active substance x increased rapidly from 4 mg/cm3 to 20mg/cm3.

From PH of 7.5 to 8.5, the rate of reaction decreased rapidly from 20mg/cm3 to 10mg/cm3.

a(iii) **Explanation**:

The PH of 6.0 was unsuitable for the activity of substance x leading to no rate of reaction.

Increase in PH from 6 to7.5 increased the rate of activity of the active substance x, PH of 7.5 being the optimum PH for the activity of substance x.

From PH of 7.5 to 8.5, the active substance x was being denatured by high PH hence the decrease in the rate of reaction.

(b) Other factors that could affect the activity of substance x include:

- Temperature.\
- Substrate concentration.
- Presence of activators.
- Presence of inhibitors.
- Enzyme concentration.

(Any 4, 1 mark each = 04mrks)

32(a) (i)

Glomerular Filtrate	**Urine**
Urea concentration is low	Urea concentration is high
Glucose concentration is high	There is no glucose

ii) **U**rea concentration is high in urine due to *tubular secretion of urea in the distal convoluted tubule* into the renal fluid

There is no glucose in urine because *it is reabsorbed back into blood stream in the proximal convoluted tubule*.

b(i) sodium ions

Reason: It is because they were in excess and they were not reabsorbed back into the blood

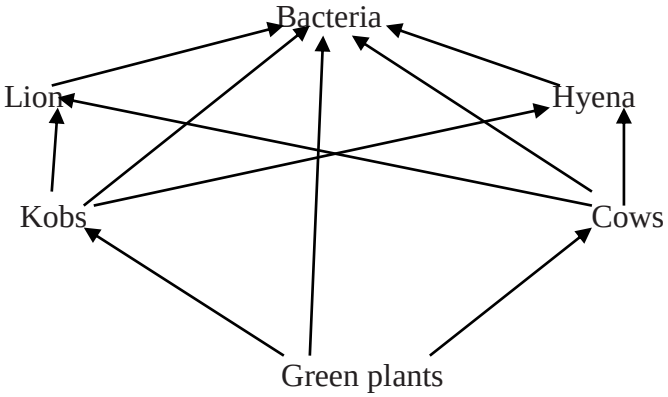
(ii) *Tubular secretion of urea in the distal convoluted tubule*

c(i) When there is some glucose released in urine
(ii) Pancreas
(iii) By taking regular injections of insulin

33(a) Food chains.

Green plants → cow → Hyena → Bacteria
Green plants → Kobs → Lion → Bacteria
Green plants → Kobs → Hyena → Bacteria

b(i) Food web



(b) (i) Niches of the following organisms.
Green plants are autotrophic(producers) in the food web and hence are a source of food to primary consumers.
Cow, is the primary consumer in the ecosystem and are therefore a source of food to secondary consumers.
Bacteria, these are the decomposers in the food web, therefore recycle nutrients.
(ii) When the cow are removed from the food web,
- It would lead to an increase in numbers of green plants in the ecosystem.
It would lead to a decrease in the lions and hyena population due to lack of food and consequently death

SECTION C

. **34(a)**
Photosynthesis takes place inside plant cells in organelles called Chloroplasts, these contain a green pigment called Chlorophyll that absorbs the light energy needed to make carbohydrates from the reaction carbondioxide with water giving -OH oxygen as a bi-product. **(5mrks)**

$$6C0_2 + 6H_20 \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}0_6 + 6\,0_2$$

(b) Aim. Experiment to test for the presence of starch in a leaf.
Apparatus/Materials.
- Plant leaf
- Iodine solution.
- Water bawl
- Methylated spirit.
- Beaker.
- Test tube
- White tile.

Procedures:
The leaf is detached from the parent plant.
The detached leaf is placed in a beaker of boiling water for about 5 minutes, boiling kill the living cells, protoplasm to stop further reactions, make the cells fully permeable and disintegrated granules in the leaf.

The leaf is then placed in a test tube of methylated spirit and is boiled in the spirit under hot water for about 5 minutes, this dissolves the chlorophyll and the leaf turns colourless. **(4mrks)**

The leaf is removed from the spirit, it is brittle, then it is washed with boiling water in order to soften it. After washing it with boiling water, it is then spread on a white tile and drops of iodine solution are added to it.

Observation:

If the leaf turns black then starch is present, but if it turns brown then starch is absent.

(c) Photosynthesis enables green plants to make their own food through use of chlorophyll to trap sunlight energy. **(3mrks)**

Photosynthesis gives out oxygen as a bi- product which is needed by respiring animals.

Photosynthesis facilitates the absorption of light energy by the green plants through chlorophyll.

35(a)

(i) open circulation, Is where blood flows through the body cavity called haemocoel(open spaces) where as closed circulation is where blood flows and confined within blood vessels. **(2mrks)**

(ii) Single circulation, is where blood passes through the heart once for a complete circuit, where as double circulation is where blood passes through the heart twice for a complete circuit.

(b)(i) Red blood cells:

- They are small biconcave in shape, providing a large surface area for transporting oxygen.
- Red blood cells contain heamoglobin which is a source of iron in the body when broken down. (3mrks)

(ii) White blood cells:

-They have a large nucleus that provides anti- bodies to fight against infection.

- White blood cells are bear shaped and large for engulfication of germs in the body.

White blood cells have anti-bodies that cause germs to stick together and easily engulfed by gramulocytes

(ii) Platelets:

- They are so small and make a tiny fraction of the blood volume and prevent bleeding by clotting around the damaged body tissues. (**3 marks)**

(iv)Plasma:

Is a light-yellow liquid of blood along with water transports nutrients, hormones and proteins to the parts of the body.

- It contains prothrombin and fibrinogen which contribute to the blood clotting to prevent bleeding.

(2mrks)

36(a) Excretion is a process by which waste products of metabolism are eliminated out of the body.

(b) Urine formation in man takes place in the kidney nephrons and in three stages.

Ultrafiltration selective re-absorption and tubular secretion.

Ultra-filtration:

Blood enters the glomerulus under high pressure due to pumping action of the heart, Higher pressure is created further due to the efferent blood vessels being narrow than afferent, Because of permeability of capillary walls of blood vessels together with higher pressure in glomerulus, small molecules such as water, glucose urea, vitamins, amino acids, ammonia, salts and uric acid pass from blood into capsular space of bowman's capsule forming glomerular filtrate.

Selective re-absorption

All substance useful to the body like glucose, amino acids and salts are re-absorbed back into the blood capillaries in the proximal convoluted tubules by active transport/diffusion and water is re-absorbed into loop of Henle and collecting ducts by osmosis, Other nitrogenous waters like urea, ammonia and other wastes are completely retained in the filtrate.

Tubular secretion:

Substances not required in the body may be secreted in the filtrate by nephron cells, before it leaves the kidney as urine like $K^{+,}$ $H^{+,}$ HCO_3^{2-}. In the distal convoluted tubules by active transport the tubular fluids, now urine is carried by collecting ducts to the renal pelvis then through ureter to the urinary bladder where it is temporarily stored before being released to the outside of the man's body through urethra. **(13 mrks)**

37(a) Pollution is the introduction of contaminants into the natural environment that cause adverse changes.

(**b**) (i) **Air pollution** is brought about by;

- Emission from industries and manufacturing activities, these industries/Factories and power plants emit high levels of carbon monoxides, organic compounds and chemical into air.
- Deforestation, which would increase the amount of carbondioxide in the atmosphere. **(13mrks)**
- Burning of fossil fuel, cars, heavy duty trucks, trains, shipping vessels all burn lots of fossil fuels to work, Emission from these automobile engines contains primary and secondary pollutants that harm animals and people which breath them.
- House hold and farming chemicals like crop dusting, fumigating homes, household cleaning products,
- Fertilizers emit harmful chemicals into air and cause pollution.
- Smoke from industrial surfaces and domestic fires may cause respiratory problems and may cover plants leaves. This kills them by reducing Photosynthesis
- Use of polychlorinated bisphenols (PCBs) and chloro fluorocarbons (CFCs) as pesticides. These dam- age the ozone layer hence causing global warming.

(**ii**) **Water pollution** is caused by a number of human activities which include;

- Industrialisation, Industries produce huge amount of waste which contain toxic chemicals and increase in phosphorus cause eutrophication that cause serious hazardous wastes to water organisms.
- Treatment of sewage and waste water, sewage and waste water produced by household is chemically treated and released into seas, lakes with fresh water and may cause disease to aquatic animals.
- Mining activities, lead to extraction of harmful chemicals and increase toxicity of water when mixes lake sulphides from rocks are harmful for the water.
- Marine dumping the garbage produced by each household in the solid forms like Aluminum, rubber, glass, plastic and food remains cause water pollution and harmful to animals.
- Use of chemical fertilizers and pesticides by farmers to protect crops from insects and bacteria mixes up with rain water and flow down into rivers and channels which pose serious damage for aquatic animals.
- Deforestation leads to global warming, it increases the water temperature and results into death of aquatic animals and marine species later results into water pollution.
- Urbanization, urban development has the demand for housing, food and clothes as more cities and towns are developed reduces the landfills for solid wastes thus are discharged into water of lakes e.t.c.
- Grazing/Stocking, the keeping of large herds of animals are washed away into rivers when it rains thus cause water borne disease like cholera, diarrhea, typhoid, jaw lice e.t.c

- Sulphur dioxide from combusting/burning fuels such as coal and oil. This may react with water vapour in the atmosphere to form sulphuric acid which damages plant leaves thus reducing the yields.

END