Candidate's Name ... PROPOSED GUIDE FOR UNNASE - UACE BIOLOGY P2 ...
Signature ... YEAR-2023 BY WASSWA ENOCK ...
Subject ... Paper code ... /...

Random No. | | | | | | | | | |
Personal Number | | | | | | | | | |

0701300439 / 0762867639 - WASSWA ENOCK

Do not write in this margin

SECTION A

NO1 (a)

Compare the levels of glucose and insulin after swallowing glucose

Similarities for levels of glucose and insulin

Both increased from 46 minutes to 76 minutes ✓

Both attained apeak / Both reached maximum ✓

Both decreases after attaining a peak. ✓

Both decreases From 120 minutes to 160 minutes ✓

mark 03

Differences for levels of glucose and insulin

Glucose levels	Insulin levels ✓
Attained a higher peak	Attained a lower peak ✓
Generally higher	Generally lower. ✓
From 120 minutes to 160 minutes, decreases gradually	From 120 minutes to 160 minutes, ✓ decreases rapidly
Reached maximum earlier / Attained apeak earlier	Reached maximum later / ✓ ~~Earlier~~ attained apeak later.

mark 03

Total = mark 06

UGANDA NATIONAL EXAMINATIONS BOARD
UGANDA CERTIFICATE OF EDUCATION
OCTOBER - NOVEMBER, 2022

Candidate's Name .....

Signature .....

Subject ..... Paper code ...../.....

Random No.							
Personal Number							

UCE
Do not write in this margin

NO 1(b)

(i) Glucose,

From 46 minutes to 90 minutes, Concentration of glucose in blood increases rapidly to the maximum because there was absorption of glucose from the ileum into the blood stream.

From 90 minutes to 160 minutes, Concentration of glucose in blood decreases gradually, because some glucose was metabolized during respiration to produce energy, some glucose was Converted into glycogen, some glucose was Converted into fats; with in the level by insulin hormone produced/secreted.

Mark 04

(ii) Insulin

From 46 minutes to 106 minutes, Concentration of insulin in blood increases rapidly to the maximum, this is because absorption of glucose in blood raises the glucose levels from the norm/set point, and this stimulated the Beta-Cells of islets of langerhans of the pancreas to secrete insulin hormone into the blood stream, which flows/moves to the liver and reduce/lowers/decrease glucose levels back to norm.

From 106 minutes to 160 minutes, Concentration of insulin in blood decreases rapidly, because it was metabolized/broken down by the body and excreted through the kidney nephron.

Mark 06

Candidate's Name .....

Signature .....

Subject ..... Paper code ...../.....

Random No.						
Personal Number						

Do not write in this margin

No 1 (c)

The Concentration of insulin would reduce/decrease, beause during exercise, the demand for energy by the body increases; therefore g stored glycogen in muscles is converted into glucose; also glycogen in liver cells is converted into glucose; by glucagon hormone therefore there would not be stimulation of beta cells of islets of langerhans in the pancreas.

Max 03

No 1 (d)

Glycogen;

From 0 to 25 minutes, prolonged exercise leads to a decrease in the amount of glycogen.

From 25 minutes to 35 minutes, prolonged exercise leads to a constant amount of glycogen.

Accept mass of liver glycogen / Mass of glycogen.

Glucagon;

From 0 to 20 minutes, prolonged exercise leads to an increase in the amount of Glucagon.

From 20 minutes to 35 minutes, prolonged exercise leads to a decrease in amount of Glucagon.

Accept Concentration of glucagon / Concentration of glucagon in blood.

Max 04

Candidate's Name .....

Signature .....

Subject ..... Paper code ...../.....

Random No.						
Personal Number						

Do not write in this margin

No 1 d (ii)

Glycogen; From 0 to 6 minutes, mass of liver glycogen, decreases gradually because little glucagon has been produced as exercise has just started.

From 6 minutes to 10 minutes, mass of glycogen decreases rapidly because glycogen is converted into glucose by produced/secreted glucagon, which is metabolized to form energy to meet the high energy demand during exercise.

From 10 minutes to 25 minutes, mass of glycogen decreases gradually because liver glycogen is getting exhausted/depleted

From 25 minutes to 35 minutes, Mass of glycogen remains Constant at 0 g because glucagon levels has lowered/reduced, and also there is another energy sources for the body for example fats metabolism. Glycogen has got depleted in the liver. Also all the glycogen has been converted to glucose.

Glucagon;

From 0 to 10 minutes, ~~mass~~ Concentration of glucagon increases gradually, this is because exercise has just started, and glucose levels ~~are just~~ have just started decreasing below the norm; there less stimulation of alpha cells of islets of langerhans of the pancreas to secrete little glucagon hormone.

Candidate's Name .....

Signature .....

Subject ..... Paper code ...../.....

Random No.						
Personal Number						

UCE

Do not write in this margin

From 10 minutes to 20 minutes, Concentration of glucagon in blood increases rapidly to the maximum, this is because further exercise, caused a ~~further~~ more decrease of blood glucose below the norm; and this caused more stimulation of beta cells of islets of Langerhans of the pancreas to secrete more glucagon hormone to raise blood glucose levels back to norm; so as to ensure energy source from respiration; and this is done by converting glycogen into glucose in the liver cells.

From 20 minutes to 35 minutes, Concentration of glucagon in blood decreases gradually; this is glucose levels have gone back to norm; and therefore glucagon hormone in blood was metabolised and excreted through the kidney.

Mark 12

UGANDA NATIONAL EXAMINATIONS BOARD
UGANDA CERTIFICATE OF EDUCATION
OCTOBER - NOVEMBER, 2022

UCE

Do not write in this margin

Candidate's Name ....

Signature .... | Random No. | | | | | | |
Subject .... Paper code ..../...... | Personal Number | | | |

No 1 (e)

under influence of Adreno Cortico trophic hormone from Anterior pituitary gland.

Adrenal gland is stimulated to secrete Cortisol hormone

Cortisol hormone Causes formation of glucose from amino acids and glycerol hence increasing glucose concentration in blood.

Cortisol hormone also increases the formation of enzymes from ~~enzymes~~ amino acids, used to Catalyse the breakdown of fats and proteins to glucose.

Adrenaline ~~hormone~~ Cause ~~breakdown~~

05

83 WASSWA ENOCK
2867639

UCE

Do not write in this margin

UNNACE – A'LEVEL BIOLOGY – P2 GUID – 2022

Candidate's Name ..... BY WASSWA ENOCK

Signature .....

Random No.

Subject ..... 070/3 00489 Paper code ..... 07628676 39 Personal Number

SECTION B

No 2 (a)

What is meant by the term eutrophication (02 mks)

Refer to excessive enrichment of the water body by the nutrients for example phosphates and nitrates leading to increased growth of the algae / aquatic plants / resulting into algal blooming

No 2 (b) State Causes of eutrophication (6 mks)

- Discharge of sewage in the water body, which accumulates nutrients leading to algal blooming

- Application of fertilizers in agriculture which later eroded by rain into the water body, increasing nutrients amounts.

- Feeding of Cattle and waste products produced by animals both Contribute to the nutrients found in rivers, lakes.

- Soil erosion Carry excess nutrients.

- EXcessive nutrients results Can accumulate in the water body when sediments and rocks are eroded

- Release of Industrial water waste products in the water body increases the growth of the algae.

- Deforestation, increases soil erosion, Carrying nutrients in water body.

Candidate's Name .....

Signature .....

Subject ..... Paper code ...../.....

Random No.

Personal Number

Do not write in this margin

UCE

Do not write in this margi

No 2 c (ii) Explain the

a) Adaptations of water hyacinth for its survival as a successful weed (06)

Water hyacinth can reproduce sexually and asexually;

- Sexually by producing seeds through flowers; and asexually reproduce by budding; this increases their survival

- Has a high reproduction rate, this enables them to multiply fast and therefore survive.

- Have leaves, with large air spaces in the spongy mesophyll layers which enables gaseous exchange and also increases buoyancy.

- Has long, pendant and adventitious roots for water absorption.

- Broad leaves; to increase surface area for absorbing sunlight for photosynthesis.

Mark 06

Candidate's Name .....
Signature .....
Subject ..... Paper code ...../.....

Random No.						
Personal Number						

No2 (c) (ii)

(ii) Explain Ecological effects of water hyacinth on water. (6 marks)

Water hyacinth grows on surface of water causing shading preventing light penetration, which restricts the development of photosynthetic algae, which form the bases of the aquatic food chain.

Restricted growth of photosynthetic algae, deprives the water of oxygen; resulting into death of fish.

- Decay of the dead weed uses up oxygen, increasing biochemical oxygen demand (B.O.D), creating anoxic condition hence death.
- Water hyacinth may be habitats for dangerous species like snakes, which are harmful to people's life
- Shallow water breeding fish compete with water hyacinth, reducing their population.
- Water hyacinth are food to aquatic organisms hence survival of those fish.

Mark of 6

UGANDA NATIONAL EXAMINATIONS BOARD
UGANDA CERTIFICATE OF EDUCATION
OCTOBER - NOVEMBER, 2022

UCE

Do not write in this margin

Candidate's Name .....

Signature .....

Subject ..... Paper code ...../.....

Random No.						
Personal Number						

No 3 (a)

Compare polyploidy and aneuploidy 06 mks

Similarities

- In both, a cell may posses extra set of chromosomes. ✓
- Both Conditions Create lethal genetic diseases ✓
- Both disrupt the existing equilibrium in Cells ✓

Candidate's Name .....

Signature .....

Subject ..... Paper code ...../.....

Random No.							
Personal Number							

Polyploidy	Aneuploidy
Involves Presence of more than two sets of chromosomes	Involves presence of an abnormal number of chromosomes
Types include monosomy, disomy, trisomy	Types include triploidy, tetraploidy
~~More Common in humans~~	
Rare in humans	More Common in humans.

Turn over

Candidate's Name .....

Signature .....

Subject ..... Paper code ...../.....

Random No.						
Personal Number						

Do not write in this margin

No 3 (b)

Give Conditions for emergence of polyploids in plants

- Mitotic chromosomal non-disjunction, in which chromosomes fail to separate equally.
- Non disjunction of the sex chromosomes leads to gamete non-reduction during meiosis
- Polyspermy, in which the female gamete is fertilized by more than one male gamete.
- Endo-duplication, the replication of DNA during the S-phase of the Cell Cycle with out the subsequent completion of mitosis

UGANDA NATIONAL EXAMINATIONS BOARD
UGANDA CERTIFICATE OF EDUCATION
OCTOBER - NOVEMBER, 2022

UCE

Do not write in this margin

Candidate's Name .....

Signature .....

Subject ..... Paper code ...../.....

Random No.						
Personal Number						

By WASWA ENOCK - 0701300431 / 0762867639

NO3 C Explain the failure to plasmodium develop an effective vaccine against gene recombination

(i) Plasmodia parasite undergo continuos mutation, forming large number of new antigenic variants, which are resistant to the vaccine made.

This mutation leads to a change in the surface membrane of the plasmodium parasite, hence failure to develop an effective vaccine against plasmodia

NO3

Explain how Man influences the process of speciation (05 mks)

Man/Humans impose artifical selection, in the process of breeding, males and females with desired characteristics are allowed to mate, individuals lacking the desired qualities are prevented from mating by extermination, segregation and by sterilization by ~~trappers~~ rigorous selection over many generation forming species which are different from parents.

Well 05

WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST:_____

O&A

Do not write in this margin

CANDIDATE'S NAME:..... INDEX No.....

SUBJECT:..... PAPER:..... SIGNATURE.....

Do not write in this margin

No 4 (a)

Describe how a Carbon dioxide molecule in the cells of mesophyll cells of a C_3 plants can be converted into a triglyceride (06 marks)

Trigly — Triglyceride is an ester of fatty acid and glycerol. ✓

— Carbondioxide diffuses into the cytoplasm of mesophyll cells and combines with Ribulose bisphosphate ✓ under Catalysis of Ribulose bisphosphate Carboxylase enzyme ✓ to form unstable a 6-Carbon intermediate which split to form stable glycerate-3-phosph

— Some of the glycerate-3-phosphate enters a glycolytic pathway ✓ where converted into pyruvate ✓ which is converted into acetyl group which later combines with a Coenzyme A ✓ to form Acetyl Coenzyme A, and this is used to form ~~Acetyl Coenzyme A~~ a variety of ~~Fatty~~ fatty acid ✓

— Some of the Glycerate-3-phosphate is reduced using $NADPH_2$ ✓ and ✓ phosphorylated ✓ using ATP to form triose phosphate. ✓

Some triose phosphate is converted into ✓ a glycerol

— Then a fatty acid combines with ✓ a glycerol to form a ~~triglyceride~~ ✓

Mark 09

WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST:_____

O&A

CANDIDATE'S NAME:..... INDEX No.....

SUBJECT:..... PAPER:..... SIGNATURE.....

Do not write in this margin

Do not write in this margin

(b)

Explain the physiological and ecological advantages C_4 plants has over C_3 plants. (6 marks)

Physiological advantages.

C_4 plants ably photosynthesize at very low Carbon dioxide Concentration because PEP Carboxylase enzyme has a very high affinity for Carbondioxide therefore no photorespiration however C_3 plants have ~~Ribo~~ RUBP Carboxylase oxygenase which has equal affinity for both oxygen and ~~oxyg~~ CO_2, therefore in condition of low Carbon dioxide Concentration, photorespiration occurs.

Ecological advantages.

The CO_2 fixing enzymes in C_4 plants are more active at hot temperature and high illumination, therefore photosynthesis occurs rapidly at low ~~attitudes~~ altitudes, hot and tropical Conditions, however C_3 plants, enzymes are more active at ~~low temp~~ low temperature, hence distributed in temperate regions, high altitude.

mark 05

WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST:_____

CANDIDATE'S NAME:..... INDEX No.....

SUBJECT:..... PAPER:..... SIGNATURE:.....

not ite this rgin

O&A

Do not write in this margin

Explain the physiological significance of chloroplast

In the thylakoid membrane, there contained (05 marks)
chrophyll molecules, which absorbs sunlight, which exites
electrons in Phytosystem 1 and photosystem 2, the
electrons move uphill and get accepted by electron
alleptor, electrons then move down hill for releasing
energy used to combine ADP and Pi to form ATP.

Also Absorbed light, split water into hydroges (H^+)
ions, electrons and oxygen gas,
H^+ and electrons combine with $NADP^+$ to form
reduced NADP or $NADPH_2$.

mark 05

WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST:_____

CANDIDATE'S NAME:..... INDEX No.....

SUBJECT:..... PAPER:..... SIGNATURE.....

O&A

Do not write in this margin

No 5 (a)

Describe the role of the aortic and Carotid bodies in the Control of the respiratory rate in man (6mks)

Aortic and Carotid bodies are chemoreceptors found in wall of ~~aorta~~ aorta and Carotid artery.

They detect changes in blood PH and initiate the firing of an impulse through the efferent nerve to the respiratory Centre ~~and~~ in the medulla oblongata of the brain; which increase or decrease the rate of ventilation.

Also they detect changes in blood pH, and initiate the firing of an impulse through the efferent nerve to the Cardiovascular centre in the medulla oblongata which regulates ~~the~~ heart rate.

mark 06

(b)

Describe how the respiratory rate in a cell is Controlled (5mks)

The respiratory rate is Controlled by respiratory Centre in medulla oblongata of the brain; which has two regions ie inspiratory centre and expiratory Centre.

When the Carbondioxide level rises, the Carotid and aortic bodies become stimulated and ~~fire~~ initiate the firing of an impulse through the efferent nerve to the inspiratory Centre in the medulla oblongata, which become stimulated on ~~reach~~ receiving the impulses and fire impulses along the ~~phrenic~~ phrenic and thoracic nerves to the diaphragm and intercostal muscles respectively, this Causes increase in Contraction, resulting into faster inspiration.

WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST:_____

CANDIDATE'S NAME:..... INDEX No.....

SUBJECT:..... PAPER:..... SIGNATURE.....

Do not write in this margin

O&A

Do not write in this margin

As the lungs expand, stretch receptors in their walls are stimulated and fire impulses along the vagus nerve to the expiratory centre in the medulla oblongata. This automatically switches off the inspiratory centre, the muscles relax and expiration takes place.

Mark 07

No 5 c

Distinguish between Krebs cycle and glycolysis (04 marks)

Krebs cycle	Glycolysis
The first Compound formed is Citric acid	The first Compound formed is Glucose-6-phosphate
occurs in the mitochondria	occurs in the cytoplasm
No phosphorylation of substances occurs (ATP is not utilised)	Phosphorylation of glucose occurs. (ATP is utilised)
More ATP molecules are formed	less ATP molecules are formed
No lysis occurs / splitting of a compound occurs	Splitting of Fructose-1,6-diphosphate
occurs in presence of oxygen	occurs in presence and absence of oxygen
The final product formed is oxaloacetate	The final Compound formed is pyruvate

WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST:_____

CANDIDATE'S NAME:..... INDEX No.....

SUBJECT:..... PAPER:..... SIGNATURE.....

Explain why ATP is a suitable energy store in Cells (03 marks)

ATP Consists of 3 phosphate groups, that link through phosphodiester bonds which are strong. Therefore on breaking the bonds, high energy is released which is used in many cell activities for example protein synthesis during growth, Active trasp transport of molecules or substances.

max 03

No 6(a) Describe the physiological significance of monosaccharides (monosaccharides)

Physiological significance of monosaccharides (Colony)

- Synthesis of nucleic acid for example Ribbose is a constituent of RNA, deoxyribose of DNA ✓

- Synthesis of some Coenzymes eg ribose is used in the synthesis of NADP and FAD, NAD ✓

- Synthesis of ATP, ADP, AMP also require ribose. ✓

- Ribulose bisphosphate is the Carbon dioxide alleptor and is made from 5C-sugar ribulose ✓

- Source of energy when oxidized in respiration, for example glucose ✓

- Synthesis of disaccharides, two monosaccharide can link to form a disaccharide ✓

- Synthesis of polysaccharides, glucose is used in formation, eg cellulose, ~~starch~~ glycogen.

max 06

WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST:_____

CANDIDATE'S NAME:..... INDEX No.....

SUBJECT:..... PAPER:..... SIGNATURE.....

O&A

Do not write in this margin

No 6 (b)

Describe the structure of the following polysaccharides

i) Starch (06 mks)

It is a main storage form of plants and it is a polymer of α-glucose ✓

- It comprises of amylose 20 to 30% ✓
- It comprises of Amylopectin 70 to 80%, all together with other substance eg phosphate ✓

- The polymer is made up of straight chain components called amylose ✓; joined by 1,4-glycosidic bonds and branches 1,6-glycosidic bond in Amylopectin the branched chain

- These components are coiled to form a helix, where the OH group points into the interior and they are not free to take part in its bonding.

next 06

INDEX No.....

WAKISSHA JOINT MOCK EXAMINATIONS

JULY/AUGUST:_____

CANDIDATE'S NAME:..... INDEX No.....

SUBJECT:..... PAPER:..... SIGNATURE.....

o not write n this nargin

Cellulose (8 marks)

- Consists of approximately 10,000 β-glucose units.
- The chain of β-glucose are unbranched with many cross linkages between chains which a parallel.
- It Contains 1,4-glycosidic bond
- It Consists of straights chain of molecules which project both sides of the chain at alternate position ie alternating heads up and tails down.

Well done

(c) Explain why Carbohydrates are able to form a variety of Carbohydrates (2 marks)

Both pentoses and hexoses can be used to make polysaccharide though normally one type of monosaccharides is used in each polysaccharide type like hemicelluloses, nucleic acids sugars may be aldoses and ketoses.

Capacity to form 1,4 and 1,6 glycosic bonds are common between sugar units eg in Cellulose. This accounts for the case of branching and hence formation of different type of polysaccharide

Existence of alpha and Beta forms of monosaccharide account for the variations of polysaccharides eg starch, alpha glucose monosaccharides while cellulose made of beta glucose units.

- Sugars may be ketoses or aldoses, these increase the polysaccharide variation like inulin is made of ketose monosaccharide units while starch and glycogen are made of aldose monosaccharide units.

The high chemical reactivity of sugars and OH groups and their variation in exposure increases polysaccharide variability

- Capacity to form chains of various length and branching.

By WASSWA ENOCK
0701300439 / 0762867639
"ALWAYS"

Mark 04

P530/2

Biology
Paper 2
July/Aug, 2023
2 1/2 Hours

UNNASE Community

UNNASE MOCK EXAMINATIONS

UGANDA ADVANCED CERTIFICATE OF EDUCATION RESOURCEFUL EXAMINATIONS

BIOLOGY PAPER 2

(THEORY)

TIME: 2 HOURS 30 MINUTES

Instruction to candidates

- This paper consists of section A and B;
- Answer question one in section A plus any three from section B.
- Candidates are advised to read the questions carefully, organised their answers and present them precisely and logically, illustrating with well labelled diagrams wherever necessary.

Question	Marks
Total	

SECTION A: (40 MARKS)

Compulsory question

1. Figure 1 shows the changes that occur in the concentration of insulin and glucose in the blood stream of a person who had fasted overnight and then swallowed 75g of glucose.

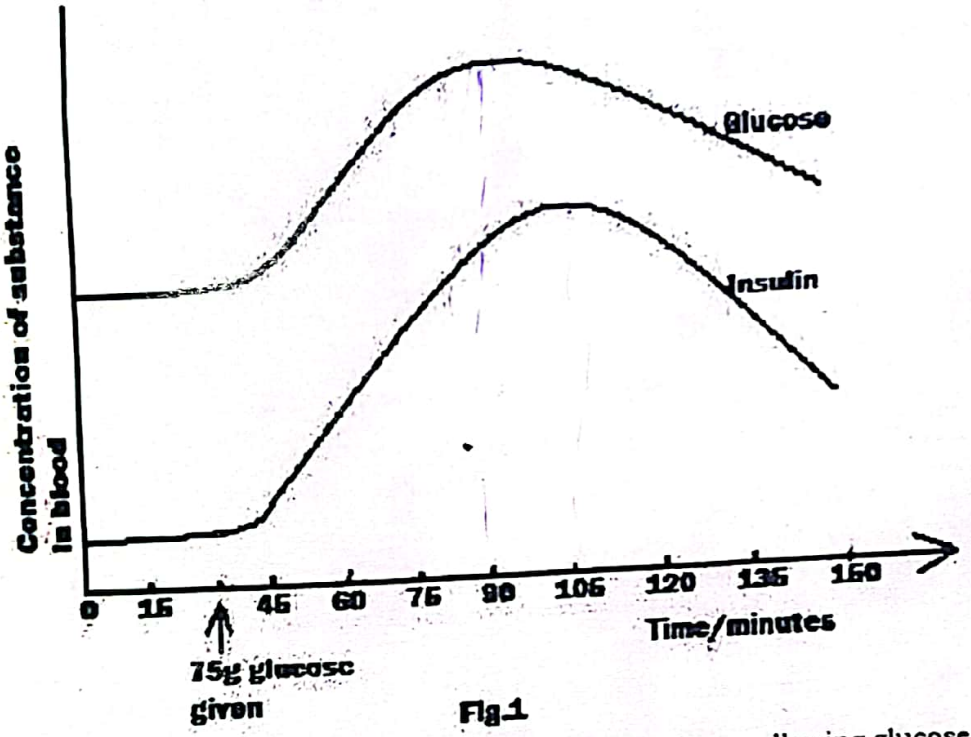

Fig.1

(a) Compare the levels of glucose and insulin after swallowing glucose. (06 marks)

(b) Explain the changes in the concentration of; (04 marks)
(i) Glucose. (06 marks)
(ii) Insulin.

(c) Explain how the concentration of insulin would change if the person engaged in an exercise. (03 marks)

(d) Figure 2 shows the changes in the amount of liver glycogen and glucagon concentration in blood of a person during prolonged exercise.

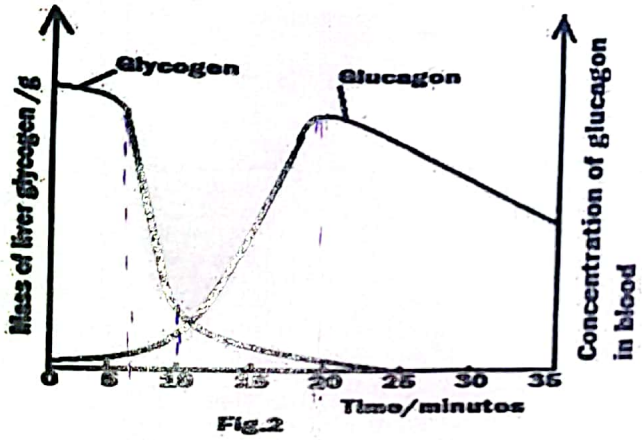

Fig.2

(i) Describe the effects of prolonged exercise on the amount of glycogen and the concentration of glucagon in blood. (04 marks)

(ii) Explain the trend in the mass of glycogen and glucagon in blood. (12 marks)

(e) Suggest how continuous supply of glucose is ensured after the 25th minute. (05 marks)

SECTION B: (60 MARKS)

Attempt any three questions

2. (a) What is meant by the term **eutrophication?** (02 marks)

(b) Explain the causes of **eutrophication.** (06 marks)

(c) Explain the;

(i) Adaptations of water hyacinth for its survival as a successful weed. (06 marks)

(ii) Ecological effects of water hyacinth on water. (06 marks)

3. (a) Compare polyploidy and aneuploidy. (06 marks)

(b) Give the conditions for emergence of polyploids in plants. (04 marks)

(c) Explain the following;

(i) Failure to develop an
which causes malaria

(ii) How man influences

4. (a) Describe how a carbon dio
plant can be converted into a trig

(b) Explain the **physiological**
C3 plants.

(c) Explain the **physiologica**

5. (a) Describe the role of the **aq**
respiratory rate in man.

(b) Describe how the respirat

(c) Distinguish between **Kreb**

(d) Explain why ATP is a suit

6. (a) Describe the **physiologica**

(b) Describe the structure of

(i) Starch.

(ii) Cellulose

(c) Explain why carbohydrat

(i) Failure to develop an effective vaccine against plasmodia species which causes malaria. (05 marks)

(ii) How man influences the process of **speciation**. (05 marks)

4. (a) Describe how a carbon dioxide molecule in the mesophyll cells of a C3 plant can be converted into a triglyceride. (09 marks)

(b) Explain the **physiological** and **ecological** advantages C4 plants have over C3 plants. (06 marks)

(c) Explain the **physiological significance** of chloroplast. (05 marks)

5. (a) Describe the role of the **aortic** and **carotid bodies** in the control of the respiratory rate in man. (06 marks)

(b) Describe how the respiratory rate in a cell is controlled. (07 marks)

(c) Distinguish between **Kreb's cycle** and **glycolysis**. (04 marks)

(d) Explain why ATP is a suitable energy store in cells. (03 marks)

6. (a) Describe the **physiological significance** of monosaccharides. (06 marks)

(b) Describe the structure of the following polysaccharides;

(i) Starch. (06 marks)

(ii) Cellulose (04 marks)

(c) Explain why carbohydrates are able to form a variety of carbohydrates. (04 marks)

END/AB 2023