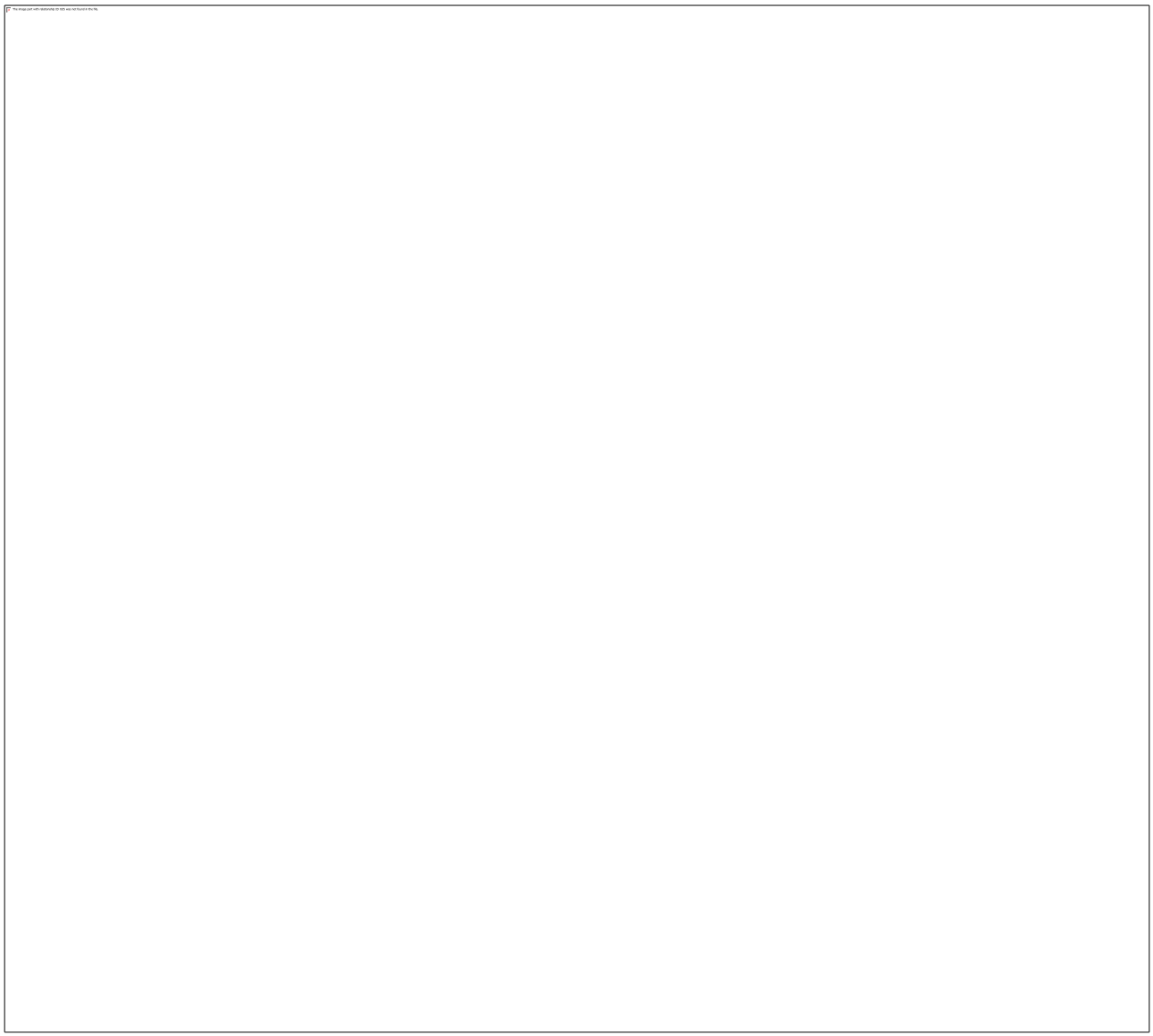
POST MOCK TERM 3 2019

MARKING SCHEME

1.A specimen of Drosophila has red eye and when crossed with a purple mutant all the F1 had red eyes.Theoffsprings were mated amony themselves and the following proportions of flies were produced; 201 gad red eyes and 67 had purple eyes.Using R to represent the dominant gene and r to represents the recessive gene,answer the following questions.

i)By the help of diagrams shows how the ratio of 201:67 was arrived at ,in the F2generation.
(5mks)

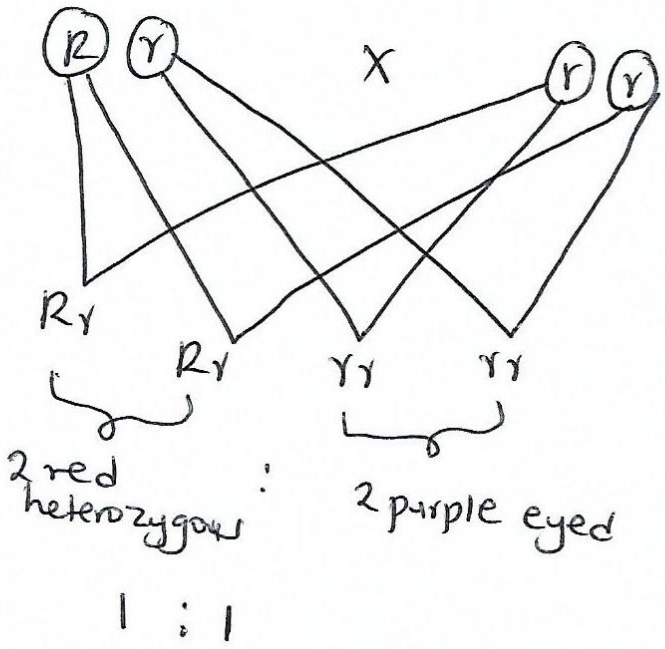
ii)Draw diagrams to show the genetic details of a cross between the heterozygous red eyed and a purple eyed individual form F2.



ii) Parental phenotype Heterozygous red eyed Purple eyed

Genotype Rr rr

Gametes



` (3mks)

2.The diagram below shows the relationship between blood supplies of the embryo ,placenta and the uterus. Use it to answer the question that follow.

a)Name the part labeled A and C. (2mks)

A-Umbilical artery

C-Chorionic villus

b) State ay two functions of placenta in mammals. (2mks)

-secretes hormones oestrogen and progesterone which maintains pregnancy

-Facilitates transfer of nutrients and oxygen from mother to embryo

-Facilitates transfer of metabolic waste from embryo to mother

-Facilitates transfer of antibodies

c.(i)What kind of flow does maternal and foetal capillaries exhibit at the placenta. (1mk)

-Counter current flow

(ii)Why is this kind of flow(c) (i)have an advantage. (1mk)

-Creates a steep concentration gradient for efficient exchange of materials

d)If the maternal and foetal blood circulatory system were to be directly connected at the placenta suggest what may happen. (1mk)

-Blood capillaries of foetus would burst due to high pressure from the maternal system.Toxic materials from, the mother might leak into foetus.

e)In lactating mammals if the pitutary glands is removed ,explain what happens. (1mk)

3.A student was given four test tubes A,B,C and D, each containing a different mixture among the following :
i)Starch +amylase + maltase+ water
ii)Starch +Pepsin +Water
iii)Starch +Glucose +Water
iv)Cellulose +amylase+ typsin+ Water
she placed the test tubes in an incubator at 30^0C until all possible reactions had taken place. She then took samples from each test tube and tested them separately for starch, reducing sugar and protein. The results obtained are given in the following table.

Tube	Starch	Reducing	Protein
A	Present	Present	Absent
B	Absent	Absent	Present
C	Present	Absent	Present
D	Absent	Present	Present

a)Name a reagent used to test for reducing sugar and state the appearance of a positive result. (2mks)

-Reagent –Benedict's solution
-Result-An orange precipitate is formed
b)Identify the contents of each of the test tube A,B,C and D according to the results obtained (4mks)

Tube	**Mixture**
A	**(iii)**
B	**(iv)**
C	**(ii)**
D	**(i)**

c)State the role of enzyme in respiration. (2mks)
-They are biological catalysts. They control chemical reaction during respiration, which takes place in many small steps.
4.The graph below shows the effect of injecting one unit of insulin into a person .The concentration of glucose in the blood is measured at regular intervals.
a)Insulin being a protein it will be digested by protein digestive enzymes

b)Explain the fall in blood glucose level. (2mks)
-The blood glucose level fell because insulin stimulated the liver cells to convert some glucose into glycogen. Some glucose was oxidized to provide energy.
c)Name the mechanism that led to the increase in blood glucose level when it had been falling. (1mk)

-Negative feedback mechanism
d)Name the hormone responsible for the conversion of glycogen to glucose. (1mk)
-Glucagon hormone
e)State the effects of each of the following in human beings.
i)Too much glucose in the blood. (1mk)
-Overproduction of energy by tissues which can burn them.
ii)Very little glucose in the blood. (1mk)

-Reduced energy by tissues which results to reduced cellular activities

5.The diagram below shows a stem of a passion fruit twining around post.

a)What is the name given to the type of growth movement shown above? (1mk)

-Thigmotrophism/Haptotropism

b)What is the biological importance of this growth? (1mk)

-It provides mechanical support to plant lacking woody stems.

c.i)Account for the twining growth pattern. (3mks)

-There is low auxin concentration on the side which comes into contact with the post. There is a higher concentration of auxins on the side away from the contact surface.Auxinscause more growth on the side away from the contact surface.The stem then twines around the support plant.

ii)Name three other types of growth responses exhibited by plants. (3mks)

-Phototropism

-Chemotropism

-Geotropism

-Hydrotropism

SECTION B(40 MARKS)

Answer question 6 and either question 7 or 8

6.The formation of acid rain is a serious environmental concern. Sulphuric acid is present in acid rain and has adverse effects on both plants and animals.

a)Name two other acids (other than sulphuric acid)that can be found in acid rain. (2mks)

-Nitric acid

-Carbonic acid

b)An experiment was carried out to investigate the effects of dilute sulphuric acid on the growth of plant seedlings. Batches of seedlings were grown in glass dishes on filter paper to which dilute sulphuric acid was added. The dishes were then incubated. The root and shoot lengths were measured after 65 hours. The results obtained are as shown in the table below.

Sulphuric acid Concentration (mol/dm^{-3})	Mean root Length(mm)	Mean shoot Length(mm)
0	55.5	25.2
$1x10^{-3}$	63.4	18.4
$3x10^{-3}$	6.5	9.5
$4x10^{-3}$	2.0	4.6
$6x10^{-3}$	1.8	0.8
$7x10^{-3}$	1.5	0.5
$8x10^{-3}$	1.3	0.3
$9x10^{-3}$	1.3	0.0
$10x10^{-3}$	1.0	0.0

Plot a graph of the mean root length and the mean shoot length against the sulphuric acid concentration on the same grid. (7mks)

c)Describe the relationship between the concentration of sulphuric acid and the:

i)Growth of the shoots. (2mks)

-As the acid concentration increases,the growth of the shoot decreases due to the low pH which is toxic to the cells.

ii)Growth of the roots. (2mks)

-The length of the root increases, slightly at the beginning ,but as the acid concentration increases the growth decreases .Low pH is not suitable for the growth of roots.

d)Estimate the mean root and mean shoot lengths when the concentration of sulphuric acid is $5x10^{-3}$. (2mks)

-The mean shoot length 2.0mm$\pm$0.1
-The mean root length 2.0mm$\pm$0.1

e)State two other effects of acid rain. (2mks)

-It kills organisms in water and soil
-It corrodes walls and roofs of buildings
-It causes leaching of aluminium from soils

f)State three ways of preventing acid rain. (3mks)

-Use substances that extract sulphur from sulphur-containing fuel
-Fit chimneys with scrubbers that dissolves gases such as sulphurdioxide and nitrogen dioxide.
-Increases use of electricity instead of fossil fuels
-Fit automobiles with filters and catalytic converters in their exhaust pipes to reduce emission of sulphur oxides.

8.(a) Describe the following terms:

(i) Secretion

Secretion is discharge of useful substances such as hormone and enzymes.

(ii) Excretion

Excretion is the elimination of waste products of metabolism

(iii) Egestion (3 mks)

Egestion is the removal of indigestible and undigested materials from the alimentary anal.

b)Explain how the mammalian kidney is adapted to its functions. (17mks)

(b) Has renal artery to supply blood rich in metabolic wastes.
-Has renal vein that drains purified blood from the kidney
-Renal artery branches into arterioles that serve individual nephrons
-Efferent arteriole is narrower than the afferent arteriole to create high pressure required for ultra filtration.
-Glomerular capillaries are very narrow to create high pressure to enhance ultra filtration.
-Has a capsule barrier that selectively allows some substance to pass through.
-Has convoluted tubule that is highly coiled to slow down rate of flow of filtrate to allow more time for re-absorption.
-Has a proximal convoluted tube having micro villa which increases the surface area for reabsorption.
-Has gromerulous with cell lining having numerous mitochondria which provides the necessary energy in form of ATP

8.Explain the role of hormones in the growth and development of plants. (20mks)

Auxins

-Auxins promote cell division
-They influence tropic responses.
-They stimulate the formation of the abscission layer/leaf fall
-Auxins promote parthenocarpy.
-Auxins promote cell differentiation in vascular tissues.
-They also cause apical dominance
-They stimulate the growth of adventitious roots
-Auxins together with cytokines induce formation of callus tissue for healing of wounds.

Gibberellins

-Gibberellins stimulate cell division and elongation in dwarf varieties.
-They also stimulate parthenocarpy
-They inhibit growth of adventitious roots
-Gibberellins break seed dormancy by activating enzymes during seed germination.
-Gibberellins also retard leaf abscission

Cytokinins

-Cytokinins break seed dormancy in some plants.
-They stimulate flowering in some plants.
-Cytokinins promote cell division in the presence of IAA.
-They stimulate formation of roots.
-They encourage leaf senescence when in low concentrations.
-In high concentration they stimulate leaf growth/expansion.

Ethylene

-Ethylene stimulates development of lateral buds.
-It stimulates ripening of fruits.
-It induces stem thickening.
-It inhibits stem elongation.
-It causes abscission of leaves and fruits.
-It promotes flowering in some plants.

Abscisicacid(ABA)

-Abscisic acid causes stomatal closure.
-It inhibits seed germination.
-It causes leaf and fruit fall.
-It inhibits stem elongation and general growth.
-It also causes seed dormancy.