KWAZULU NATAL DEPARTMENT OF EDUCATION

GRADE 11- LIFE SCIENCES – PAPER 1
NOVEMBER 2019
MEMORANDUM

SECTION A
QUESTION 1

1.1

1.1.1 B ✓✓
1.1.2 D ✓✓
1.1.3 B ✓✓
1.1.4 A ✓✓
1.1.5 A ✓✓
1.1.6 C ✓✓
1.1.7 D ✓✓
1.1.8 B ✓✓
1.1.9 D ✓✓
1.1.10 C ✓✓

[10x2=20]

1.2

1.2.1 Cuticle ✓
1.2.2 Glucose ✓
1.2.3 ATP /Adenosine Triphosphate ✓
1.2.4 Emulsification ✓
1.2.5 Bowmans Capsule ✓

[5x1=5]

1.3

1.3.1 B only ✓✓
1.3.2 A only ✓✓
1.3.3 Both A and B ✓✓
1.3.4 B only ✓✓
1.3.5 A only ✓✓

[5x2=10]

1.4

1.4.1 A- Afferent arteriole √
B- Efferent arteriole √
C- Glomerulus ✓
D- Wall of Bowman's Capsule ✓
E- Capsular space of Bowman's Capsule ✓

[5]

1.4.2 *Ultra – filtration / Glomerular filtration ✓
Part labelled B is narrower ✓ than Part labelled A, therefore slowing down the rate of blood flow. This creates higher ✓ blood pressure in part labelled C.High blood pressure leads to leakage ✓ of blood plasma with smaller substances such as glucose, amino acids, water, urea and other ✓ nitrogenous waste products through the micro pores on the capillary network ✓ at C. Blood cells, plasma proteins and other large solutes are left behind in blood. ✓

(5)

* Compulsory Mark

1.4.3 Podocytes (2)

1.4.4 Bowman's capsule is cup shaped. Fits closely with the glomerulus. Allows for effective filtration. **OR**

Bowman's capsule is cup shaped. Provides a large surface area for effective filtration (3)

[15]

QUESTION 2

2.1.1 The rate of photosynthesis increases as the light intensity increases, therefore the mean mass of lettuce plants increase. (any 2) (2)

2.1.2 Carbon Dioxide
Temperature (2)

2.1.3 They raised the level of CO_2 to an optimum level of 4% and temperature of 25°c as they increased the light intensity to 8 arbitrary units. (3)

Any 3

2.1.4 The rate of photosynthesis will drop because at higher temperature the protein molecules of the enzymes become denatured and therefore become functionless (3)

Any 3

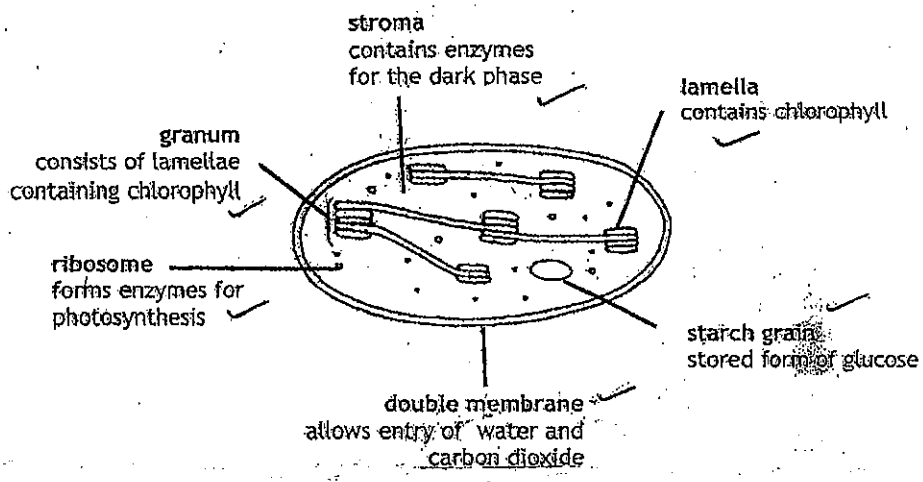
2.1.5

Structure of a chloroplast

Caption : 1

Drawing : 3

Labels : Any 3



(5 marks)

2.1.6

(a) Provision of food /energy for organisms in the higher trophic levels. Primary producers absorb radiant energy, and they form the base of the food pyramid, providing food to all other consumers above them. (2)

(b) Control of carbon dioxide and oxygen levels in the atmosphere. Photosynthesis uses up large amounts of CO2 to maintain balance of gases in the atmosphere. Excess CO2 can lead to harm to living organisms on earth. (2)

2.1.7 Too much light exposure can damage the photosynthetic process and bleach the leaves. (2)

2.2.1 Logistic (1)

2.2.2 1.Lag Phase/Establishment Phase

2. exponential(geometric) growth phase

3. Decelerating growth phase

4. Stationary (equilibrium) phase (4)

2.2.3 population size is small

Population is adapting to its environment/population is new to the area

There are few reproducing individuals

Some can't find a mating partner when density is low

2.2.4 (a) 2 Exp. (b) 2 Exp. (c) 3 Decelerating phase (d) 4 Stat. [4]

2.2.5 Competition: increased number resulted in more competition for food, shelter and space (3)

Territoriality: results in organisms claiming space for themselves, leaving others with limited space (3)

Disease: due to an increase in population size, diseases spread more rapidly causing population growth to slow down (3)

Predation -

ANY OF THE TWO OPTIONS ABOVE [6]

QUESTION 3

3.1.1 4- bell jar 5- rubber sheet (2)

3.1.2 1. Trachea
2. Bronchus
3. Lungs
4. Thoracic wall
5. Diaphragm (5)

3.1.3 Apparatus A : rubber sheet moves up to its original position therefore more pressure exerted on the balloons, resulting in air being forced out. (3)

3.1.4 Bell jar representing the thoracic wall is inflexible and therefore does not show the movement of the ribs and intercostal muscles OR there is a large space between the balloons and the bell jar and in humans the lungs sit against the thoracic cage (2)

3.1.5 Inhalation . The lung volume expands as a result of the contraction of the diaphragm and intercostal muscles (the muscles that are connected to the rib cage) thus expanding the thoracic cavity. Due to this increased volume, the pressure is decreased, and the air flows into the lungs (4)

3.1.6.1 Alveoli (1)

3.1.6.2 Healthy alveoli have deep folds.
Diseased alveoli have shallow folds.
Healthy alveoli have wide bronchiole.
Diseased alveoli have constricted bronchiole.

OR

Healthy alveoli have large surface area.
Diseased alveoli have smaller surface area.

(2)

3.1.6.3 Constricted bronchiole causes less oxygen to get in and longer time for CO2 to be expelled.
Shallow folds mean less surface area for absorption of oxygen.
Absorption of oxygen takes longer time.
Smaller airways are a major site of airflow obstruction.
Less elasticity means less efficient gaseous exchange taking place and less of alveolar surface area. ANY 3 (3)

3.2.1 Predation (1)

3.2.2 Predators (leopards) hunt and kill their prey (impala) (2)

3.2.3 It will regulate the population size of impala so that it remains within the carrying capacity/so that a balance is maintained in the ecosystem (2)

3.2.4 (a) X ✓ (1)
(b) Y ✓ (1)

3.2.5 * The initial increase in the impala population
* Increased the number of prey available to the predators.
* This increased the number of predators, this results in more prey being eaten, causing the number of prey to fall and this will result in the number of predators falling ✓
* Once the population numbers drop to below carrying capacity of each, both population will increase in number again. ✓ (5)

3.2.6 Intraspecific competition ✓ (1)

[13]

3.3.1 Cellular respiration ✓ (1)

3.3.2 (a) Absorbs carbon dioxide ✓
(b) Indicates the presence or absence of carbon dioxide ✓ (2)

3.3.3 Potassium hydroxide should be removed as it will absorb the carbon dioxide given off by the organisms. (2)

[5]

QUESTION 4

When the level of blood glucose increases above 0,7mg/cm³

The Islets of Langerhans/pancreas are stimulated to release insulin into the blood. Insulin increases the rate of absorption of excess glucose by the cells of the liver and muscles by converting it to glycogen and this decreases the level of blood glucose and the glucose concentration is restored to normal.

When the level of blood glucose deceases below 0,7g per cm³

Cells of Islets of Langerhans /pancreas are stimulated to release glucagon into the blood which stimulates the liver to convert glycogen to glucose and this increases the level of blood glucose restoring the glucose concentration to normal.

[11]

Diabetes- when insulin cannot be produced in the body the glucose level of the blood rises, the condition is termed "Diabetes Mellitus" , the kidneys excrete some of the excess glucose

[2]

Symptoms of Diabetes

Glucose in urine

Extreme thirst

Nausea/Vomitting

Blurred Vision

Frequent urination

Fatigue/Lethargy/Faintness

Weight loss

Non-healing wounds/poor healing of wounds

[4]

Assessing the presentation of the essay

Relevance	Logical sequence	Comprehensive
All information on the following is relevant to the topic: • Role of pancreas and liver in maintaining a constant glucose level • Consequences of poor insulin production • Symptoms of Diabetes and there is no irrelevant information [1]	Ideas arranged in a logical cause-effect sequence for : • Role of pancreas and liver in maintaining a constant glucose level • Consequences of poor insulin production • Symptoms of Diabetes [1]	Answered all aspects required by the essay in sufficient detail with at least the following : • Role of pancreas and liver in maintaining a constant glucose level 8/11 • Consequences of poor insulin production 1/2 • Symptoms of Diabetes 2/4 [1]

CONTENT: (17)

SYNTHESIS (3)

NOTE : No marks will be awarded for answers in the form of flow charts or diagrams

TOTAL MARKS FOR SECTION C = (20)

GRAND TOTAL : (150)

LIFE SCIENCES WEIGHTING GRID GRADE 11 PAPER 1

2019

Quest No.	Cognitive ability levels				Photosynthesis	Animal Nutrition	Respiration	Gas Exchange	Excretion in Humans	Population Ecology	TOTAL
	A	B	C	D							
1.1	12	4	4		4	4	4		4	4	20
1.2	5				1	1	2		1		5
1.3	2		4	4					10		10
1.4.1	7	5	3						15		15
2.1	7	4	3	7	21						21
2.2	16		3							19	19
3.1	8	5	4	5				22			22
3.2	3	4	6							13	13
3.3	1	2		2			5				5
4		17		3		20					20
Actual Marks	61	41	27	21	26	25	11	22	30	36	150
Norm %	40	25	20	15	18	18	10	15	15	24	100%
Marks	60	37.5	30	22.5	27	27	15	22	23	36	150%

A = Knowing Science B= Understanding Science C= Applying scientific knowledge D= Evaluating, anlalysing, synthesising