education

Department:
Education
PROVINCE OF KWAZULU-NATAL

NATIONAL SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES

COMMON TEST

JUNE 2019

MARKS: 150

TIME: 2½ hours

This question paper consists of 17 pages.

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answers to each question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You may use a non-programmable calculator, protractor and a compass.
11. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 The significance of the folded nature of the lining of the small intestine in the human digestive system is to ...

A increases digestion.
B increases secretions.
C increases surface area for absorption.
D decreases surface area for assimilation.

1.1.2 Grade 11 learners designed an experiment to investigate whether oxygen is used up during respiration of seeds.

Which of the following increases validity of their results?

A Use more respiring seeds in sample
B Use seeds from the same plant
C Repeat investigation and observe if they get the same results
D Expose seeds to light

1.1.3 The generation that is dominant in flowering plants is ...

A spores
B gametophyte
C sporophyte
D gametes

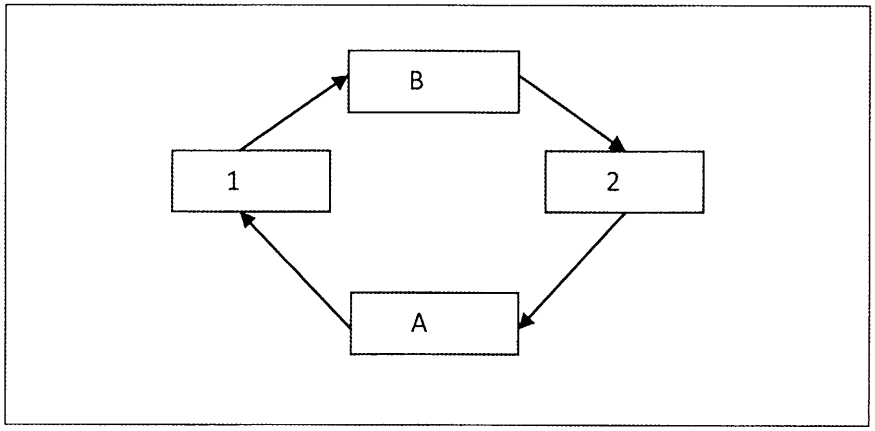
1.1.4 In an experiment the enzyme carbohydrases was exposed to a temperature above optimum.

State the effect of this increased temperature on the enzyme activity.

A Enzymes become inactive
B Enzymes function better
C Enzymes denature
D Temperature increase has no effect on enzyme activity

COMMUNITY SCHOOLS

QUESTION 1.1.5 is based on the diagram below.



1.1.5 If **A** is carbon dioxide and **B** is oxygen, then process **1** and **2** are respectively ...

A cellular respiration and photosynthesis
B anaerobic respiration and fermentation
C fermentation and photosynthesis
D photosynthesis and cellular respiration

1.1.6 The following processes occur during human nutrition

(i) Digestion
(ii) Egestion
(iii) Absorption
(iv) Ingestion

Re-arrange the processes in their correct order.

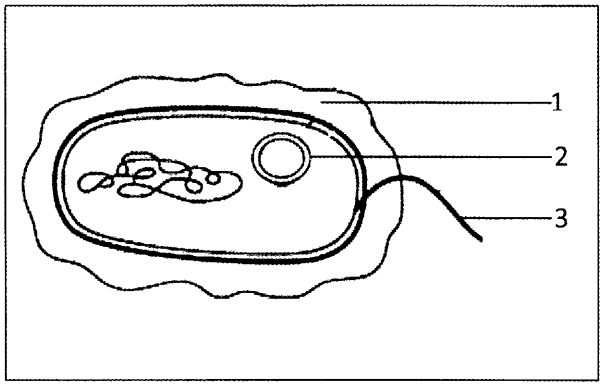
A (ii), (i), (iv) and (iii)
B (iv), (i), (iii) and (ii)
C (iii), (ii), (iv) and (i)
D (ii), (iii), (iv) and (ii)

1.1.7 The following organism belongs to the phylum Platyhelminthes:

A Round worm
B Flatworm
C Ring worm
D Segmented worm

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1.1.8 The diagram below represents an organism that you studied.



Which of the following represents parts **1**, **2** and **3** respectively?

A Plasmid, flagellum, slime capsule
B Flagellum, slime capsule, plasmid
C Plasmid, slime capsule, flagellum
D Slime capsule, plasmid, flagellum

1.1.9 A seed bank in Norway stores seeds of a rare and endangered plant. To ensure that seeds stored are conserved, 120 seeds of this plant were selected to be grown. Out of these 120 seeds only 90 germinated.

What percentage of the seeds did not germinate?

A 50%
B 25%
C 50%
D 75%

1.1.10 Phylum with a closed blood system and a through-gut is the...

A arthropoda
B cnidaria
C annelida
D porifera (10 x 2) **(20)**

1.2 Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number (1.2.1 to 1.2.10) in the ANSWER BOOK.

1.2.1 Photosynthetic tissues in the leaf consisting of elongated cells

1.2.2 Part of a flower that becomes a fruit after fertilisation

1.2.3 An evolutionary trend in the animal kingdom towards centralisation of the central system concentrating it in the anterior region of the body

1.2.4 The type of reproduction that does not involve the fusion of gametes

1.2.5 Medication taken for the treatment of bacterial diseases

1.2.6 The ability of an organism to produce antibodies to fight diseases

1.2.7 Molecules that act as energy carriers

1.2.8 A structure made to cultivate plants where the roof and walls are made with transparent glass or plastic

1.2.9 A cartilaginous structure which prevents food from entering the trachea

1.1.10 Animals that remain attached to a substrate for most of their lives

(1x10) **(10)**

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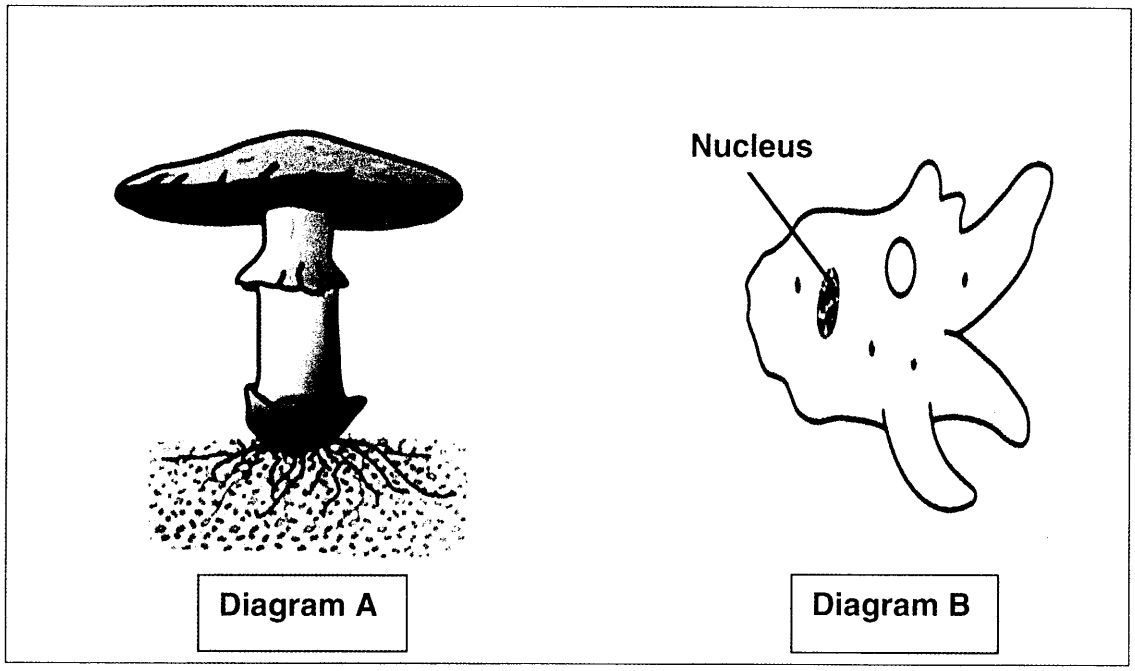
1.3 Indicate whether each of the descriptions in COLUMN I applies to **A ONLY, B ONLY, BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.3.1 to 1.3.5) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Gland that function as both exocrine and endocrine	A: Liver B: Pancreas
1.3.2	A plant body that has not differentiated into true roots, stems and leaves	A: Thallus B: Sorus
1.3.3	The site for cellular respiration	A: Chloroplast B: Mitochondria
1.3.4	Plants with naked seeds	A: Pteridophytes B Bryophytes
1.3.5	A fluid filled body cavity	A: Gut B: Coelom

(5 x 2) **(10)**

GR11 LIFE SCIENCES

1.4 Study the diagrams below.



1.4.1 Name the Kingdom represented by each of the following

(a) Organism **A** (1)

(b) Organism **B** (1)

1.4.2 State TWO characteristic features of the kingdom represented by organism **A**. (2)

1.4.3 The kingdom to which organism **A** belong is valuable to the environment.

(a) Mention ONE medicinal value (1)

(b) Mention ONE other industrial/ economic value (1)

1.4.4 Malaria is a disease caused by organisms that belong to kingdom **B**.

State TWO symptoms of malaria. (2)

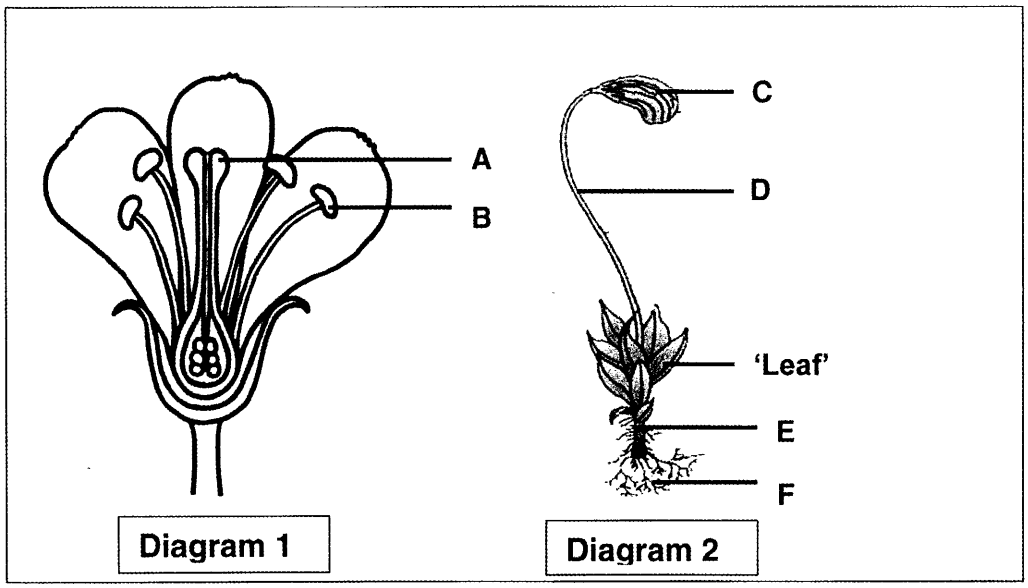
1.4.5 Explain ONE way how the group of organisms represented by diagram **B** play a role in maintaining balance in the environment. (2)
(10)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The diagrams below represents plant diversity



2.1.1 State the function of:

(a) Part **A** (1)

(b) Part **B** (1)

2.1.2 Give TWO observable reasons why **diagram 1** represents an insect pollinated flower. (2)

2.1.3 Name the dominant generation in plant group represented by:

(a) Diagram **1** (1)

(b) Diagram **2** (1)

2.1.4 Identify part:

(a) **D** (1)

(b) **E** (1)

(c) **F** (1)

2.1.5 Give TWO reasons why the plant represented by **diagram 2** is poorly developed to live on land (2)
(11)

2.2 Grade 11 learners wanted to investigate whether a new antibiotic, called *Vibramycin*, could restrict the production of a population of bacteria which was resistant to other antibiotics.

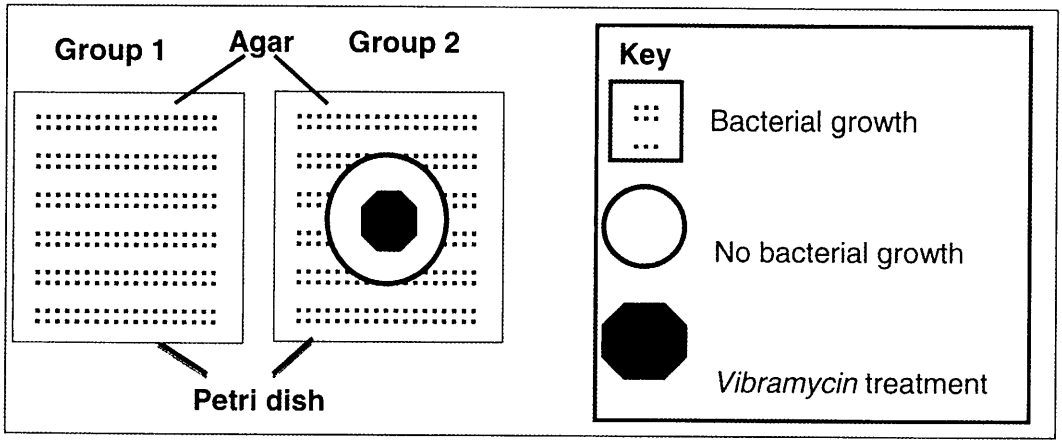
Their investigation was set up as follows:

- The bacteria were cultured in the same type of agar medium in 20 petri dishes of the same size and then divided into 2 groups:

➢ **Group 1**: 10 petri dishes were given no treatment

➢ **Group 2**: 10 petri dishes were treated with *Vibramycin* of the same concentration

- The petri dishes were then incubated under the same conditions and examined for bacterial growth.
- The diameter of the area where no bacteria grew was measured for each petri dish.



2.2.1 For the investigation above identify:

(a) The dependent variable (1)

(b) THREE factors that should have been kept constant during the investigation, other than those mentioned above. (3)

2.2.2 Why did the scientist use more than one petri dish in each group? (1)

2.2.3 What was the aim of group 1 in the investigation? (1)

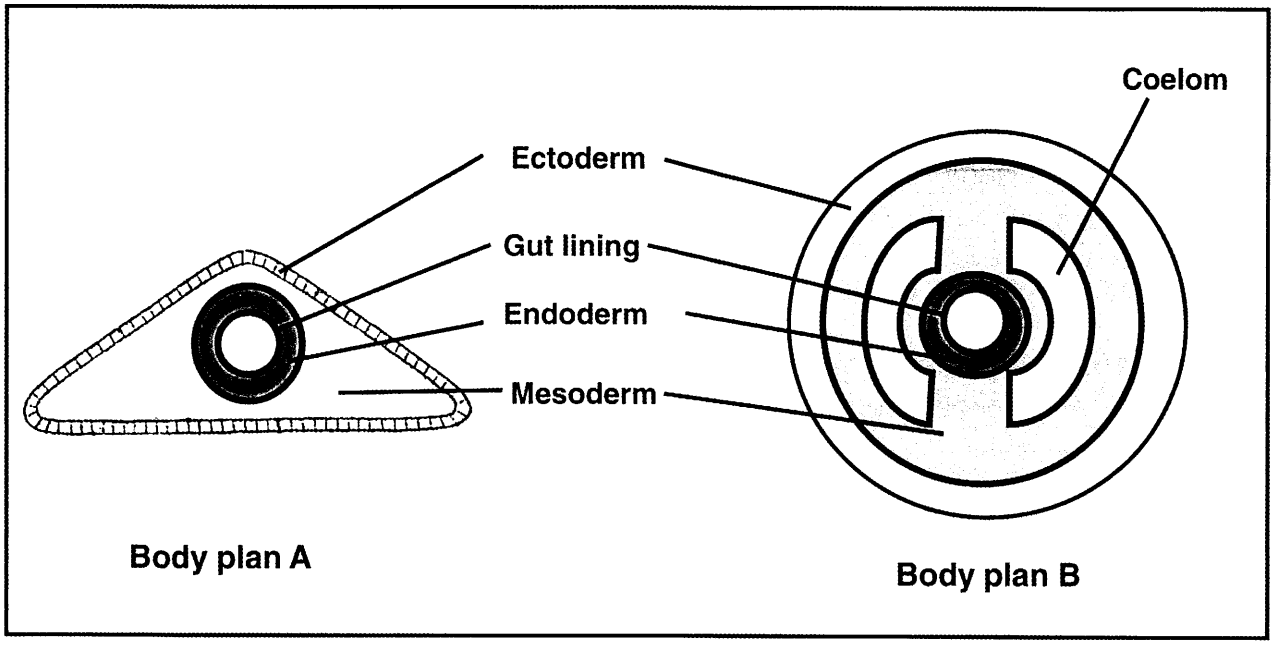
2.2.4 A similar experiment was done in which the cultured bacteria were divided into 5 groups. These groups were then treated with different concentrations of *Vibramycin*.

(a) Formulate a hypothesis for the above investigation. (2)

(b) State the independent variable for this investigation. (1)
(9)

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2.3 Study the diagrams below showing body plans of two organisms.



2.3.1 Are the body plans shown in the diagrams diploblastic or triploblastic? (1)

2.3.2 Give a reason for your answer in **QUESTION 2.3.1**. (1)

2.3.3 State the type of symmetry characteristic of organism with body plan **A**. (1)

2.3.4 State TWO animal phyla that you have studied, that display body plan **B**. (2)

2.3.5 From which embryonic layer does the gut lining develop? (1)

2.3.6. The presence of a coelom in body plan **B** allows for the formation of a more specialised animal than body plan **A**.

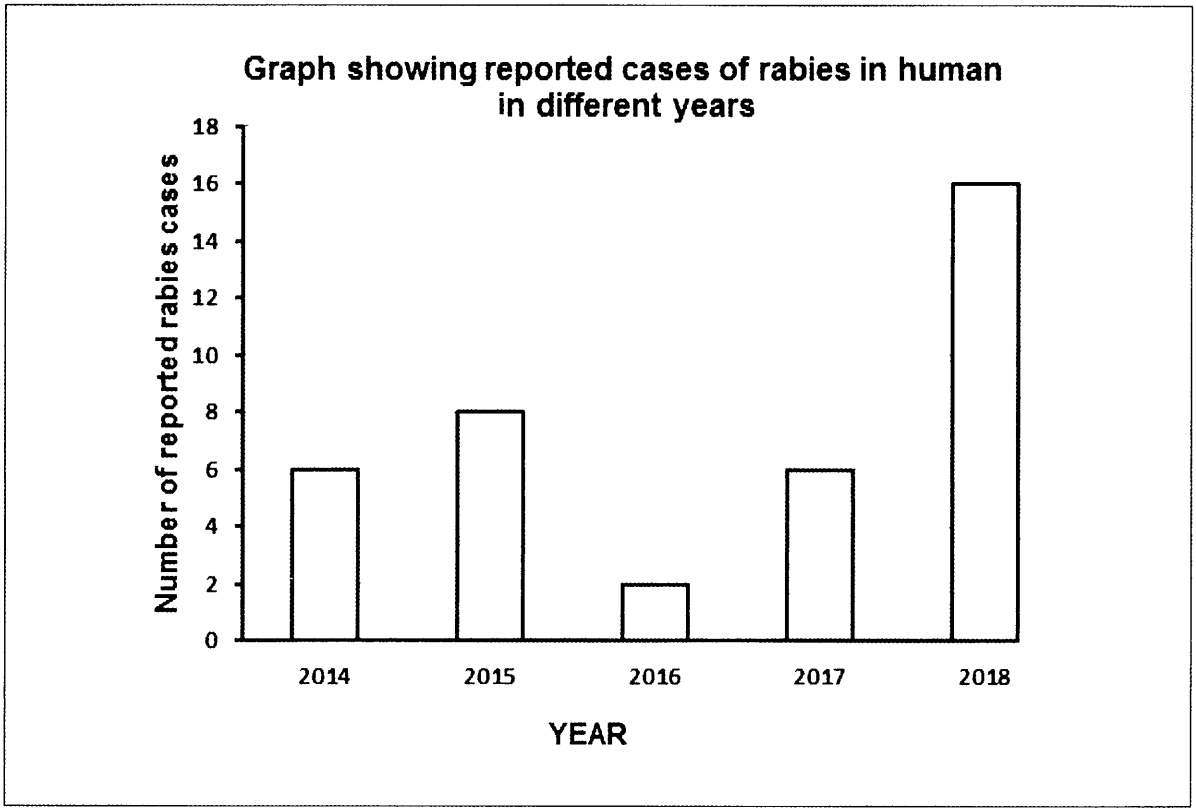
Explain TWO reasons for the above statement. (4)
(10)

2.4 A skeletal system is necessary for all living organisms. The type of skeleton enables different organisms to adapt to their unique environments and to ensure their survival.

2.4.1 Name the type of skeleton in arthropods. (1)

2.4.2 Name TWO other skeletons that you studied (2)
(3)

2.5 Study the graph below showing the number of reported rabies cases in human in different years and answer the questions that follow.



2.5.1 In which year was the highest number of rabies cases reported? (1)

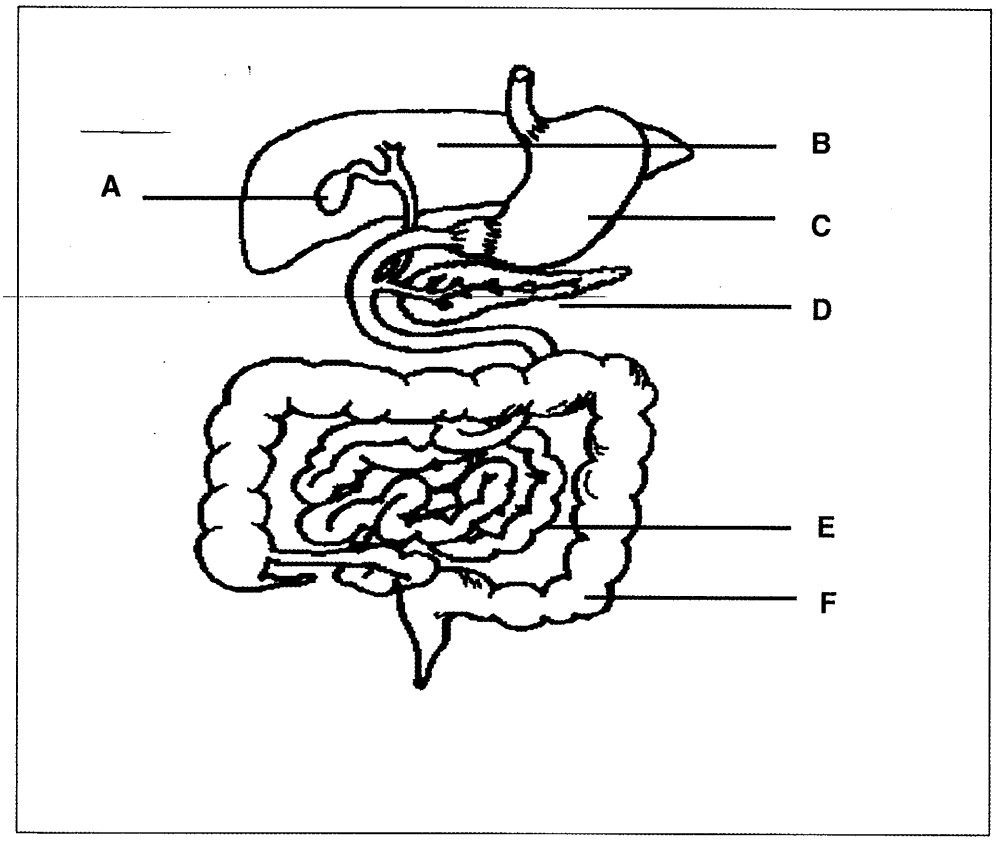
2.5.2 Calculate the percentage increase in reported cases between 2014 and 2016. Show all working. (2)

2.5.3 Describe the trend shown by the data on the reported cases of rabies. (3)

2.5.4 Between which two consecutive years was the greatest increase in reported cases? (1)
(7)
[40]

QUESTION 3

3.1 Study the diagram below showing part of the human digestive system and answer the questions that follow.



3.1.1 Identify parts **A, C, E** and **F** (4)

3.1.2 Explain ONE structural adaptation of the oesophagus for its function. (2)

3.1.3 Name the disease related to a high blood sugar level. (1)

3.1.4 Describe the role of part **B** and **D** when the blood glucose level decreases below normal. (5)
(12)

3.2 The table below shows the effect of temperature on the rate of photosynthesis in a species of plant.

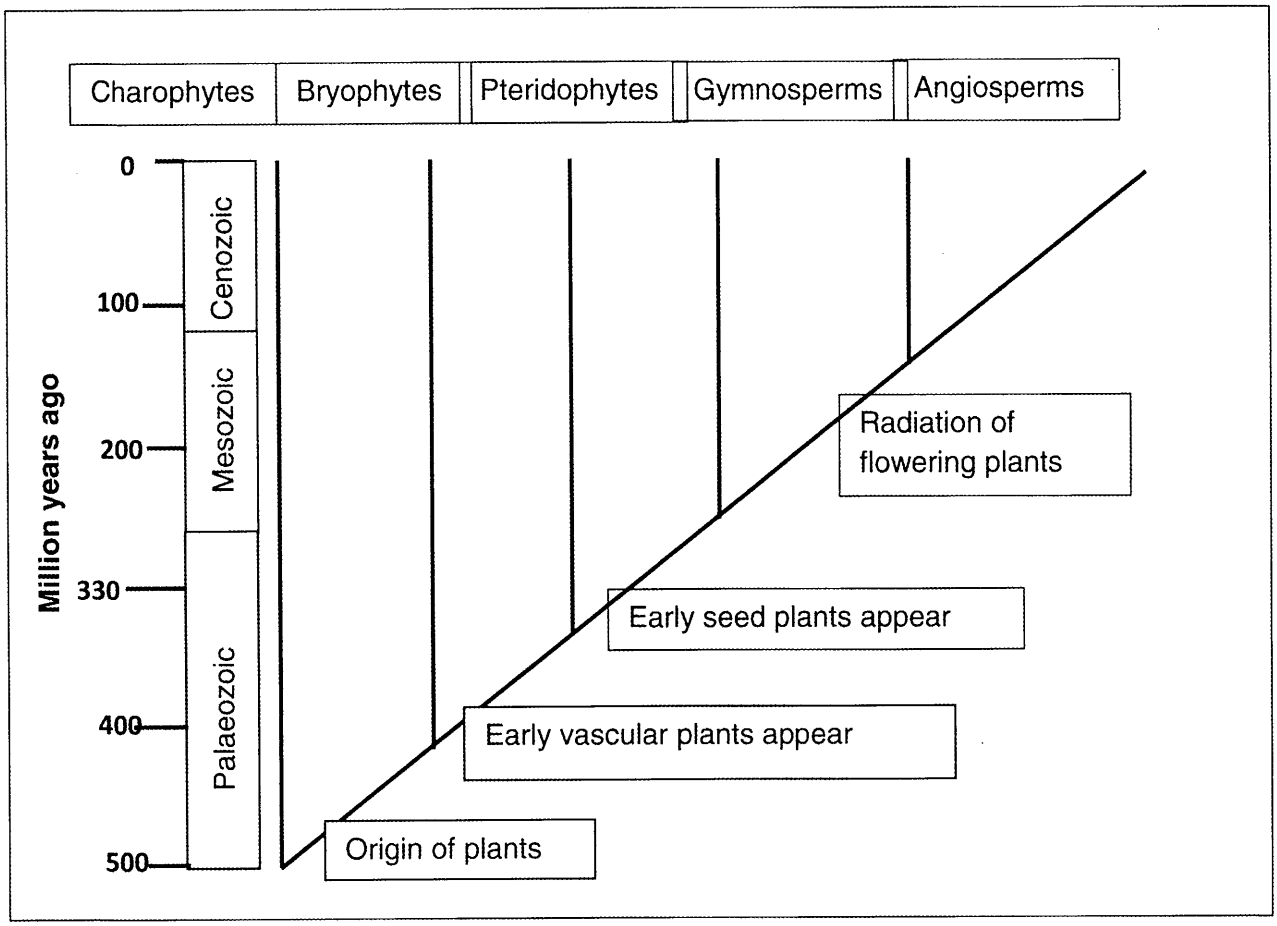
Temperature ^{O}C	Rate of photosynthesis (arbitrary units)
15	14
20	17
25	20
30	15
35	10

3.2.1 Draw a line graph to represent the data in the table. (6)

3.2.2 Why is the rate of photosynthesis low at a temperature of $15^{0}C$ (1)

3.2.3 Explain TWO reasons why an increase in carbon dioxide concentration may not necessarily lead to an increase in the process of photosynthesis. (4)
(11)

3.3 Study the information below and answer the questions that follow.



3.3.1 What is the name given to the above diagram? (1)

3.3.2 In which era did the bryophytes first appear? (1)

3.3.3 Identify ONE characteristic from the diagram that is shared by pteridophytes but is absent in bryophytes. (1)

3.3.4 According to the diagram, what characteristic is shared by the gymnosperms and angiosperms only? (1)

3.3.5 Are bryophytes or pteridophytes more closely related to angiosperms? (1)

3.3.6 Give a reason for your answer in QUESTION 3.3.5 (2)

3.3.7 State TWO advantages of storing seeds in seed banks. (2)

(9)

3.4 Read the extract below and then answer the questions that follow

The need for oxygen supply

Cellular respiration is the process in which cells use oxygen to produce ATP. During exercise muscles cells have to work harder which increases their demand for oxygen and thus breathing and heart rate increases to help increase the oxygen in the blood stream. During high speed athletics the oxygen supply is less than the demand therefore muscles begin converting glucose into lactic acid instead of energy. At the end of the race, athletes have to breathe deeper and faster.

3.4.1 Name the type of respiration that requires no oxygen. (1)

3.4.2 An athlete runs very fast for 200m. When he stops running, his breathing rate and his heart rate remain high for several minutes.

Explain why his breathing rate and heart rate remain high. (2)

3.4.3 Tabulate TWO differences between aerobic and anaerobic respiration. (5)

(8)

[40]

TOTAL SECTION B: 80

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SECTION C

QUESTION 4

Describe the events during the dark phase of photosynthesis in plants and also describe steps to follow when testing a green leaf for the presence of the stored products of this process. Explain how carbohydrates are broken down in the human digestive system. (17)

Content : (3)
Synthesis: **(20)**

NOTE: NO marks will be awarded for answers in the form of tables, flow charts or diagrams.

TOTAL SECTION C: 20

GRAND TOTAL: 150

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Department:
Education
PROVINCE OF KWAZULU-NATAL

LIFE SCIENCES

MARKING MEMORANDUM

COMMON TEST

JUNE 2019

NATIONAL SENIOR CERTIFICATE

GRADE 11

MARKS: 150

TIME: 2½ hours

This marking guideline consists of 11 pages.

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SECTION A

QUESTION 1

1.1

1.1.1	C ✓✓		
1.1.2	B ✓✓		
1.1.3	C ✓✓		
1.1.4	C ✓✓		
1.1.5	D ✓✓		
1.1.6	B ✓✓		
1.1.7	B ✓✓		
1.1.8	D ✓✓		
1.1.9	B ✓✓		
1.1.10	C ✓✓	(10 x 2)	**(20)**

1.2

1.2.1	Palisade mesophyll✓		
1.2.2	Ovary✓		
1.2.3	Cephalisation✓		
1.2.4	Asexual✓		
1.2.5	Antibiotics /✓		
1.2.6	Immunity✓		
1.2.7	ATP✓/Adenosine triphosphate		
1.2.8	Greenhouse✓		
1.2.9	Epiglottis✓		
1.1.10	Sessile✓/sedentary	(1 X 10)	**(10)**

1.3

1.3.1	B only ✓✓		
1.3.2	A only ✓✓		
1.3.3	B only ✓✓		
1.3.4	None ✓✓		
1.3.5	B only ✓✓	(5 x 2)	**(10)**

1.4

1.4.1 (a) Kingdom Fungi✓ (1)
(b) Kingdom Protista✓ (1)

1.4.2
- Eukaryotic✓
- Decomposers✓
- Heterotrophic/ No chlorophyll✓
- Multicellular, some unicellular✓
- Non-motile✓
- Cell wall ✓ (2)

(Mark first TWO only)

1.4.3 **(a)**
- Fungi are used to produce antibiotics✓ (1)

(Mark first ONE only)

(b)
- Production of cheese✓
- Production of beer✓/ alcoholic beverages
- Production of wines✓/ alcoholic beverages
- Production of bread✓
- Production of food✓/ mushrooms

(mark first ONE) (1)

1.4.4
- Fever✓/ sweating
- Chills✓
- Fatigue✓/ pain
- Night sweats✓
- Vomiting✓
- Nausea✓
- Headache✓
- Muscle pain✓ (2)

(mark first TWO only)

1.4.5
- Some protists are photosynthetic✓
- maintain the balance between oxygen and carbon dioxide✓

or

- Some protists are decomposers✓
- thus release important nutrients back to the soil✓

or

- Some protists are producers✓
- provide a food source for other organisms✓ (2)

(mark ONE explained only) **(10)**

TOTAL MARKS SECTION A: 50

SECTION B

QUESTION 2

2.1

2.1.1 (a) Receive pollen✓ (1)
(b) Produce pollen✓/ male gamete (1)

2.1.2 - Has a large corolla/ petals✓
- Filaments and stigma are enclosed✓ (2)
(mark first TWO only)

2.1.3 (a) Sporophyte✓ (1)
(b) Gametophyte✓ (1)

2.1.4 a) Seta✓ (1)
b) Stem✓ (1)
c) Rhizoid✓ (1)

2.1.5 - Poorly developed vascular system✓
- Sexual reproduction is dependent on water✓ (2)
(mark first TWO only) **(11)**

2.2

2.2.1 **(a)**

Growth of bacteria✓/ the diameter of the area with no bacterial growth (1)

(b)
- Same strain of bacteria✓
- Same amount of bacteria in all the petri dishes✓
- Same amount of agar medium✓
- ALL measurements of the diameter should be done by the same person/instrument✓/ using the same instrument (3)
(Mark first THREE only)

2.2.2 To increase the reliability of the results ✓ (1)

2.2.3 To verify that any difference in bacterial growth is due to the action of *Vibramycin*✓/ acts as a control (1)

2.2.4 **(a)**

- An increase in the concentration of *Vibramycin* antibiotic will increase bacterial growth✓✓

OR

- An increase in the concentration of *Vibramycin* antibiotic will decrease bacterial growth✓✓

OR

- An increase in the concentration of *Vibramycin* antibiotic will have no effect on bacterial growth✓✓ (2)

(b)

Concentration of *Vibramycin*✓

(1)
(9)

2.3

2.3.1 Triploblastic✓ (1)

2.3.2 Both organisms have a body plan derived from three germ layers✓/ ectoderm, endoderm, mesoderm. (1)

2.3.3 Bilateral✓ (1)

2.3.4 Arthropoda✓;Chordata✓;Annelida✓ (any2) (2)
(Any first TWO only)

(1)

2.3.5 Endoderm✓

2.3.6

- Separates gut wall from the body wall✓ allowing more efficient digestion of food✓/ allowing the body wall to function independently to gut wall
- Provides a hydrostatic skeleton✓ which assist in movement and efficient circulation of nutrients and removal of wastes✓
- Coelom provides space✓ for the development of specialised internal organs✓
- Coelomic fluid cushions✓the internal organs protecting✓them from injury

(4)
(mark first TWO explained only) (2x2) **(10)**

2.4 2.4.1 Exoskeleton✓

(1)

2.4.2

- Hydrostatic skeleton✓
- endoskeleton✓

(mark first TWO only) (2)
(3)

2.5

2.5.1 2018✓ (1)

2.5.2 8 - 6 = $\frac{2 \times 100}{6}$ ✓
=33.3%✓ reported cases (2)

2.5.3 Rabies cases increased✓ from 2014 to 2015 and decreased✓in 2016 and increased✓ again from 2017 to 2018 (3)

2.5.4 2017 and 2018✓ (1)
(7)

TOTAL QUESTION 2 40

QUESTION 3

3.1

3.1.1 A – gall bladder✓ (1)
C – stomach✓ (1)
E – small intestine✓ (1)
F – large intestine✓ (1)

3.1.2
- Has muscles✓ which forces the bolus down to the stomach✓
- Has goblet cells✓in its wall which secrete mucus which serve to lubricate✓ the walls for the passage of the bolus. (2)

(mark first ONE explained only) (1x 2)

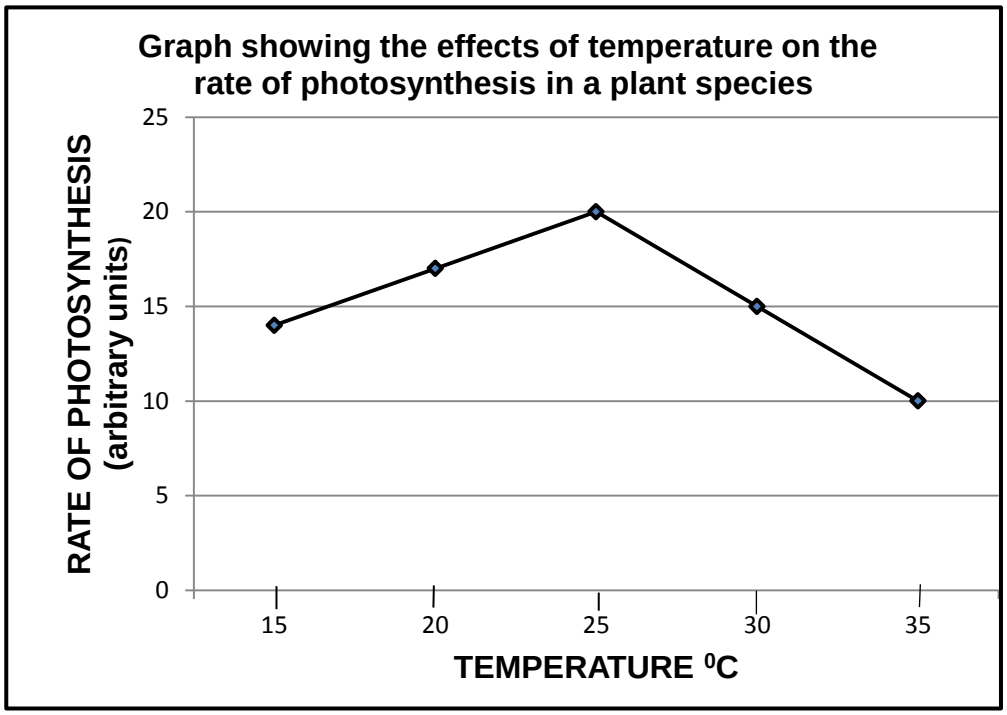
3.1.3 Diabetes✓mellitus (1)

3.1.4
- The cells of the islets of Langerhans✓/pancreas/part D
- secrete more glucagon✓ into the blood
- glucagon acts on the liver✓/part B and stimulate the conversion of stored glycogen to glucose✓
- The blood glucose level increases✓back to normal (5)

(12)

3.2

3.2.1



criterion	Elaboration	Mark
Type of graph	Line graph drawn	1
Caption	Includes both variables	1
X-axis	Correct label of X- axis (temperature) and appropriate scale	1
Y-axis	Appropriate scale AND correct label and units for Y-axis	1
Plotting of points	1-4 points plotted correctly- 1 mark All 5 points plotted correctly-2 marks	2

(6)

3.2.2 Enzymes controlling the process are inactive✓ at low temperature (1)

3.2.3
- Other factors✓of the process may be in short supply✓ / limiting
- A large increase in the concentration of carbon dioxide could affect the pH of the cell✓which may not be optimum for enzymes✓ controlling this process

(4)

(mark first TWO only) (2 X 2) **(11)**

3.3

3.3.1 Phylogenetic tree✓ /cladogram (1)

3.3.2 Palaeozoic ✓ (1)

3.3.3 Vascular tissue ✓
(mark first ONE only) (1)

3.3.4 They both produce seeds✓

3.3.5 Pteridophytes ✓ (1)

3.3.6 Pteridophytes share the most recent✓common ancestor✓ with angiosperms than bryophytes (1)

3.3.7
- seeds remain dormant ✓until they are needed for replanting since they are stored under low temperatures
- seed banks provide conditions necessary for longevity ✓ of seeds
- plants can be stored in their seed form✓since they are small therefore occupy minimum space
- availability of genes in seeds for plant breeders✓/genes to increase yield/ genes to resist diseases

(Mark first TWO only) (2)
(9)

3.4 3.4.1 Anaerobic✓ (1)

3.4.2
- It takes time for oxygen debt to be repaid✓
- more oxygen needed for lactic acid to be broken down✓ / converted to energy ✓ (2)

3. 4.3

Aerobic Respiration	**Anaerobic Respiration**
Occurs when oxygen is present in cell✓	Occurs when oxygen is absent in cell✓
Starts in the cytosol and ends in mitochondria✓	Occurs in cytosol✓
One glucose molecule releases 38 ATPs✓ / more energy released	One glucose molecule releases 2 ATPs✓ / less energy released
ATP, CO_2 and water are the products in both plant and animal cells✓	ATP, CO_2 and ethanol are the products in plant cells. ATP and lactic acid are the products in animal cells✓

(Mark first TWO only) Any 2 x 2 + 1 for table (5)
(8)

TOTAL QUESTION 3 40

SECTION C

QUESTION 4

Dark phase of photosynthesis
- It takes place in the stroma ✓of the chloroplast
- Carbon dioxide✓ from the atmosphere
- combines with energy rich hydrogen ✓ atoms from the light phase
- using energy from ATP✓
- to form carbohydrates✓/glucose/ starch
- The reactions are controlled by enzymes✓ Any 5

Testing a leaf for the presence of starch
- Boil the leaf in water✓
- Boil the leaf in alcohol✓
- Rinse in water✓
- Pour a few drops of iodine solution onto the leaf✓
- If the leaf turns blue-black/ black✓
- It indicates the presence of starch✓
- If it turns brown✓ Any 5
- It indicates the absence of starch✓

Mechanical breakdown of carbohydrates
- Carbohydrates broken down to smaller size✓
- by teeth✓/ through mastication/ chewing
- and stomach ✓which churns food
- to become a liquid called chyme✓
- and by peristalsis✓

Chemical digestion of carbohydrates
- Carbohydrases✓ in the
- saliva ✓
- pancreatic juice✓
- intestinal juice✓
- break down the polysaccharides✓
- to disaccharides✓
- and eventually to monosaccharide's✓ Any 7
- in an alkaline medium✓

ASSESING THE PRESENTATION OF THE ESSAY

RELEVANCE	**LOGICAL SEQUENCE**	**COMPREHENSIVE**
All information provided is relevant to the topic	Ideas arranged in a logical/ cause effect sequence	Answered all aspects required by the essay in sufficient detail
All information is relevant to: - Dark phase - Effect of temperature - Digestion There is no irrelevant information	Ideas are presented in a logical Sequence with regards to: - Dark phase - Effect of temperature - Digestion	All aspects are answered Comprehensively as follows: - Dark phase **(3/5)** - Effect of temperature **(3/5)** - Digestion **(5/7)**
1 mark	1 mark	1 mark

NOTE: NO marks will be awarded for answers in the form of tables, flow charts or diagrams.

TOTAL SECTION C: 20

GRAND TOTAL: 150

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