DEPARTMENT OF SCIENCE AND MATHS
GREENBURY SECONDARY SCHOOL
LIFE SCIENCES
PAPER 2

GRADE 11
TIME: 2½ HOURS

NOVEMBER 2016
MARKS: 150

EXAMINER: MRS K.GOVENDER

MODERATORS: MRS C. JUGDHAW
MRS S. SINGH

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 or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale, unless mentioned.
9. You must use a non-programmable calculator, a protractor and a compass where necessary.
10. Write neatly and legibly.

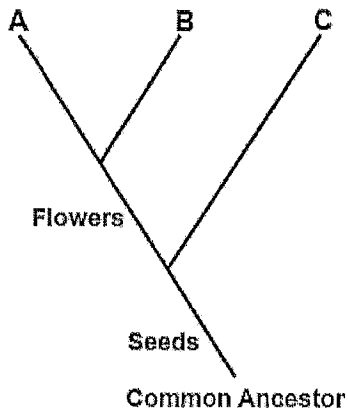
P.T.O. SECTION A.....

SECTION A

QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the correct 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 In the phylogenetic tree below .....



A. A, B and C all share the derived character for seeds, and A and B share the derived character for flowers.
B. A, B and C share the derived characters of seeds and flowers.
C. Only A has the characteristics of seeds and flowers, not B and C.
D. Only B has the characteristics of flowers, and only C have the characteristic of seeds.

1.1.2 Which of the following is an adaptation of wind pollinating flowers?
A. Brightly coloured petals
B. Large flowers
C. Flowers give pleasant smells
D. Large, feathery stigma

1.1.3 Antibiotics can be used to treat:
A. Bacterial infections
B. Viral infections
C. Influenza
D. Measles

1.1.4 A saprophyte:
A. Uses sunlight to manaufacture its own food
B. Is dependent on dead or decaying organic matter for its food
C. Is parasitic
D. Always dependent on animals for its food

1.1.5 Mining activities in South Africa impact negatively on our biodiversity due to the effects of:

(i) Acid mine drainage
(ii) Soil compaction
(iii) Heavy metal pollution
(iv) The replanting of original vegetation on abandoned mining sites

Which one of the options applies to the above statement?

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

1.1.6 A scientist designed an experiment to test the effect of temperature on bacterial growth. He grew three different cultures of the bacterium *E. coli* under three heat lamps at different temperatures.

What was the independent variable in this experiment?

A. Length of the experiment
B. Number of bacteria
C. Reproduction rate
D. Temperature

1.1.7 Which one on the following is NOT a characteristic of bacteria?

A. Break down organic matter
B. Can be producers in the food chain
C. Are eukryotes
D. Form mutualistic relationships in legumes

1.1.8 The list below describes viruses. They:

(i) Are the major pathogens of humans
(ii) Play a significant role as decomposers
(iii) Are obligate parasites
(iv) Reproduce within host cells

Which of the following are of biological importance in viruses?

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

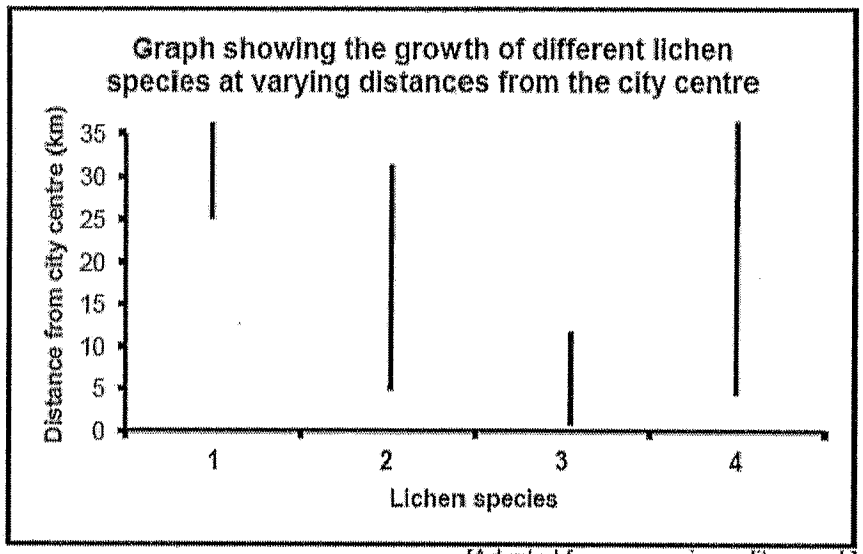
1.1.9 Fungi obtain their energy from:

A. Sunlight
B. Organic matter
C. Yeast
D. Mycelium

1.1.10 Air pollution is generally higher in city centres than away from it.

The amount of pollution in the atmosphere can be estimated by using lichen. Lichen is a plant that consists of a fungus and an alga living together in a mutualistic relationship.

The graph below shows the growth of different lichen species at varying distances from the city centre.



[Adapted from www.air-quality.org.uk]

Which lichen has the HIGHEST tolerance for varying levels of pollution.

A Species 1
B Species 2
C Species 3
D Species 4

(10 x 2) **(20)**

1.2 State the correct biological term for the following statements.

1.2.1 The process in which the excessive use of fertilisers cause algal bloom

1.2.2 A large variety of plant and animal species.

1.2.3 An increase in the earth's temperature as a results of an increased greenhouse effect.

1.2.4 The effect created when the radiant energy of the sun becomes trapped and the heat is kept inside.

1.2.5 The sum of all the carbon dioxide emissions resulting from an individuals activities within a given period.

1.2.6 The type of pollution that occurs when water bodies are used as a coolant.

P.T.O. 1.2.7 A farming practice.....

1.2.7 A farming practice where a single plant specie is planted on the same piece of land for a number of consecutive years

1.2.8 Plants that occur outside of their natural habitats.

1.2.9 The making of new products from materials previously used for something else.

1.2.10 Permaeble rock from which ground water can be extracted through a borehole.

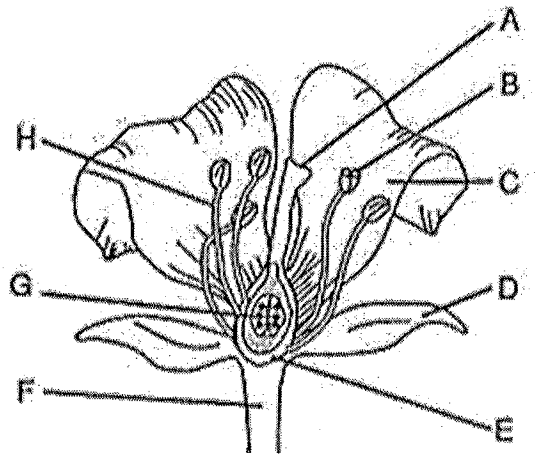
(10x1) **(10)**

1.3 Study the following table which consists of a statement in COLUMN I and two terms (A and B) in COLUMN II. Indicate whether each of the statements in COLUMN I applies to **A ONLY, B ONLY, BOTH A AND B** or **NONE**. Write **A only, B only, both A and B** or **none** next to the question number.

	COLUMN I	**COLUMN II**
1.3.1	Vegetation that is naturally found in an area	A. Endemic B. Indigenous
1.3.2	illegal hunting of animals	A. Poaching B. Culling
1.3.3	A permanent destruction of natural vegetation	A. Deforestation B. Desertification

(3x2) **(6)**

1.4 Study the diagram of the flower.



Provide the LETTER of the part that:

1.4.1 receives pollen grains

1.4.2 becomes the fruit after fertilization

1.4.3 produces male gametes

1.4.4 attracts pollinating agents

(4x1) **(4)**

1.5 A farmer in KZN conducted an investigation to determine which type of fertiliser would increase the yield of his maize crop.

- He divided his farm into three 1 hectare plots and treated them as follows:

Treatment	Hectare X	Hectare Y	Hectare Z
Type of fertiliser	None	Contains phosphates	Contains Magnesium
Amount of fertiliser (grams)	None	10 000	10 000

- He planted the same type of crop, namely maize, during November each year for five years.
- He used water from a river which flows through the farm to irrigate his crop.
- He recorded the yield per plot for each year. The yield was measured by calculating the number of kilograms of maize produced per hectare.

1.5.1 Identify the dependent variable in this investigation. (1)

1.5.2 Explain the purpose of including hectare X in this investigation. (2)

1.5.3 State ONE way in which the farmer could have increased the reliability of his results. (1)

1.5.4 If this investigation was carried out for more than five years, list THREE negative effects planting the same type of crop on the same plot would have. (3)

1.5.5 List THREE steps that the farmer would have considered in planning this investigation. (3)

[10]

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The diagrams below show the parts of plants representing the different groups/divisions, that you have studied.

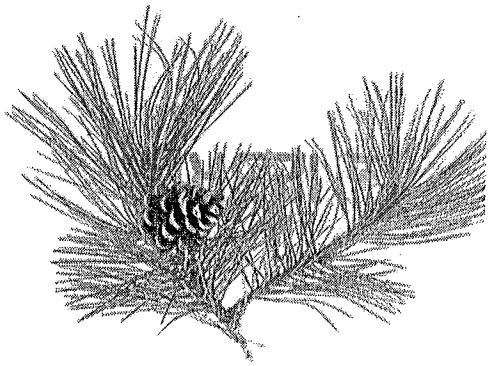


Diagram A (x0.2)

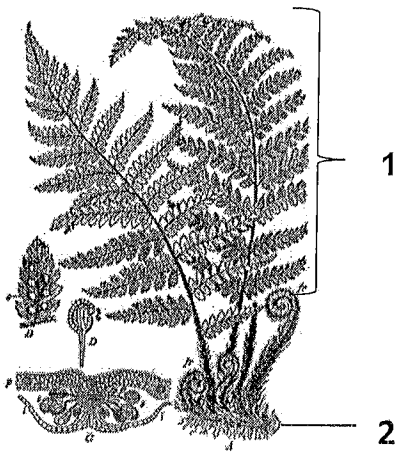


Diagram B (x0.05)

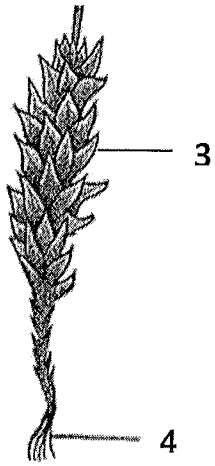


Diagram C (x20)

2.1.1 Provide labels for numbers 1,2, 3 and 4. (4)

2.1.2 Name the plant that is wind pollinated? (1)

2.1.3 Which part (A/B/C) is largest? (1)

2.1.4 Name the group of plants to which
(a) A belongs
(b) B belongs (2)

2.1.5 State one way in which the seeds of group A plants are adapted for dispersal. (1)

2.1.6 Identify whether A, B or C represents a gametophyte generation. (1)

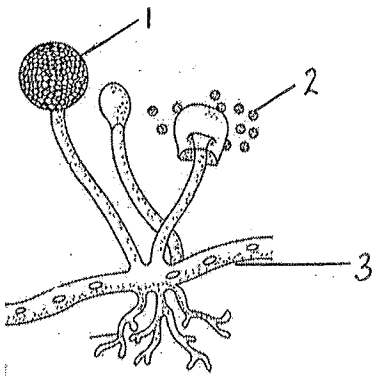
2.1.7 Explain how the dependency on water for reproduction is reduced in group A plants. (2)

2.1.8 Explain the significance of the shape of the leaves in Diagram A to its habitat. (3)

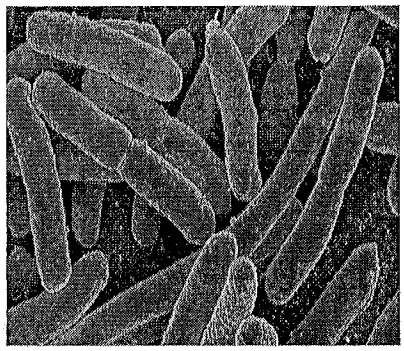
(15)

2.2 Draw and label a diagram of a dicotyledonous seed. **(5)**

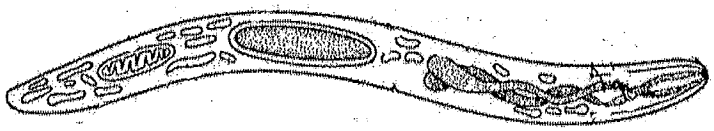
2.3 Study the diagrams of micro-organisms and then answer the questions.



A (*Rhizopus stolonifer*)



B (*Myobacterium tuberculosis*)



C (*Plasmodium falciparum*)

2.3.1 Identify the Kingdom to which each of the above belong. (3)

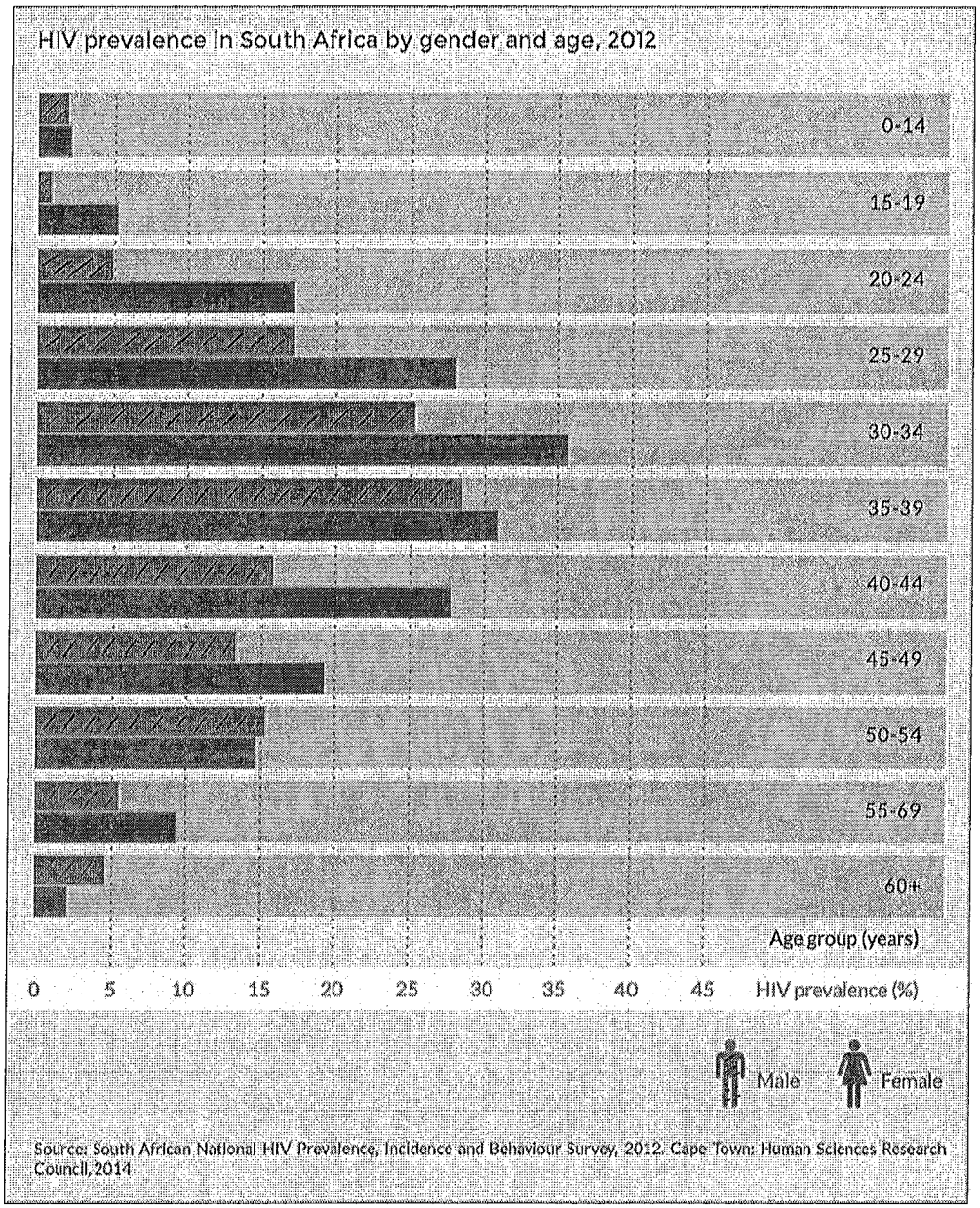
2.3.2 Provide labels for 1, 2 and 3. (3)

2.3.3 State the disease caused by EACH of micro-organisms:
(a) B, and
(b) C, respectively. (2)

2.3.4 Explain the economic importance of the micro-organism represented by diagram A. (2)

(10)

2.4 Study the data on the HIV prevalence in South Africa in 2012.



2.4.1 Which age group showed the highest incidence of HIV prevalence? (1)

2.4.2 State TWO general conclusion that is made from this graph about the prevalence of HIV. (2)

2.4.3 Explain the 2 to 3 percent HIV prevalence in children in the age group 0 to 14 years. (2)

2.4.4 Explain how knowledge of one's HIV status can help prevent the spread of this deadly virus. (2)

2.4.5 Calculate the percentage increase in the HIV prevalence of males in the age group 20-24 years and 30-34 years. (3) **(10)**

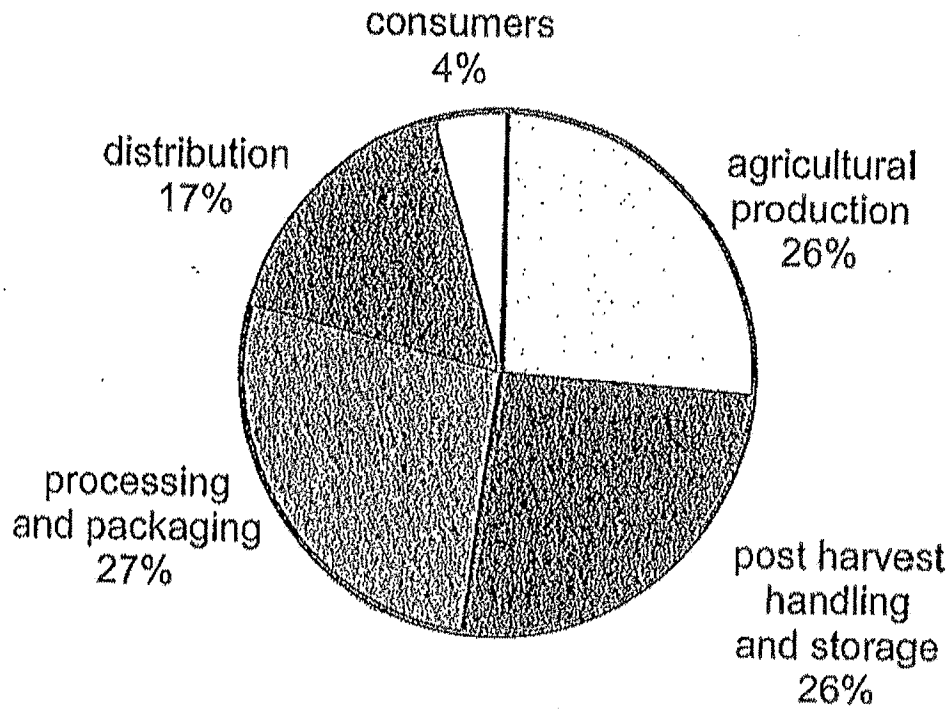
[40]

P.T.O. QUESTION 3.....

QUESTION 3

3.1 In South Africa, 9,4 million tons of food is wasted annually. Besides the problems this causes in terms of waste disposal, it has a huge negative influence on our country's food security.

The Pie Chart below indicates the sources of food waste in South Africa. Study it and answer the questions.



3.1.1 Calculate the amount of food wasted in South Africa during processing and packaging. Show all working. (2)

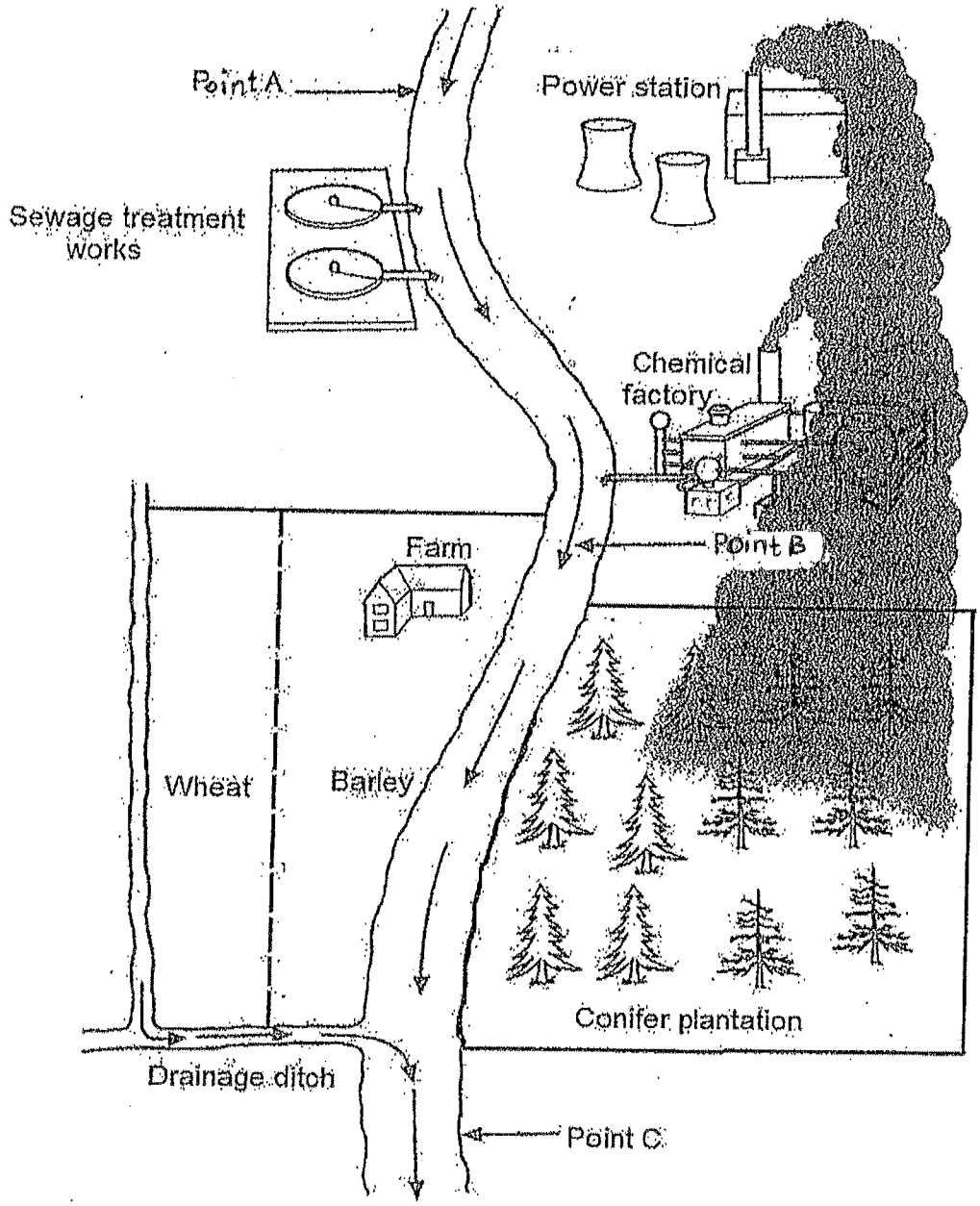
3.1.2 Wastage includes food thrown away and food not eaten. Explain the impact of food wastage on food security in South Africa. (2)

3.1.3 South Africa is a developing country. Explain the pattern of food wastage in a developing countries. (2)

3.1.4 Explain TWO possible ways of food wastage in agricultural production. (4)

[10]

3.2 Below is the map of a river showing related activities.Study it and then answer the questions.



3.2.1 Why do fishermen catch more fish at point A than point C? (2)

3.2.2 Many trees in the conifer plantation are dying. Why do you think this is so? (2)

3.2.3 One day the sewage treatment broke down and untreated sewage entered the river. Explain the effect of this on the aquatic animals. (3)

3.2.4 Local fish eating birds get sick when the farmer sprays his crop with pesticides . Explain why? (3)

(10)

3.3 Read the extract below and then answer the questions.

WATER CRISIS IN SOUTH AFRICA

The impact of the water scarcity will be one of South Africa's biggest problems soon. Recently a province had to switch off the water supply because the dams were 'so close on the edge'. It is stated that people are using more water than what's available; the demand is more than the supply.

About 37% of the clean, drinkable water is being lost through poor infrastructure (leaking pipes, dripping taps) and wastage. About 60% is used for irrigation.

Industries and mines also contribute to the water crisis by polluting our water bodies. They generate harmful waste which is sometimes dumped into water bodies, creating acid mine drainage. The impact of climate change also adds to the water crisis.

There is a suggestion that South Africa needs to work with neighbouring countries to come up with solutions. An example is to grow the agricultural products in neighbouring countries with a higher rainfall, and then South Africa imports these products.

[Adapted from mg.co.za/article and www.news24.com]

3.3.1 Refer to the extract and state TWO causes of the water crisis in South Africa. (2)

3.3.2 State how importing agricultural products from neighbouring countries would reduce South Africa's water crises. (1)

3.3.3 Explain how switching off the water supply would affect the industries that depend on water. (2)

3.3.4 The South African government could possibly solve the water crises by increasing the cost of water.

Suggest TWO ways in which this solution could help to reduce the water crises. (2)

(7)

3.4 The table below shows the global carbon dioxide emissions from fossil fuel combustion and some industrial processes in 2008.

COUNTRY	CARBON DIOXIDE EMISSIONS (%)
China	23
European Union	13
USA	19
India and Russian Federation	12
Other	33

[Adapted fromwww.environmentalprotectionagency.gov/climatechange]

3.4.1 Draw a bar graph to represent the data in the table. (6)

3.4.2 Explain the impact of the increased carbon dioxide emissions on the environment. (3)

3.4.3 Each country has been given a mandate to reduce its carbon dioxide emissions to reach a certain target. This is reviewed annually by the Conference of the Parties (COP), a United Nations organisation comprising 195 countries that meets to assess progress in dealing with climate change.

Explain TWO reasons why some countries are against reducing the carbon dioxide emissions by the industries. (4)
(13)
(40)

TOTAL SECTION : 80

SECTION C

QUESTION 4: ESSAY

Invertebrates show an evolutionary trend with regard to their body symmetry, body layers and nutrition which allows them to be grouped into different phyla. Describe the body plan of a named example from each of the phyla Cnidaria and Annelida to show this trend.

Facts: 17
Synthesis: 3

TOTAL SECTION C: 20

GRAND TOTAL: 150

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DEPARTMENT OF MATHS & SCIENCES
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.....
01/11/2012

The end....

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01/11/2016

MEMO – GR 11 – PAPER 2 – LIFE SC – 2016

QUESTION ONE

1.1.1 A✓✓
1.1.2 D✓✓
1.1.3 A✓✓
1.1.4 B✓✓
1.1.5 D✓✓
1.1.6 D✓✓
1.1.7 C ✓✓
1.1.8 B ✓✓
1.1.9 B✓✓
1.1.10 D✓✓
(20)

1.2.1 eutrophication✓
1.2.2 biodiversity✓
1.2.3 global warming✓
1.2.4 greenhouse effect✓
1.2.5 carbon footprint✓
1.2.6 thermal pollution ✓
1.2.7 monoculture✓
1.2.8 alien/exotic✓
1.2.9 recycling✓
1.2.10 aquifer✓
(10)

1.3.1 Both A and B✓✓
1.3.2 A only✓✓
1.3.3 A only✓✓
(6)

1.4.1 A✓
1.4.2 E✓
1.4.3 B✓
1.4.4 C✓
(4)

1.5.1 Number of kilograms of maize per hectare/yield✓ (1)

1.5.2 To compare✓ the yield obtained when using two types of fertilizers with the yield of the hectare with no fertilizer✓

OR

It acts as a control ✓– to ensure that the results obtained are due to The addition of fertilizers✓ and not an other factor any (1x2) (2)

1.5.3 -He could have increased the sample size✓/number of plots/ number of plants for each type of fertilizer used
-Repeated the investigation✓
(Mark first ONE only) any (1)

1.5.4 - depletes the nutrients in the soil✓
- leads to decrease in yield✓
- increases pests✓
- leads to soil erosion✓
- decreases biodiversity✓
(Mark first THREE only) any (3)

1.5.5 - collect /gather equipment need to prepare the plots✓
- get permission from the relevant authorities✓
- locate/choose the area for the plots✓/locate plots
- get the necessary help to prepare the plots and for the planting✓
- plan a recording sheet to collect data✓
(Mark first THREE only) any (3)
(10)

TOTAL = 50 (Sect A)

QUESTION TWO

2.1.1 1 - frond✓
2 - rhizome✓
3 - 'leaf" ✓
4 - rhizoid✓ (4)

2.1.2 Pine✓ (1)

2.1.3 A✓ (1)

2.1.4 a) Gymnospermae✓

b) Pteridophyta✓ (2)

2.1.5 - they are winged✓ (1)

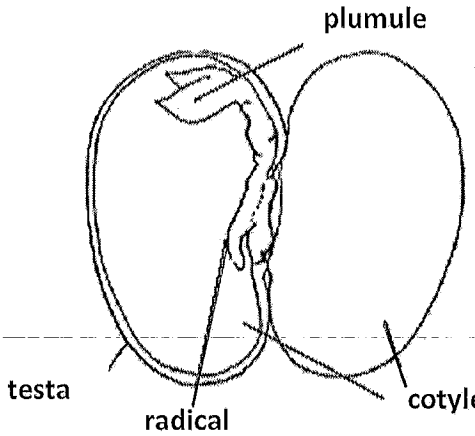
2.1.6 C✓ (1)

2.1.7 - pollen grains carry the male gametes to the ovule✓
- wind is the agent that takes the pollen from the male cone to the female cone✓ (2)

2.1.8 - needle shaped leaves✓
- reduces the surface area✓
- fewer stomata✓
- reduced transpiration✓ in hot dry habitat any (3)

(15)

2.2 1- correct, neat diagram
1 – caption
3 – labels **(5)**



STRUCTURE OF DICOT SEED

2.3.1 A - Fungi✓
B - Monera✓
C - Protist✓ (3)

2.3.2 1 - sporangium✓
2 - spore✓
3 - stolon✓ (3)

2.3.3 a) TB/ Tuberculosis✓
b) Malaria✓ (2)

2.3.4 - it is a mould that grows on food✓
- which it spoils ✓
- and can cause infections when consumed✓ any (2)

(10)

2.4.1 30 – 34 years✓ (1)

2.4.2 -HIV prevalence is more common in females than males.✓
-HIV can affect humans of all age group✓
-The highest HIV prevalence is in the 30-34age category in males, and 35-39 age category in females✓ any (2)

2.4.3 -HIV is transmitted from mother to child during pregnancy✓
-HIV is transmitted from mother to child during breast feeding✓
-Young teenagers become sexually active prematurely and become infected✓
-Young teenagers take drugs and share needles and become infected✓ any (2)

2.4.4 - one can take the necessary steps to treat oneself if they are HIV positive✓
- one can take precautions to prevent the infection of HIV if one is HIV negative✓ (2)

2.4.5 25% - 5% = 20%✓

20/5 x 100 ✓= 400%✓ (3)

(10)

(40)

QUESTION THREE

3.1.1 27/100 x 9,4 million tons✓ = 2,54 million tons✓ (2)

3.1.2 - price of food increases✓
- reducing food security✓ (2)

3.1.3 - people depend on small , local sources of food✓
- will have less food security✓ / will not have food in excess of their need
- there would be less wastage✓ any (2)

3.1.4 - Monoculture✓- depletes the nutrients in the soil and impacts negatively✓ on crop quality
- Pesticide / Pest control using chemicals✓- chemicals get into healthy tissue of plants✓
(2x2) (4)
(10)

3.2.1 Water is cleaner✓ at A.✓ (2)

3.2.2 Increased acid rain causes the trees to die✓ (1)

3.2.3 Increases sewage increases decomposition✓ activity by bacteria.✓
Bacteria uses up oxygen in the water✓
Depleting oxygen supply to animals✓
Causing the animals in the water to die✓ any (3)

3.2.4 - Pesticides are washed into the river✓
- And ingested by fish✓
- When a large number of fish are eaten✓ by the birds
- The level of pesticides accumulates✓ in the bird. Any (3)
(10)

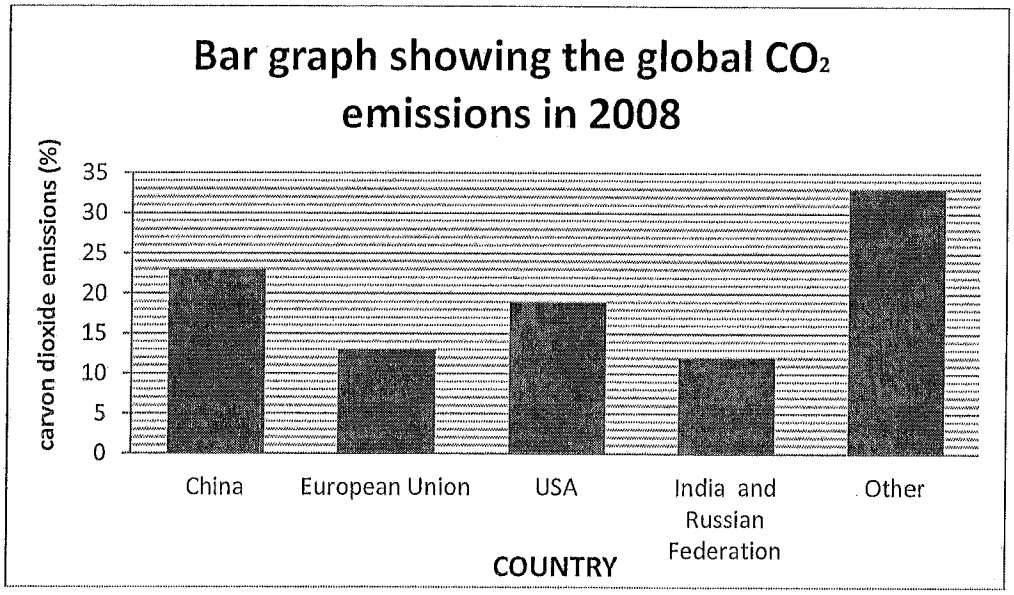
3.3.1 - Poor infrastructure✓
- Climate change✓
- Wastage
- Pollution of water sources✓ any (2)

3.3.2 - the need of water for irrigation will be reduced✓ (1)

3.3.3 - Decreased production✓
- will lead to loss of profit✓ (2)

3.3.4 - More revenue for fixing poor infrastructure✓ /building dams
- Less water wastage✓ by individuals and companies (2)
(7)

3.4.1



Correct type of graph	1 mark
caption	1 mark
Correct scale, label and unit for Y axis	1 mark
Correct label, width of bars, spaces between bars on X axis	1 mark
Plotting of bars	1-4 correct: 1 mark All 5 correct: 2 marks

(6)

3.4.2
- Leads to the enhanced 'greenhouse effect'✓
- and thus global warming✓
- Global warming influences the weather patterns✓
- which can destroy habitat✓
- leading to a decrease in biodiversity✓ (3)

3.4.3
- It will be expensive✓ to change the machinery that produce less carbon dioxide✓
- Too expensive✓ to purchase or develop systems that remove excess carbon dioxide From outlet gases✓

-This would reduce profit ✓that will lead to job losses✓ / have negative Effect on the country's economy

(Mark first TWO only) Any (2x2) (4)

(13)

(40)

QUESTION FOUR

ESSAY:

Cnidaria
Example: Hydra✓*
Body symmetry - radially symmetrical✓
- body can be divided into two equal parts by a cut along the radius✓

Body plan - diploblastic✓
- two body layer✓, ectoderm✓ and endoderm✓, with mesoglea✓in between

Nutrition - blind gut✓
-one opening✓, the mouth✓
-gut cavity is the coelenteron✓
-both ingestion ✓ and egestion✓ occurs through same opening

***compulsory(1) +7=8**

Annelida
Example: Earthworm✓*
Body symmetry -bilateral✓
-body can be cut along one plane✓ from anterior end to posterior end✓
-from dorsal through to the ventral side✓

-animal is cephalised✓
-with the anterior end✓ having a high concentration of nerves✓

Body plan - triploblastic✓
-having three body layers✓ - ectoderm, ✓ endoderm✓ and mesoderm✓
- having a coelom✓ - body cavity✓ in the mesoderm✓

Nutrition -through gut✓
-separate mouth✓ and an anus✓
-gut is specialized with organs for different functions in nutrition✓
-separate opening for ingestion ✓ and separate opening for egestion✓

***compulsory(1) + 8=9**

Relevance	Logical sequence	Comprehension
Only information regarding body Symmetry, body plan and nutrition of a named example each of Cnidaria and Annelida is given (no irrelevant information)	Generally, the body symmetry, body plan and nutrition of the named eg of a Cnidarian example and Annelida example are described logically.	All **three aspects** of the essay is discussed **Example** is given, and **four** facts on each aspect

17 + 3 = 20