education

Department of Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES P2
FINAL EXAMINATION
NOVEMBER 2017

GRADE 11

EXAMINER: MRS J. RAMSEWAK (STANMORE SECONDARY SCHOOL)
MODERATOR: MR N. BRAMDAW (MT EDGECOMBE PRIVATE SCHOOL)

MARKS: 150

TIME: 2 ½ HOURS

N.B. This question paper consists of 12 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer **ALL** the questions.
2. Write **ALL** the answers in your **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. If answers are **NOT** presented according to the instructions of each question, candidates will lose marks.
6. All drawings should be done in pencil and labelled in **blue or black ink**.
7. Draw diagrams and flow charts **ONLY** when requested to do so.
8. The diagrams in this question paper may **NOT** necessarily be drawn to scale.
9. The use of graph paper is **NOT** permitted.
10. You may use a **non-programmable** calculator, protractor, and compass.
11. Write **neatly** and **legibly**.

QUESTION ONE

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

1.1.1. Bacteria are ...
A. Unicellular and without a nucleus.
B. Unicellular and parasitic in plants and animals.
C. Microscopic plants with a saprophytic mode of nutrition.
D. Unicellular with a nucleus and parasitic in plants and animals.

1.1.2. Viruses have a ...
A. Nucleic acid core and protein coat.
B. DNA-containing nucleus and a lipid envelope.
C. Nucleic acid core and a plasma membrane.
D. DNA core and a protein coat.

1.1.3. The following is a list that describes viruses:

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

Which of the following are of biological importance in viruses?

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

1.1.4. Bryophytes are terrestrial plants that have NO ...
A. Cellulose
B. Rhizoids
C. Vascular tissue
D. Sporophyte phase

1.1.5. The carpel (pistil) of a flower consists of the ...
A. Anther, style and ovary
B. Stigma, filament and ovary
C. Anther, filament and ovary
D. Stigma, style and ovary

1.1.6. Fertilization in Angiosperms occurs when ...
A. The pollen tube grows down the style.
B. Pollen moves from the anther to the stigma.
C. A sperm unites with an egg cell.
D. The ovary enlarges into a fruit.

1.1.7. Angiosperms are classified as spermatophyte because they ...
A. Produce flowers.
B. Produce seeds.
C. Are naked seeded plants.
D. Produce cones.

1.1.8. Fungi DO NOT play a role as ...
A. Saprophytes
B. Producers
C. Parasites
D. Symbionts

1.1.9. Which one of the following statements about Platyhelminthes is incorrect?
A. They are diploblastic.
B. They do not have a coelem.
C. They are bilaterally symmetrical.
D. They are parasitic.

1.1.10. Using natural resources so that they are not depleted.
A. Conservation
B. Sustainable use
C. Poaching
D. Deforestation.

10x2 [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 1.2.6.) in your ANSWER BOOKLET.

1.2.1. The concentration of sense organs at the anterior end of an animal leading to the formation of a head.

1.2.2. Places where seeds are stored to help preserve biodiversity.

1.2.3. A fluid filled cavity lined with mesoderm.

1.2.4. The type of alimentary canal which stretches from the mouth to the anus.

1.2.5. The increase in concentration of nutrients in an aquatic ecosystem, which leads to algal boom.

1.2.6. Measurement of the total amount of carbon dioxide emission of an individual, a defined population or a company per year.

1x6 [6]

1.3. Match a statement from COLUMN II with the terms from COLUMN I. Write only the correct LETTER next to the questions 1.3.1 – 1.3.5, in your ANSWER BOOKLET.

COLUMN I	COLUMN II
1.3.1. Vector	A. A plant body that has no differentiations into roots, stems and leaves.
1.3.2. Thallus	B. Has roots, stems and leaves.
1.3.3. Diploblastic	C. A notochord is present in the adult form.
1.3.4. Vertebrates	D. A body plan with two layers of cells.
1.3.5. Thermal pollution	E. An organism that carries a disease without being affected by it.
	F. Caused when water is released into a river after being heated by industries.
	G. Causes algal bloom.

5x2 [10]

1.4. Indicate whether each of the statements 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 (1.4.1. to 1.4.7.).

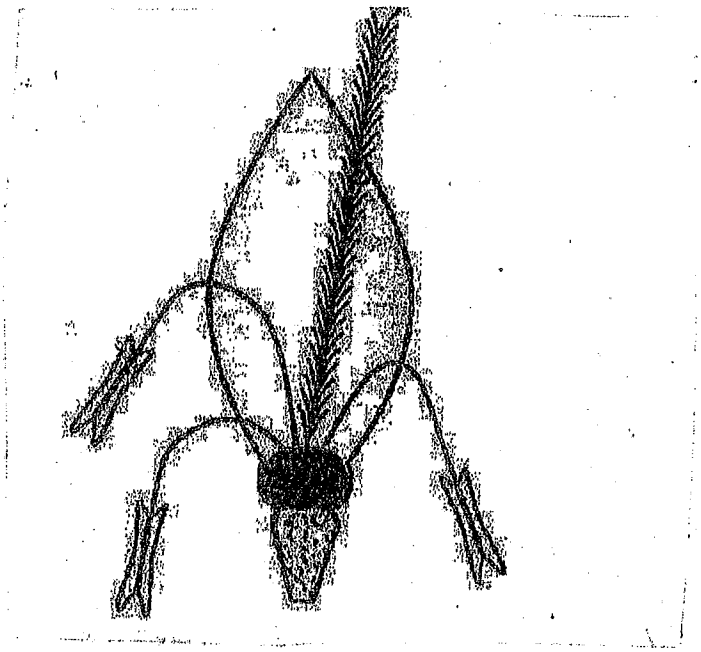
COLUMN I	COLUMN II
1.4.1. Requires water to undergo sexual reproduction.	A. Angiosperms B. Pteridophytes
1.4.2. The part that is formed from a fertized ovule.	A. Seed B. Fruit
1.4.3. The plant(s) where the gametophyte is dominant.	A. Fern B. Gymnosperm
1.4.4. Unicellular organisms that can exist in coccus, spirillum and bacillus for form.	A. Viruses B. Bacteria
1.4.5. Reduces the pest population by the introduction of its natural enemy.	A. Biological control B. Chemical control
1.4.6. Examples of greenhouse gases.	A. Carbon dioxide B. Methane
1.4.7. Factors affecting water availability.	A. Destruction of wetlands B. Poor farming practices

7x2 [14]

50 MARKS

QUESTION TWO

2.1. Flowers are reproductive structures used for sexual reproduction in angiosperm plants. Study the diagram below and answer the questions that follow.



Magnification: X20

2.1.1. Is this flower insect, wind, or bird pollinated? (1)

2.1.2. List **TWO** characteristics of this flower that make it well adapted for your answer given in QUESTION 2.1.1. (2)
[3]

2.2. Angiosperms are a group of plants that produce seeds by means of sexual reproduction.

2.2.1. What is the **main advantage** of sexual reproduction to plants? (1)

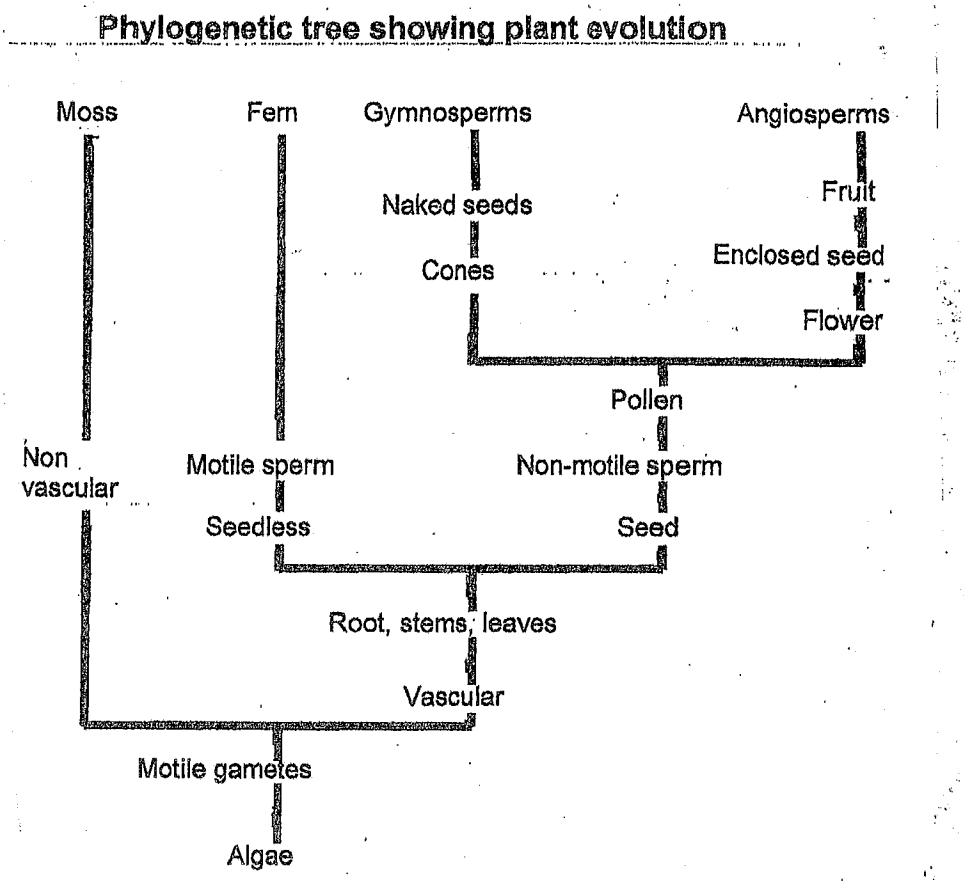
2.2.2. A seed bank in Norway has been storing seeds of a rare and endangered plant. To keep the seeds fresh, 120 of the seeds of this plant were selected to be grown. Out of these 120 seeds, only 90 germinated.

What **percentage** of the seeds was not fertile? Show all your working. (2)

2.2.3. Explain how each of the following features of seeds is important for the plant's survival:

a) Seeds can remain dormant for long periods of time. (1)
b) Some seeds contain endosperm tissue. (1)
[5]

2.3. Study the phylogenetic tree below, taking note of how the four plant divisions have evolved and answer the questions that follow.



2.3.1. What is the ancestral form of all the plant divisions shown? (1)

2.3.2. Which plant division is the best adapted to life on land? (1)

2.3.3. Which plants are the most closely related? (2)

[4]

2.4. The table below shows the number of cases of tuberculosis (TB) and the number of deaths from TB around the world in 2009. Study the table and answer that questions that follow.

Region	Number of cases	Number of deaths
Africa	3 900	430
America	350	20
Europe	560	62
South-East Asia	4 900	480
Western Pacific	2 900	240
Eastern Mediterranean	1 000	99
Global Total	**14 000**	**1 300**

2.4.1. Draw a **BAR GRAPH** using the data for each region in the table to show the number of deaths from TB in 2009. (6)

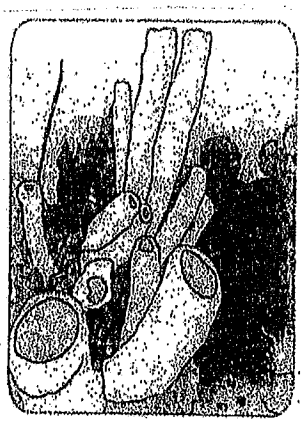
2.4.2. Calculate the **percentage** of cases in the Eastern Mediterranean. (2)

2.4.3. Why do you think that Europe and America have such a small number of cases of TB **compared** to the other countries in the table? Give **ONE** reason. (2)
[10]

2.5. Study the diagram representing three animals and answer the questions that follow:

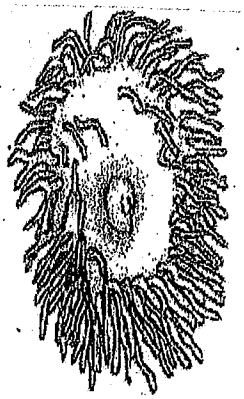
A

Arthropoda



B

Porifera



C

Cnidaria

2.5.1. State the type of symmetry of animal **B**. (1)

2.5.2. Which of the animal(s) (A, B or C) does not poses a through gut? (2)

2.5.3. State whether each of the organisms A and C are diploblastic or triploblastic? (2)

2.5.4. Mention the type of symmetry, as it relates to each of the following animals, and explain how the symmetry is appropriate to the mode of life of:

a) Organism **A**

b) Organism **C**

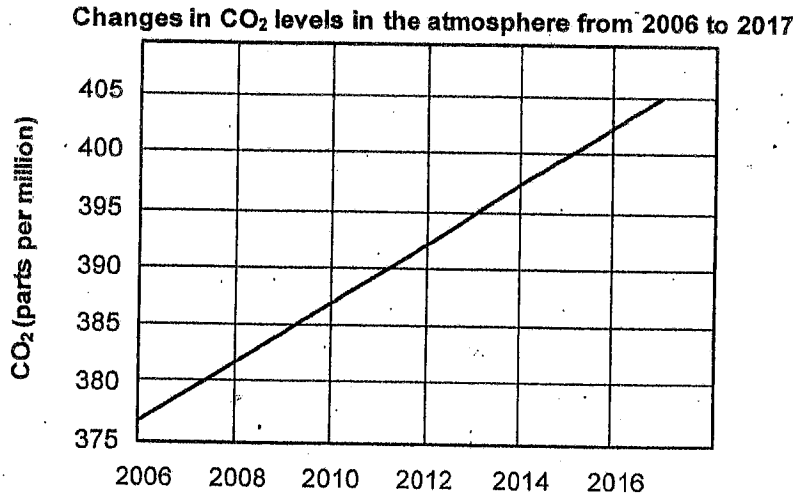
2X3 (6)

[11]

2.6. Read the passage and study the graph.

Accumulation of greenhouse gases in the atmosphere changes the climate melting glaciers, rising sea levels and new and more frequent weather extremes will change the entire world. Water supplies are decreasing, crop yields are dropping, forests are burning and our oceans are becoming more acidic.

Climate change scientists warn that if we do not reduce our greenhouse gas emissions, average global temperatures could increase by 4°C or more by the year 2100 with frightening implications.



2.6.1. Write **ONE** phrase from the passage that indicates that climate change affects the following:

a) Food security (1)

b) Water availability (1)

2.6.2. From the graph, state the CO_2 level in the atmosphere in 2013. (2)

2.6.3. Describe how the destruction of forests by humans contributes to global warming. (3)

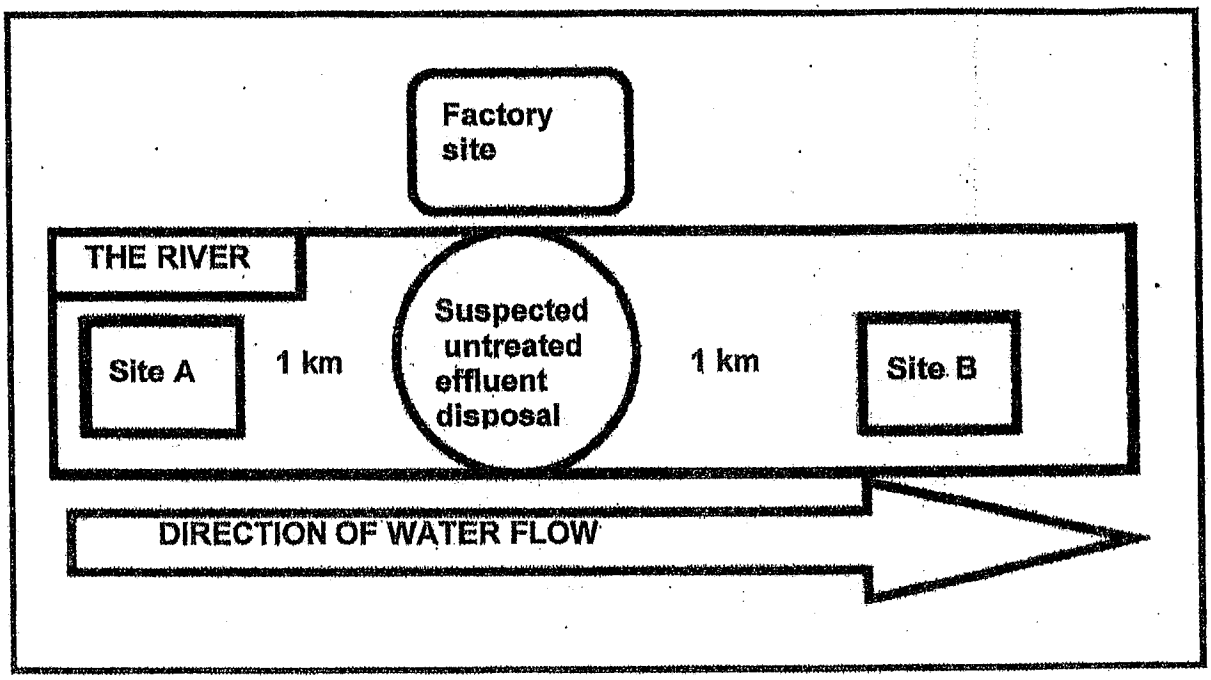
[7]

40 MARKS

QUESTION THREE

3.1.

A certain community living close to an industrial area witnessed the unexplained death of many fish and other aquatic organisms in the nearby river. Many members of the community accused the local chemical factory of disposing untreated acid containing effluent into the river. This incident triggered an investigation by learners at nearby school. The learners were instructed to monitor and record pH levels of two different sites **A** and **B** as indicated in the site diagram below, on a daily basis, for three weeks.



A summary of the recorded data is below. Study the information below and answer the questions that follow.

	pH of water at Site A	pH of water at Site B
Week 1	6,5	4,1
Week 2	6,8	3,5
Week 3	6,4	3,2

3.1.1. State the **aim** of the above investigation. (2)

3.1.2. State a **hypothesis** for the investigation. (2)

3.1.3. Mention any **TWO** steps to be considered when planning this investigation. (2)

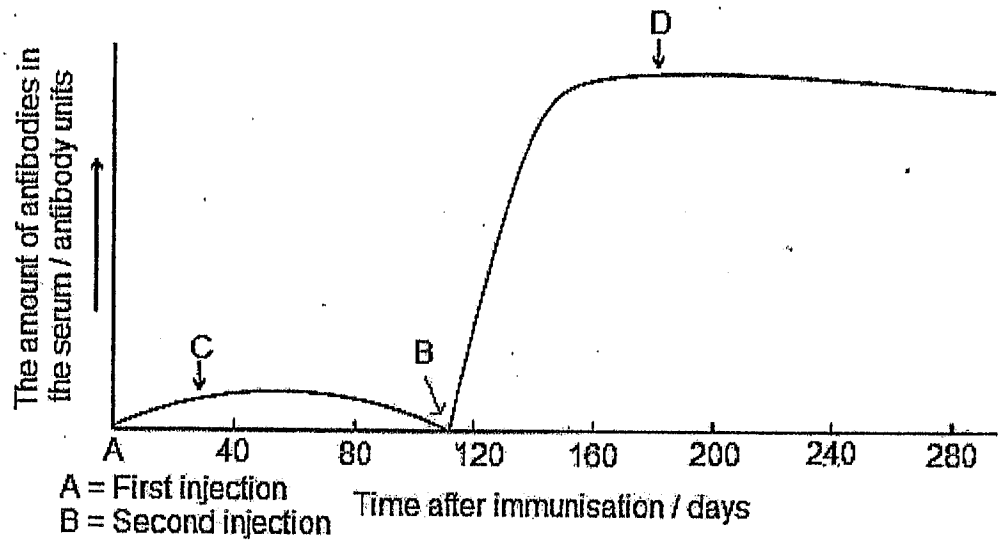
3.1.4. Provide a reason for also testing the pH of water at Site A. (2)

3.1.5. State **ONE WAY** in which this investigation can be made more reliable. (2)

[10]

3.2. Study the graph below, which shows the body's response to a vaccination given by an injection and a booster injection. Answer the questions that follow.

Primary and Secondary responses to an injection containing dead or weakened germs



3.2.1 Mention **ONE** common ways of receiving vaccines. (2)

3.2.2 What in the vaccination stimulated the body to make antibodies? (2)

3.2.3 Which cells in the immune system produce the antibodies? (2)

3.2.4 What happened to the antibody level after the first injection? (2)

3.2.5 What happened to the antibody level after the second injection? (2)

[10]

3.3. Read through the text below and answer the questions that follow.

Cape Towns landfill crisis

Approximately 6 000 tons of waste are currently generated daily within the City of Cape Town. Fifty-five percent of waste ending up at the Council's six landfill sites is directly received from the industrial and commercial sectors, whereas the domestic waste from households account for approximately 30% of the waste stream.

A total of 1,7 million tons of waste was received in landfill sites in Cape Town during 2002 compared to the 1,6 million tons in 2001 and the 1,5 million tons in 2000. This is roughly an annual increase of 7%.

Waste from lower income households are shown to contain about 80% organic waste compared to that from affluent suburbs, which typically contains about 60–70% of packaging waste. Of the total amount of waste produced, more than 90% is landfilled by the City of Cape Town.

There is an urgent need for a new regional landfill site as the city faces the closure of most of its current landfill sites. Clean-up costs of litter and dumping exceed R100 million a year. This is money that could be put to far greater use within the city, particularly given the housing crisis.

[Adapted from: www.capetown.gov.za/en/SolidWaste]

3.3.1 Calculate how many tons of domestic waste are produced per day. Show all calculations. (3)

3.3.2 Suggest **ONE** reason for the increase in solid waste in the city landfill site. (2)

3.3.3 Landfills are known to cause pollution to the environment. Briefly describe **TWO** possible ways in which this could happen. (4)

3.3.4 Give **ONE** way in which lower income households could reduce the amount of waste that they send to landfills. (1)

3.3.5 Explain how poor management of landfill sites can affect the water quality in a city. (2)

[12]

3.4. Water shortage in Cape Town have reached crisis levels.

If you were the Minister of Water Affairs, explain **FOUR** strategies you could use to ensure that the city of Cape Town copes with the water crisis. [8]

40 MARKS

SECTION: C

QUESTION FOUR

Describe how habitat loss through various human activities may lead to a loss of biodiversity.

Content : 17
Synthesis: 3
[20]

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

20 MARKS

GRAND TOTAL: 150

education

Department of Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES P2

FINAL EXAMINATION

MEMORANDUM

NOVEMBER 2017

GRADE 11

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MARKS: 150

TIME: 2 ½ HOURS

N.B. This question paper consists of 7 pages.

Grade: 11 Paper 2 2017 Memorandum

SECTION: A

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

2x10 (20)

1.2.1. cephalization √
1.2.2. Seed Banks√
1.2.3. coelom√
1.2.4. through gut√
1.2.5. eutrification√
1.2.6. carbon footprint √

6x1 (6)

1.3.1. E √√
1.3.2. A√√
1.3.3. D√√
1.3.4. C √√
1.3.5. F √√

2x5 (10)

1.4.1. B only √√
1.4.2. A only√√
1.4.3. None √√
1.4.4. B only√√
1.4.5. A only√√
1.4.6. Both A and B√√
1.4.7. Both A and B√√

2x7 (14)

50 MARKS

SECTION: B

QUESTION TWO

2.1.1. Wind.√ (1)

2.1.2.

- Small flowers without colourful petals√
- Produces large amounts of pollen to increase chance of pollination√
- Pollen grains are light, smooth and dry to allow them to float.√
- Anthers are attached to filament in such a way that they are easily movable with wind√
- Stigma is large, feathery and sticky to trap as much pollen as possible.√
- Large anthers.√

Any 2 2X1(2)√

2.2.1. It generates genetic variety.√ (1)

2.2. 120 – 90 = 30

30/120 x 100/1√ = 25%√ (2)

2.2.3. a) They can survive unfavourable periods.√ (1)

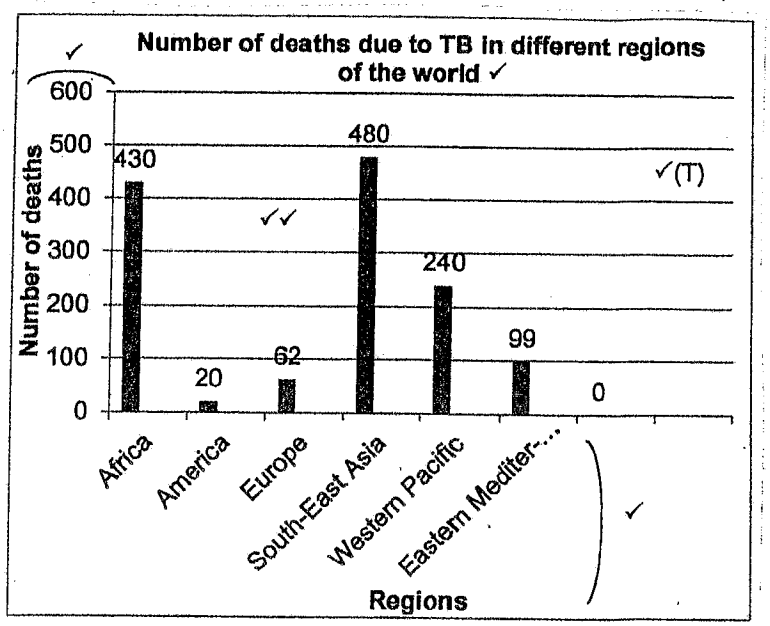
b) Provides food for the growing embryo √ until the plant starts to make food by photosynthesis(1)

2.3.1. Algae.√ (1)

2.3.2. Angiosperms√ (1)

2.3.3. Gymnosperms and Angiosperms:√√ (must have both together to get 2 √√)

2.4.1.



Guideline for the assessing of the graph

Correct type of graph	1
Title of graph	1
Correct label and scale of x-axes	1
Correct label and scale of y-axes	1
Plotting of points	1: 1 to 3 points plotted correctly 2: all 6 points plotted correctly

NOTE:
If the wrong type of graph is drawn, 3 marks will be lost for:
- 'Correct type of graph
- 'Plotting of points'

If labels of the axes are transposed then 2 marks will be lost for:
- 'Correct label and scale for X-axis and Y-axis' (6)

2.4.2. 1000/14000 x 100/1 √

= 7,1 % √ (2)

2.4.3.

- They are well developed countries√√
- Low level of poverty√√/ well off/ good health and social infrastructure.
- More people are well nourished√√/did not live in crowded/ dirty/unhygienic conditions.
- Well educated about the disease√√

Any 1 1x2 (2)

2.5.1. B- Asymmetrical√ (1)

2.5.2. B √ and C√ (2)

2.5.3. A- Triploblastic √ C. diploblastic √ (2)

2.5.4. a) bilateral symmetry√ Leads to cephalization√

As soon as the organism enters into a new environment it can sense danger and detect food.√ (3)

b) Radial symmetry√ Can sense food and danger√ equally well from all directions√ especially because of their sedentary nature. (3)

2.6.1. a) Crop yields are dropping.√ (1)

b) Water supplies are decreasing√ (1)

2.6.2. 395√ parts per million√ (2)

2.6.3. There will be less trees/no trees√
So that less carbon dioxide will be used from the atmosphere√
for photosynthesis√
Carbon dioxide will accumulate in the atmosphere, leading to enhanced greenhouse effect√
Which will cause global warming. Any 3 3x1(3)

40 MARKS

QUESTION THREE

3.1.1. To compare the pH at two sites A and B√ before and after effluent disposal√ (2)

3.1.2. The ph of water at Site B (after effluent disposal)√ will be lower than that at Site A.√(Any other)(2)

3.1.3.

- Formulate a hypothesis for testing√
- Seek expert advice from relevant people√
- Decide on a suitable site for sampling√
- Organise all the required chemicals and equipment before the start of the sampling process√
- Design a relevant recording sheet√
- Obtain permission to enter the area if it is required√
- Organise protective clothing such as gloves and boots.√
- Decide on the volume of daily samples/ Depth at which samples are collected/ and the time of sample taken√ Any 2√ 2X1 (2)

3.1.4. Sample A is used as a control√

To compare the variations of ph at Site B√ (2)

3.1.5. Repeat the investigation√ or (2)

Take more samples at each site√

3.2.1. injection√√ (2)

3.2.2. Dead or weakened germs√√ (2)

3.2.3. white blood cells/ T- lymphocytes√√ (2)

3.2.4. It increases slowly to about day 50√ where it is at its highest and then it decreases√ (2)

3.2.5. It increases rapidly in the first 30 days/ +- day 140√to its maximum, then levels off and stayed constant√ until up to over 280 days. (2)

3.3.1. 30/100√ x 6000√

= 1800√ tons (3)

3.3.2. Increase in population produces more solid waste√√

People more well off, purchasing more goods/ food.√√ Any 1 1x2(2)

3.3.3.

- There could be littering √ when wind blows plastic bags/paper into surrounding areas√
- The ground water could be polluted√ when leaching takes place√
- Air pollution occurs√ when waste is burnt/ incinerated√
- Air pollution occurs√ when methane gas is given off at the dumps√ Any 2 2x2(4)

3.3.4. They could have compost heaps and not throw away organic wastes.√
They can recycle goods.√ Any 1 1x1(1)

3.3.5. If an impermeable layer (plastic) is not laid down before dumping,√ leachate could contaminate ground water, causing it to be polluted.√ (2)

3.4.

- Fix leaking pipes/ toilets/ taps√
  To reduce wastage of water√
- Provide incentives to families to save water√ To encourage sustained use of water√
- Reduce pressure in pipes√ To reduce wastage of water√
- Provide education to people√ On wise use of water√
- Encourage good farming practices√ To prevent contamination of water sources by fertilizers and pesticides√
- Use boreholes/ tanks √ To increase water availability√
- Prevent destruction of wetlands√ To improve the availability and quality of water√
- Desalinate sea water√ To make more water available√
- Remove alien trees√ Because it takes up a lot of water√
- Recycling of grey water√ To conserve water√
- Impose fines for overuse of water√ To reduce water wastage√

(Mark first 4 only) 4X2 (8)

40 MARKS

SECTION: C

QUESTION FOUR

- As a result of urbanisation√ land is cleared for housing√ industries and roads√
- leading to loss of habitat for animals/ insects√ causing loss of biodiversity.
- Monoculture√ many species of indigenous vegetation and animals are removed√
- for the purpose of planting crop of a single species√
- Disrupts predator- prey relationships√/ Food chains are broken
- Uniform flora attracts only a few species of animals√
- The lack of variety of plants and animals may lead to rapid increases in pest populations√
- As a result of overgrazing√ loss of topsoil/erosion increases√
- Decreasing soil fertility√ decreasing the potential of plant life√
- When pesticides are used to kill pests√ the chemicals enter the ground water√ and may affect plant life in the area.√
- When fertilizers are added to soil √ it may be washed into rivers√ causing algal bloom√ which eventually leads to a depletion of oxygen in the water√ making it difficult to sustain life√
- As a result of mining√ The pH of water may be affected√ and toxic gases may be emitted into the atmosphere√ the environment is altered such that organisms can no longer exist in the area√
- An increase in deforestation√ as a result of the demand for wood products√ destroys the ecosystems within the forest area√
- Destructions of wetlands and grasslands√ To make way for agriculture√ / human inhabitation, reduces the biodiversity of organisms living on wetlands and grasslands√

ASSESSNG 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
Only information relating to loss of biodiversity through habitat destruction is provided (There is no irrelevant information)	Effects on the habitat are appropriately linked to the cause	At least five causes of habitat destruction should be fully described (5 x 2 = 10 marks).
1 mark	1 mark	1 mark

Content (Any 17 √
Synthesis 3
Total 20

20 MARKS

GRAND TOTAL: 150 MARKS