Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

COMMON TEST

MARCH 2018

NATIONAL SENIOR CERTIFICATE

GRADE 10

MARKS: 60

TIME: 1 hour

N.B. This question paper consists of 9 pages.

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 must use a non-programmable calculator, protractor and a compass, where necessary.
11. Write neatly and legibly.

SECTION A

QUESTION 1

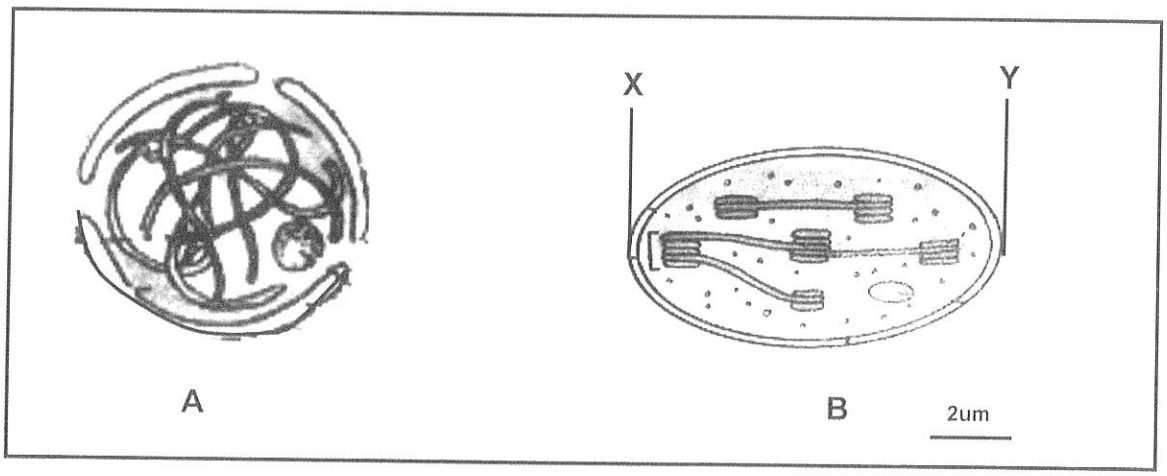
1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.5) in your ANSWER BOOK, for example 1.1.6 D.

1.1.1 The cell organelles in which proteins are synthesised are the ...

A chloroplasts.
B ribosomes.
C lysosomes.
D mitochondria.

QUESTION 1.1.2 AND 1.1.3 REFER TO THE DIAGRAMS BELOW.

The diagrams below represent two cell organelles.



1.1.2 Which ONE of the following combinations are processes that will be affected if organelles **A** and **B** were not present in a cell?

A Photosynthesis and cellular respiration
B Cellular respiration and mitosis
C Mitosis and photosynthesis
D Digestion and mitosis

1.1.3 What is the length of organelle **B** along the **X** – **Y** axis?

A 2um
B 2,5um
C 12um
D 10um

1.1.4 Which organelles store food in different forms such as starch?

A Lysosomes
B Leucoplasts
C Mitochondria
D Endoplasmic reticulum

1.1.5 Which organelles would you expect in large numbers in muscle cells to help an athlete during a race?

A Ribosomes
B Nucleus
C Mitochondria
D Golgi Apparatus

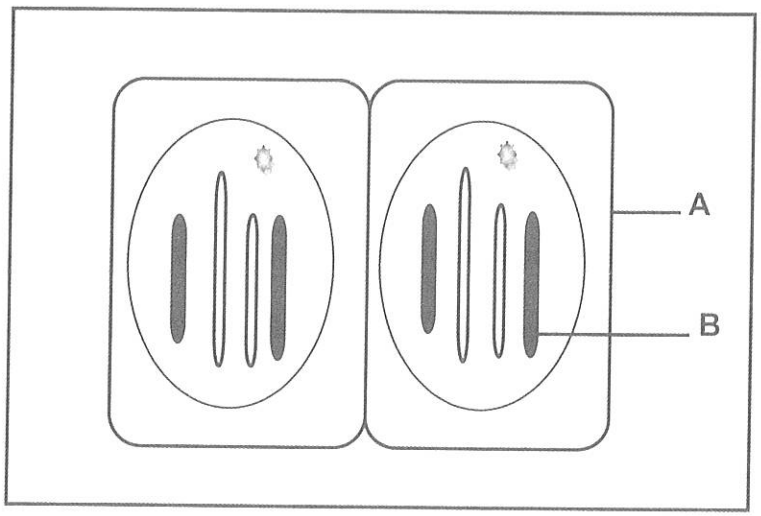
(5 x 2) **(10)**

TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1 Study the diagram showing a phase of mitosis.



2.1.1 Identify the phase shown in the diagram above. (1)

2.1.2 State TWO visible reasons for your answer to QUESTION 2.1.1. (2)

2.1.3 Identify parts **A** and **B**. (2)

2.1.4 How many chromosomes:

(a) Were present in the original cell at the start of mitosis (1)

(b) Are present in EACH cell in the diagram (1)

2.1.5 Explain the importance of interphase that occurs before mitosis. (2)

(9)

2.2 Read the extract below.

> Mitosis is a type of cell division which amoeba relies on for asexual reproduction through binary fission. It also helps to replace damaged cells in all living organisms.
>
> Abnormal and uncontrolled mitosis of body cells may result in cancer. The extra cells form a growth or a tumor. These cells can be spread to other parts of the body.
>
> Chemotherapy is used to destroy cancer cells but may cause the loss of hair.

2.2.1 State ONE importance of mitosis stated in the passage. (1)

2.2.2 According to the passage, state the side effect of using chemicals to destroy cancer cells. (1)

2.2.3 Name and describe the phase of mitosis in which the nucleolus and nuclear membrane disappear. (4)

(6)
(15)

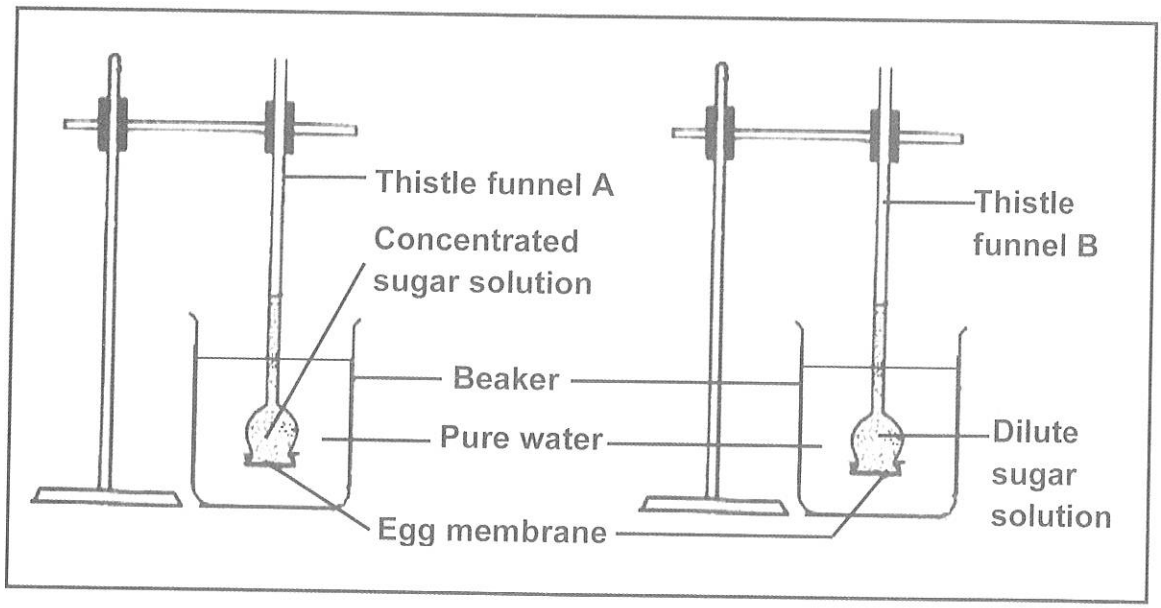
QUESTION 3

3.1 An investigation was carried out to determine the effect of different concentrations of sugar solution on the rate of movement of water across a membrane.

The procedure was as follows:

- Two thistle funnels were placed in beakers with an equal amount of pure water.
- A concentrated sugar solution was placed in thistle funnel **A** and a dilute sugar solution was placed in thistle funnel **B**.
- An egg membrane was used to separate each solution from pure water.

The apparatus is shown in the diagram below.



The results of the investigation are shown in the table below.

THISTLE FUNNEL	INITIAL LEVEL OF SOLUTION	LEVEL OF SOLUTION FIVE HOURS LATER
A	20 ml	30 ml
B	20 ml	23 ml

3.1.1 For this investigation state the:

(a) Dependent variable (1)
(b) Independent variable (1)

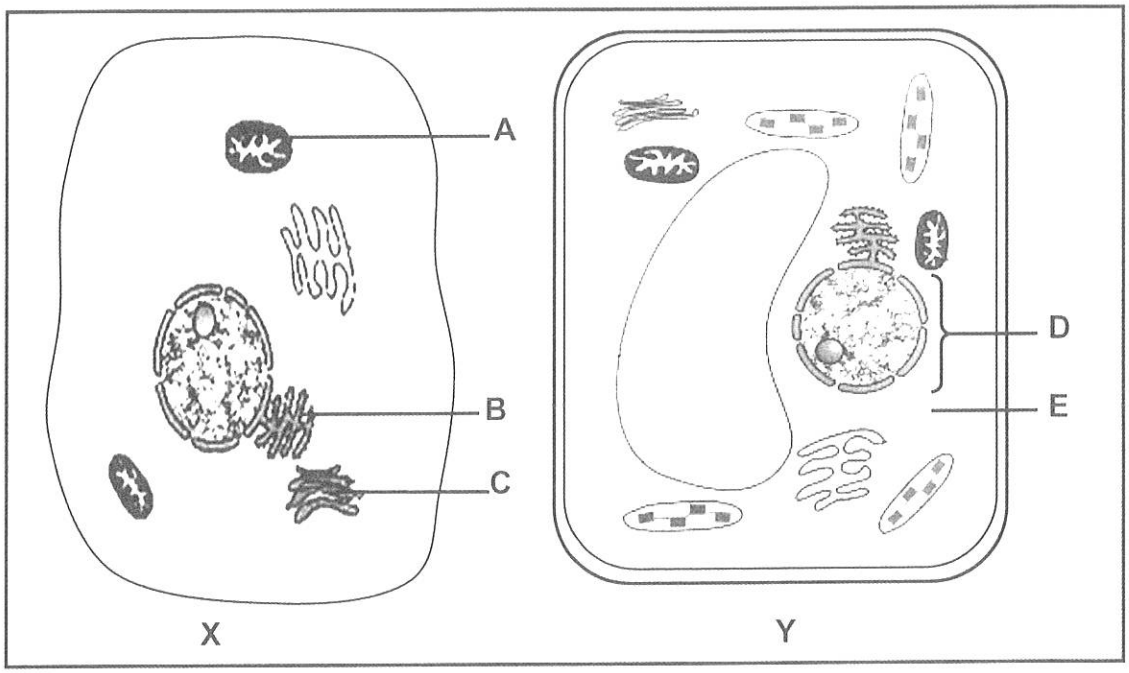
3.1.2 State TWO ways in which the scientists could have ensured the reliability of the results. (2)

3.1.3 Give a reason why the level of solutions in thistle funnel **A** and **B** were made equal at the start of the investigation. (1)

3.1.4 Explain why the rate of water movement was greater in **A** in comparison with **B**. (4)

(9)

3.2 The diagrams below represent two cells (**X** or **Y**) with their organelles.



3.2.1 Which cell (**X** or **Y**) represents a plant cell? (1)

3.2.2 State TWO visible reasons for your answer in QUESTION 3.2.1. (2)

3.2.3 Identify part **E**. (1)

3.2.4 Give the LETTER only of the organelle that:

(a) Has a secretory function (1)

(b) Acts as a communication system (1)

(6)

(15)

TOTAL SECTION B: 30

SECTION C

QUESTION 4

We rely on crops produced by farmers for our source of vitamins, carbohydrates and proteins. To increase crop yield, farmers often use fertilizers.

Provide a description for each of the following:

4.1 The structure and functions of carbohydrates and proteins (7)

4.2 Method used to test for the presence of proteins in a food sample (5)

4.3 Effect of fertilizers on the aquatic ecosystem when it is washed from the farms into rivers (5)

Content: (17)
Synthesis: (3)

(20)

NOTE: NO marks will be awarded for answers in the form of flowcharts or diagrams.

TOTAL SECTION C: 20
GRAND TOTAL: 60

(Grade-10 & 11)

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LIFE SCIENCES

MARKING GUIDELINE

COMMON TEST

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GRADE 10

This marking guideline consists of 4 pages.

SECTION A

QUESTION 1

1.1

1.1.1 B✓✓
1.1.2 C✓✓
1.1.3 D✓✓
1.1.4 B✓✓
1.1.5 C✓✓

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

TOTAL SECTION A **10**

SECTION B

QUESTION 2

2.1

2.1.1 Telophase✓ (1)

2.1.2 - Cytokinesis occurred✓/ two cells formed
- Nuclear membrane re-appeared✓
- Single stranded chromosomes✓
(**Mark first TWO only**) Any (2)

2.1.3 **A** Cell membrane✓/ plasma membrane
B Chromosome✓ (2)

2.1.4 (a) 4✓ (1)
(b) 4✓ (1)

2.1.5 - DNA replication✓/so that genetic material is doubled
- allowing for the production of genetically identical cells✓/so that genetic material can be shared between daughter cells (2)
(9)

2.2

2.2.1 - Replace damaged cells✓
- Asexual reproduction✓/Binary Fission
(**Mark first ONE only**) Any (1)

2.2.2 Loss of hair✓ (1)

2.2.3 - Prophase*✓
- Chromatin network unwinds ✓
- and become visible as chromosomes ✓
- consisting of two chromatids joined by centromere ✓
- Centrosome form centrioles that move to opposite poles ✓
- Spindle fibres formed by centrioles ✓ (4)

* **compulsory mark** + any 3 other points

(6)

[15]

GREENBURY

QUESTION 3

3.1

3.1.1 (a) Rate of movement of water✓ (1)
(b) Concentration of sugar solution✓ (1)

3.1.2 - Repeat the investigation✓
- Use more than one thistle funnel at each concentration✓ (2)

3.1.3 - To compare the changes in levels in thistle funnel **A** and **B**✓ (1)

3.1.4 - Since the sugar concentration is higher in A✓
- This created a steeper concentration gradient✓
- Allowing for greater movement of water from the beaker into the thistle funnel✓
- producing a greater rise in level✓ (4)
(9)

3.2

3.2.1 **Y**✓ (1)

3.2.2 - Has a cell wall✓
- Has a vacuole✓
- Has chloroplasts✓ Any (2)
(**Mark first TWO only**)

3.2.3 Cytoplasm✓/cytosol (1)

3.2.4 (a) **C**✓ (1)
(b) **B**✓ (1)
(6)

(15)

TOTAL SECTION B 30

SECTION C

QUESTION 4

Structure of carbohydrates and proteins
- Carbohydrates have elements C, H and O✓
- They consist of monosaccharides✓
- Proteins contain the elements C, H, O and N✓
- Some have S, P and Fe✓
- They are made up of amino acids✓ Any (3)

Functions of carbohydrates and proteins
- Carbohydrates are the source of energy✓
- They store energy✓ in the form of starch/glycogen
- They form the cell wall✓
- Proteins store energy✓
- They are part of cell membranes✓
- Enzyme/hormones are proteins✓ Any (4) (7)

Protein test
- Make a protein solution✓
- Add Millon's reagent✓/Biuret test
- Heat the solution✓ in a beaker
- Solution turns brick red✓/violet
- indicating the presence of proteins✓
- if it remains clear✓/blue
- then proteins are absent✓ Any (5)

Effect of fertilizers on the ecosystem in rivers
- Leads to eutrophication✓
- resulting in rapid growth of algae✓and other aquatic plants
- Algae prevents sunlight✓
- from reaching plants growing in deeper water✓
- Prevents photosynthesis✓ of other water plants
- Plants will die✓ and rot
- Decomposition bacteria reduce oxygen in water✓
- Aquatic animals die✓ Any (5)
Content **(17)**
Synthesis **(3)**
[20]

ASSESSING 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: - Structure and functions of carbohydrates and proteins - The protein test - Effect of fertilisers on ecosystem in rivers There is no irrelevant information	Correct sequence of events in: - Structure and functions of carbohydrates and proteins - The protein test - Effect of fertilisers on ecosystem in rivers	Answer contains at least the following: - Structure and functions of carbohydrates and proteins **(5/7)** - The protein test **(3/5)** - Effect of fertilisers on ecosystem in rivers **(3/5)**
1 mark	1 mark	1 mark

TOTAL SECTION C: 20
GRAND TOTAL: 60