Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

COMMON TEST

MARCH 2015

NATIONAL SENIOR CERTIFICATE

GRADE 10

MARKS: 60

TIME: 1 hour

N.B. This question paper consists of 8 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. ALL drawings must be done in pencil and labelled in blue or black ink.
7. Draw diagrams, flow charts or tables 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.
11. Write neatly and legibly.

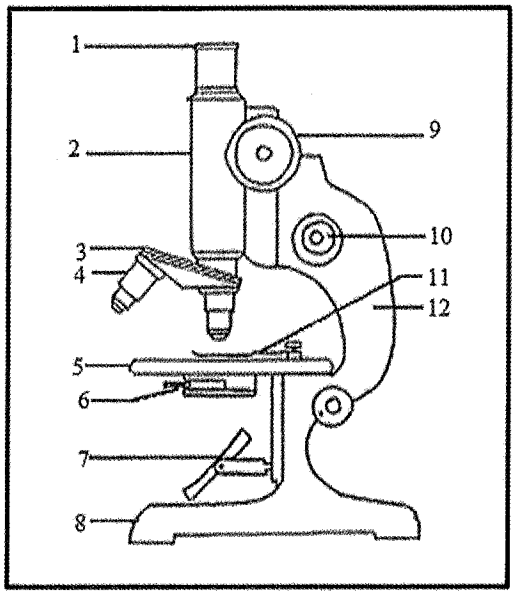
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SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the 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 Study the diagram below of a microscope.



The coarse adjustment and fine adjustment is represented, respectively by ...

A. 6 and 9.
B. 4 and 7.
C. 1 and 10.
D. 9 and 10.

1.1.2 When a pupil observed plant tissue under a microscope, the magnification was x400. Which combination of lenses provided this magnification?

A. 10x eye-piece and a 40x objective
B. 40x eye-piece and a 20x objective
C. 200x eye-piece and a 200x objective
D. 100x eye-piece and a 300x objective

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1.1.3 Which ONE of the following is an inorganic molecule that provides a fluid medium for chemical reactions?

A. Proteins
B. Water
C. Carbon dioxide
D. Carbohydrates

1.1.4 Which ONE of the following would you expect to be in larger numbers in a muscle cell as compared to a skin cell?

A. Golgi bodies
B. Vacuoles
C. Mitochondria
D. Lysosomes

1.1.5 Osmosis is the movement of ...

A. a solute across a differentially permeable membrane.
B. molecules from a region of high concentration to a region of low concentration.
C. water through a differentially permeable membrane.
D. water molecules from a region of low concentration to a region of high concentration.

5 x 2 **(10)**

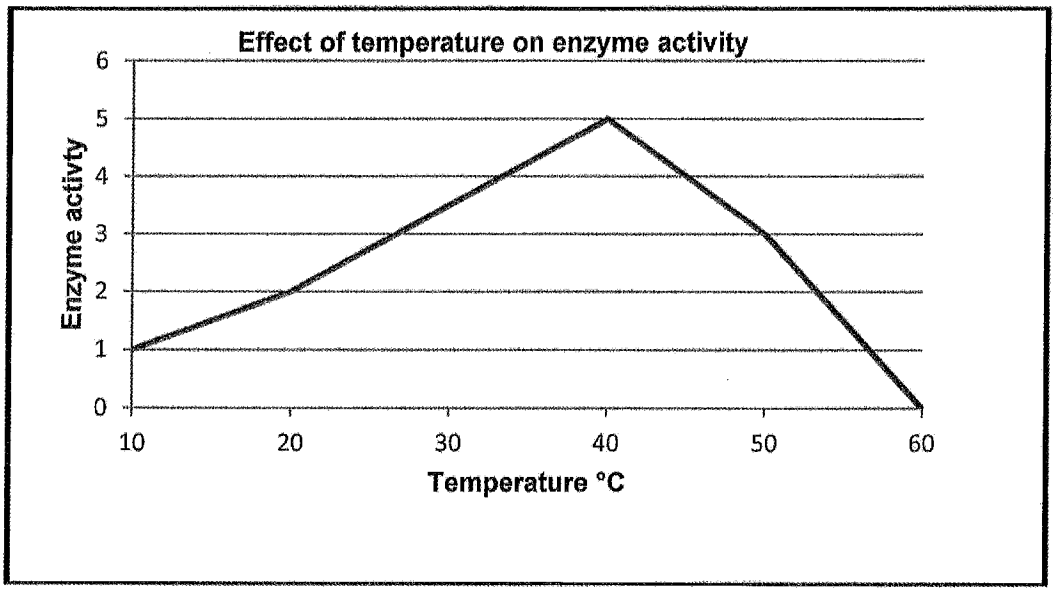
TOTAL SECTION A: 10

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SECTION B

QUESTION 2

2.1 Study the line graph below showing the effect of temperature on enzyme activity.



2.1.1 Identify the independent variable in the above investigation. (1)

2.1.2 At which temperature does the enzyme work the best? (1)

2.1.3 Account for the decrease in enzyme activity after the temperature mentioned in QUESTION 2.1.2? (2)

2.1.4 Explain why the enzyme represented in the graph could be from a human? (2)
(6)

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2.2 Grade 10 learners carried out three different food tests to investigate the composition of apple juice, peanuts and beans. The table below shows the results obtained from the investigation.

Chemical Reagent	Food types		
	Apple juice	Peanuts	Beans
Millon's reagent	Negative	Positive	Positive
Benedict's/ Fehling's A and B solution	Positive	Negative	Negative
Ether/ethanol solution	Negative	Positive	Positive

2.2.1 Which chemical reagent indicates the presence of glucose? (1)

2.2.2 Name any ONE food type that contains fats and proteins. (2)

2.2.3 Which food type will be best for providing energy? (2)
(5)

2.3 The following is a list of characteristics related to vitamins:

A	Promotes absorption of calcium
B	Needed for good vision
C	Scurvy (bleeding of gums)
D	Beriberi and loss of appetite
E	Deficiency leads to night blindness
F	Slows down fat absorption

Write the LETTER only that applies to each of the following:

2.3.1 TWO characteristics related to vitamin A. (2)

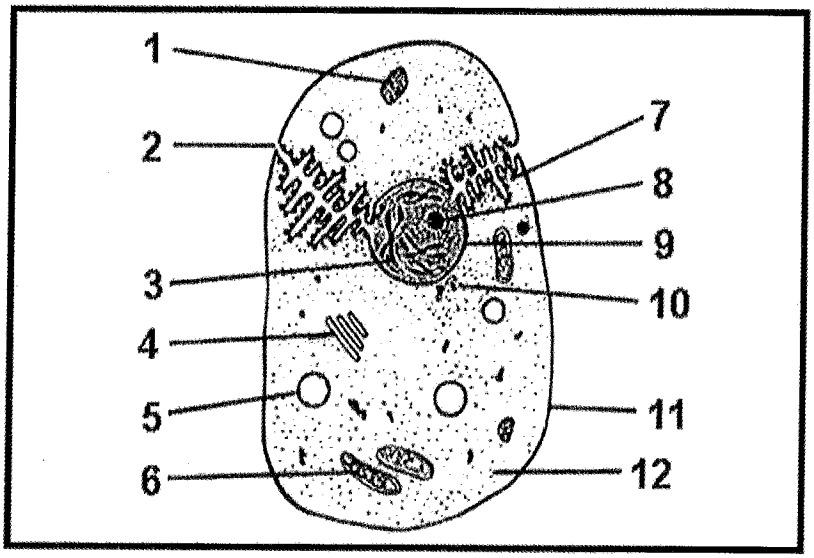
2.3.2 ONE characteristics related to vitamin D. (1)

2.3.3 ONE characteristic related to vitamin C. (1)
(4)

[15]

QUESTION 3

3.1 Study the diagram of a cell below and answer the questions that follow.



3.1.1 Does this diagram represent a plant cell or an animal cell? (1)

3.1.2 Give THREE reasons for your answer to QUESTION 3.1.1. (3)

3.1.3 Write down the NUMBER and NAME of the:

(a) System of membranous sacs secreting cellular products. (2)

(b) Structure that carries genetic/hereditary information. (2)

(c) Fluid that consists of 90% of water with dissolved substances (2)

3.1.4 Explain what will happen if the structure labelled **11** becomes impermeable. (2)
(12)

3.2 State ONE function for each of the following plastids:

3.2.1 Chloroplasts (1)

3.2.2 Chromoplasts (1)

3.2.3 Leucoplasts (1)
(3)

[15]

TOTAL SECTION B: (30)

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SECTION C

QUESTION 4

Give a description of mitosis under the following headings:

4.1 Events during Interphase (2)

4.2 Events of the 4 phases of mitosis (12)

4.3 THREE biological importance of mitosis (3)

Content: (17)
Synthesis: (3)
(20)

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

TOTAL SECTION C: 20

GRAND TOTAL: 60

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LIFE SCIENCES

MEMORANDUM

COMMON TEST

MARCH 2015

NATIONAL
SENIOR CERTIFICATE

GRADE 10

N.B. This memorandum consists of 5 pages including this page.

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SECTION A

QUESTION 1

1.1

1.1.1 D ✓✓

1.1.2 A ✓✓

1.1.3 B ✓✓

1.1.4 C ✓✓

1.1.5 C ✓✓

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

TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1

2.1.1 Temperature ✓ (1)

2.1.2 40°C ✓ (1)

2.1.3 - High temperature ✓
- denatures the enzyme ✓ /changes the shape of the enzyme. (2)

2.1.4 - Human body temperature is about 37°C. ✓
- Optimum activity for this enzyme is 40°C ✓ / close to human body temperature. (2)
(6)

2.2

2.2.1 Benedict's ✓ / Fehling's A and B solution (1)

2.2.2 Penanuts ✓✓ / Beans
(Mark first ONE only) (2)

2.2.3 Apple juice ✓✓ (2)
(5)

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2.3

2.3.1 B ✓ and E ✓ (2)
(Mark first TWO only)

2.3.2 A ✓ (1)
(Mark first ONE only)

2.3.3 C ✓ (1)
(Mark first ONE only)

(4)
[15]

QUESTION 3

3.1

3.1.1 Animal cell ✓ (1)

3.1.2 - Has irregular shape
- No cell wall ✓ / outermost layer is a cell membrane
- Has centrosome ✓
- Has small vacuoles ✓
- Has lysosomes ✓ **Any** (3)

(Mark first THREE only)

3.1.3 (a) 4 ✓ Golgi body ✓ (2)

(b) 3 ✓ chromosomes ✓ / chromatin (2)

(c) 12 ✓ cytosol ✓ / cytoplasm (2)

3.1.4 - Useful substances will not move in ✓/ waste will not move out
- so the cell may die ✓ (2)
(12)

3.2

3.2.1 Photosynthesis ✓ (1)

3.2.2 Gives colour ✓ to some fruits, vegetables and flower petals (1)

3.2.3 Stores starch ✓ (1)
(3)

[15]

TOTAL SECTION B: (30)

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SECTION C

QUESTION 4

4.1 Possible answer

INTERPHASE

- Cell prepares for division ✓
- DNA replication occurs ✓
- Identical copies of chromosomes formed ✓ Any (2)

4.2 PROPHASE ✓

- Chromatin network unwinds ✓
- Become shorter and thicker ✓
- Visible as chromosomes ✓
- Consisting of two chromatids joined by centromere ✓
- Nuclear membrane and nucleolus disappear ✓
- Centrosome form centrioles that move to opposite poles ✓
- Spindle fibres formed by centrioles ✓ Any (3)

METAPHASE ✓

- Chromosomes arrange on the equator of the cell ✓
- Chromosomes attach to the spindle fibres – at the centromeres ✓
- in a single row ✓ Any (3)

ANAPHASE ✓

- Centromeres of each chromosome divides into two ✓
- Spindle fibres shorten to pull chromatids towards opposite poles ✓
- Chromatids are now called daughter chromosomes ✓ Any (3)

TELOPHASE ✓

- Daughter chromosomes group themselves at poles ✓
- Chromosomes uncoil, lengthen forming chromatin network ✓
- Nuclear membrane and nucleolus re-appears ✓
- Cytoplasm divides so that two cells form ✓/ cytokinesis occurs Any (3)

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4.3 IMPORTANCE OF MITOSIS

- Allows for growth ✓
- Replace and repair damaged cells or tissues ✓
- Produce identical cells to parent cells ✓
- For asexual reproduction in most unicellular organisms ✓

(Mark first THREE only)

Any (3)
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
Only information relating to interphase, mitosis and its importance is given (there is no irrelevant information).	Events of mitosis given in the correct sequence	ALL three aspects are included: 1. Interphase 2. All phases of mitosis 3. Importance of mitosis
1 mark	1 mark	1 mark

TOTAL SECTION C: 20

GRAND TOTAL: 60

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