



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH AND APPLIED SCIENCES

DEPARTMENT OF NATURAL AND APPLIED SCIENCES

QUALIFICATION: BACHELOR OF SCIENCE (MAJOR AND MINOR)	
QUALIFICATION CODE: 07BOSC	LEVEL: 5
COURSE NAME: GENERAL BIOLOGY 1A	COURSE CODE: GNB501S
SESSION: JULY 2019	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SUPPLEMENTARY/SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
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<p style="text-align: center;">INSTRUCTIONS</p> <ol style="list-style-type: none">1. Write clearly and neatly2. Number the answers clearly3. All written work MUST be done in blue or black ink4. No books, notes and other additional aids are allowed5. Mark all answers clearly with their respective question numbers

THIS QUESTION PAPER CONSISTS OF 7 PAGES
(Including this front page)

QUESTION 1

MULTIPLE CHOICE QUESTIONS

[10]

- 1.1 Which is the lowest level of biological organization that biologists consider to be alive? (1)
- (a) A protein
 - (b) DNA
 - (c) A cell
 - (d) A multicellular organism
- 1.2 What is the magnification of an object viewed at 10X oculars and the 40X objectives? (1)
- (a) 40X
 - (b) 100X
 - (c) 400X
 - (d) 1000X
- 1.3 Maltose, sucrose, and lactose differ from one another; (1)
- (a) Because not all contain glucose.
 - (b) Because not all of them exist in a ring form.
 - (c) In the number of carbons in the sugar.
 - (d) By the linkage of the monomers.
- 1.4 Junctions that permit the transfer of water, ions, and molecules between adjacent plant cells are; (1)
- (a) tight junctions
 - (b) desmosomes
 - (c) gap junction
 - (d) plasmodesmata
- 1.5 The different shapes and functions of proteins are determined by (1)
- (a) the R groups of the amino acids they contain
 - (b) the amino groups of the amino acids they contain
 - (c) the carboxyl groups of the amino acids they contain
 - (d) whether or not they contain any amino acids
- 1.6 In meiosis; (1)
- (a) Homologous chromosomes pair at prophase II.
 - (b) Chromosomes segregate from their homologous partners at anaphase I.
 - (c) The centromeres split at anaphase I.
 - (d) Reduction of chromosome number occurs in meiosis II.

1.7 The DNA content in a diploid cell in G_2 is X . If that cell goes into meiosis at metaphase II, the DNA content will be: (1)

- (a) $0.5X$.
- (b) X .
- (c) $2X$.
- (d) $4X$.

1.8 Which of the following sequences of events describes the general life cycle of an animal? (1)

- (a) $2n$ – meiosis – $2n$ – fertilization – $1n$
- (b) $1n$ – meiosis – $2n$ – fertilization – $1n$
- (c) $2n$ – meiosis – $1n$ – fertilization – $2n$
- (d) $2n$ – mitosis – $1n$ – fertilization – $2n$

1.9 Which of the following statements about mitosis is *incorrect*? (1)

- (a) Microtubules from the spindle poles attach to the kinetochores on the chromosomes.
- (b) In anaphase, the spindle separate sister chromatids and pulls them apart.
- (c) In metaphase, spindle microtubules align the chromosomes at the spindle midpoint.
- (d) Cytokinesis describes the movement of chromosomes.

1.10 Through a microscope, you see a cell plate beginning to develop across the **middle of the cell and nuclei** re-forming on either side of the **cell plate**.

This cell is most likely; (1)

- (a) an animal cell in the process of cytokinesis
- (b) a plant cell in the process of cytokinesis
- (c) an animal cell in the S phase of the cell cycle
- (d) a plant cell in metaphase

QUESTION 2

FILL IN THE BLANK SPACES

[10]

- 2.1 When conducting an experiment, the experimenter makes a special effort to keep factors that affect the experiment constant so that they will not influence the outcome. These factors are called _____? (1)
- 2.2 Prokaryotic organisms make up the kingdoms _____ and _____. (2)
- 2.3 The noncyclic electron flow generates the gas _____, as well as _____ and the energy carrier _____. (3)
- 2.4 The light reactions take place in the _____ and the Calvin cycle takes place in the _____. (2)
- 2.5 The ETC uses the energized electrons carried by the coenzymes _____ and _____ to make 34 ATP's of energy. (2)

QUESTION 3

ONE WORD ANSWERS

[10]

- 3.1 Name the polysaccharide found in the cell walls of fungi? (1)
- 3.2 The process by which a disaccharide is broken down into its monomers is called? (1)
- 3.3 Which organelle will produce steroid hormones in the testes and adrenal cortex while detoxifying alcohol in the liver? (1)
- 3.4 How many molecules of carbon dioxide are produced during the Krebs cycle? (1)
- 3.5 State the location at which the following processes of cellular respiration takes place in the cell; (a) glycolysis, (b) Electron Transport Chain and (c) the Krebs cycle? (3)

3.6 The **DNA strand** that is copied is called? (1)

3.7 Junctions that permit the transfer of water, ions, and molecules between adjacent plant cells are called? (1)

3.8 During the glycolysis of one glucose molecule, how many ATP molecules are produced (gross)? (1)

QUESTION 4

DEFINE THE FOLLOWING TERMS: [10]

4.1 Nucleus (2)

4.2 Denaturation (2)

4.3 Lactic acid fermentation (2)

4.4 Active transport (2)

4.5 Tetrad (2)

QUESTION 5

DISTINGUISH BETWEEN THE TERMS: [10]

5.1 Quantitative data; qualitative data (2)

5.2 Nucleoplasm; nuclear envelope (2)

5.3 Amino acid; protein (2)

5.4 Catabolism; anabolism (2)

5.5 Sex chromosome; autosome (2)

QUESTION 6

SHORT QUESTIONS [35]

6.1 State the **procedure** of precautions to be considered **when using a microscope**. (3)

6.2 What is the difference between dehydration synthesis reactions (condensation reaction) and hydrolysis? (2)

6.3 Define nucleolus and state its function? (2)

6.4 Give two examples for each of the following (a) integral proteins and (b) peripheral proteins. (4)

6.5 Distinguish between passive transport and active transport. (4)

6.6 Explain the effect of a hypertonic solution that surrounds an animal cells. (2)

6.7 Differentiate between cellular respiration and oxidative phosphorylation. (2)

6.8 Tabulate the difference between the **Cyclic Photophosphorylation** and the **Non-cyclic Photophosphorylation**. (10)

6.9 Give the complementary sequence of the following DNA sequence, **TTAGGC**. (1)

6.10 A cell in the basal layer of the skin contains 27 chromosomes and divides by mitosis to produce new skin cells. After ten successive divisions, how many chromosomes will the basal cell have? (1)

- 6.11 Cattle contain 16 chromosomes.
- (a) How many homologous pairs of chromosomes does it contain? (1)
- (b) How many chromosomes are present in its cells during metaphase? (1)
- 6.12 If yellow flower colour in a plant is controlled by an allele F and green flower colour is controlled by an allele f .
- (a) Which flower colour is dominant? (1)
- (b) If true-breeding yellow-flowered plants are crossed with true-breeding green-flowered plants, what will be the flower colour(s) of the F1 plants? (1)

QUESTION 7

ESSAY QUESTION

[15]

- (a) Define **mitosis** and, (1)
- (b) Using sketches, describe the main stages of mitosis. (14)

END OF EXAM