



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGY, CHEMISTRY AND PHYSICS

QUALIFICATION: BACHELOR OF SCIENCE (MAJOR AND MINOR)	
QUALIFICATION CODE: 07BOSC	LEVEL: 5
COURSE NAME: GENERAL BIOLOGY 1A	COURSE CODE: GNB501S
SESSION: JULY 2023	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SUPPLEMENTARY/SECOND OPPORTUNITY QUESTION PAPER	
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MODERATOR:	Dr. Lamech Mwapagha

INSTRUCTIONS	
<ol style="list-style-type: none">1. Answer ALL the questions.2. Write clearly and neatly.3. Number the answers clearly.4. All written work MUST be done in BLUE or BLACK ink.	

PERMISSIBLE MATERIAL

Scientific Calculator

THIS QUESTION PAPER CONSISTS OF EIGHT (8) PAGES
(Including this front page)

SECTION A: MULTIPLE CHOICE QUESTIONS

[20]

- There are 20 multiple choice questions in this section. Each question carries 1 mark.
- Answer **ALL** questions by selecting the **LETTER** with the correct answer.

1.1 Which among the following sentence is not correct about the organelles?

- A. They are found in all Eukaryotic cells.
- B. They are found in multicellular organisms.
- C. They coordinate to produce the cell.
- D. All of the above

1.2 Which of the following cell organelles does NOT contain DNA?

- A. Nucleus
- B. Lysosomes
- C. Chloroplast
- D. Mitochondria

1.3 The fluidity of the plasma membrane increases with_____

- A. Increase in unsaturated fatty acids in the membrane
- B. Increase in saturated fatty acids in the membrane
- C. Increase in glycolipid content in the membrane
- D. Increase in phospholipid content in the membrane

1.4 _____ is the first step in cellular respiration that begins releasing energy stored in glucose.

- A. Alcoholic fermentation
- B. Lactic acid fermentation
- C. Glycolysis
- D. Electron transport chain

1.5 Name the three carbon molecule produced when glucose is broken down during the first step in cellular respiration.

- A. Pyruvic acid
- B. Lactic acid
- C. Acetyl Co-A
- D. Citric acid

1.6 What, approximately, is the fraction of genetic variation in the nuclear genome is that is expected to have a harmful effect on gene function?

- A. 50%.
- B. 25%.

- C. 10%.
- D. 1%.

1.7 Animal cells do NOT have _____.

- A. centrioles
- B. centromeres
- C. cell plates/walls
- D. cytoplasm

1.8 The scientist used restriction enzymes for what purpose in the experiment?

- A. To make the plasmid small enough to transform cells
- B. To make cuts in the plasmid DNA
- C. To make the plasmid enter the cells
- D. To enable the fragments of DNA to form covalent bonds

1.9 Most of the life of any cell is spent in a period of growth called _____.

- A. telophase
- B. prophase
- C. interphase
- D. anaphase

1.10 Identify the option which is NOT a process of the cell cycle?

- A. death
- B. division
- C. development
- D. growth

1.11 During which stage of interphase do cells perform their normal cell functions (such as growing and making enzymes to digest your food)?

- A. S stage
- B. G1 stage
- C. G2 stage
- D. Mitosis

1.12 During which stage of interphase do cells copy their DNA?

- A. S stage
- B. G1 stage
- C. G2 stage
- D. Cytokinesis

1.13 Which best describes how a plant cell divides?

- A. A new cell plate and wall forms in the middle of the cell and two new cells are formed.
- B. The two cells twist apart.
- C. The membrane pinches shut in the middle of the cell and the cells are split apart.
- D. Plant cells do not divide.

1.14 How long does it take a cell to complete the cell cycle?

- A. 8 minutes
- B. 1 year
- C. 24 hours
- D. The time it takes depends on the type of cell that is dividing.

1.15 A represents the dominant allele and a represents the recessive allele of a pair. If, in 1000 offspring, 500 are aa and 500 are of some other genotype, which of the following are most probably the genotypes of the parents?

- A. Aa and Aa
- B. Aa and aa
- C. AA and Aa
- D. AA and aa

1.16 A form of vitamin D-resistant rickets, known as hypophosphatemia, is inherited as an X-linked dominant trait. If a male with hypophosphatemia marries a normal female, which of the following predictions concerning their potential progeny would be true?

- A. All of their sons would inherit the disease
- B. All of their daughters would inherit the disease
- C. About 50% of their sons would inherit the disease
- D. About 50% of their daughters would inherit the disease

1.17 Which of the following best describes the parents in a testcross?

- A. One individual has the dominant phenotype and the other has the recessive phenotype.
- B. Both individuals are heterozygous.
- C. Both individuals have the dominant phenotype.
- D. Both individuals have the recessive phenotype.

1.18 Which of the following is the most likely explanation for a high rate of crossing-over between two genes?

- A. The two genes are far apart on the same chromosome.
- B. The two genes are both located near the centromere.
- C. The two genes are sex-linked.
- D. The two genes code for the same protein.

1.19 If a single locus controls wing shape, then the alleles for this gene act as...

- A. dominant-recessive alleles
- B. incomplete-dominance alleles
- C. codominant alleles
- D. multiple alleles

1.20 Which of the following is an additional use of the gel electrophoresis technique?

- A. To express a gene
- B. To separate proteins in a mixture
- C. To ligate DNA fragments
- D. To transform *E. coli*

SECTION B

[80]

- There are **FIVE (5)** questions in this section. Answer all Questions.

QUESTION 2: FILL IN THE BLANK

[10]

- 2.1 A cell without a cell wall is termed as _____ (1)
- 2.2 It is the smallest cell _____ (1)
- 2.3 The DNA in our cells is susceptible to damage as a result of exposure to harmful radiation or to _____ mutagens. (1)
- 2.4 _____ is meiosis producing eggs & occurs in the female's ovaries (1)
- 2.5 This is the basis of the sexual process in organisms. It involves the production of special sex cells, called _____ (1)
- 2.6 Division of the nucleus, also called _____ (1)
- 2.7 Sister chromatids attach to each other by the _____ (1)
- 2.8 The hypothesis of a scientific method must be _____. (1)
- 2.9 Increase in apparent size is called _____ (1)
- 2.10 _____ is used to describe a gene affects more than one characteristic (1)

QUESTION 3: Short answer questions

[20]

- 3.1 Explain why the Golgi bodies are sometimes referred to as 'the shippers' (2)
- 3.2 List 3 similarities of animal cells and plant cells (3)
- 3.3 What is chemiosmosis? (3)
- 3.4 List the phases of the cell cycle (6)
- 3.5 In the tabular form compare Non-cyclic Photophosphorylation and Cyclic Photophosphorylation. (6)

QUESTION 4: TRUE OR FALSE

[20]

- 4.1 It contains genes and helps in inheritance or transfer of characters from the parents to the next generation (2)
- a. True
- b. False
- 4.2 The nucleic acids DNA and RNA are polymers of nucleotides. DNA is the genetic material and RNA is an intermediary during the process of protein synthesis. (2)
- a. True
- b. False
- 4.3 Guanine is occasionally methylated to give O-6-methylguanine which base pairs with adenine rather than with cytidine. (2)
- a. True
- b. False
- 4.4 In each nucleated cell, about 300-600 adenines are converted to 3-methyladenine per day (2)
- a. True
- b. False
- 4.5 Hydrolytic attack also commonly causes amino groups to be stripped from bases (deamination). (2)
- a. True
- b. False
- 4.6 Cytosines are often deaminated to give thymine's. (2)
- a. True

b. False

4.7 Crosslinking of bases on opposing DNA strands is especially problematic for cells because it presents an obstacle to DNA replication (the replication fork stalls). (2)

a. True

b. False

4.8 Double strand DNA breaks are a challenge for cells because if repair is not affected immediately the ends can drift apart quickly making correct repair impossible. (2)

a. True

b. False

4.9 Repair of double stranded DNA breaks is easier in cells prior to DNA replication than after DNA replication has occurred. (2)

a. True

b. False

4.10 Each person makes many millions of different HLA proteins so as to be able to recognize and bind foreign antigens. (2)

a. True

b. False

QUESTION 5: Essay Questions [30]

5.1 Explain the process of DNA replication (12)

5.2 Describe the various steps in Krebs cycle (12)

5.3 Explain the important differences between transcription and replication (6)

THE END