NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

SCHOOL OF NATURAL AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGY, CHEMISTRY AND PHYSICS

QUALIFICATION : BACHELOR OF SCIENCE (MAJOR AND MINOR)	
QUALIFICATION CODE: 07BOSC	**LEVEL:** 6
COURSE CODE: CEB601S	**COURSE NAME**: CELL BIOLOGY
SESSION: JULY 2023	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

SUPPLEMENTARY/SECOND OPPORTUNITY QUESTION PAPER	
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MODERATOR	DR JEYA KENNEDY

INSTRUCTIONS

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. What is the minimum distance for the eye to focus any object?
   A. 11 cm
   B. 25 cm
   C. 32 cm
   D. 42 cm

2. The movement of water molecules from an area of high concentration to an area of low concentration through a semipermeable membrane is known as;
   A. Active Transport
   B. Diffusion
   C. Phagocytosis
   D. Osmosis

3. Which of the following statements about the TCA cycle is correct?
   A. Oxygen is used to oxidise the acetyl group carbons of acetyl-CoA in the TCA cycle
   B. Oxygen is not used in the TCA cycle, so the cycle can occur in anaerobic conditions
   C. The TCA cycle produces the water that is formed during the complete oxidation of glucose
   D. Three molecules of NADH and one molecule of $FADH_2$ are produced in one turn of the TCA cycle

4. Which statement correctly outlines some of the main events in photosynthesis?
   A. A 5C carbohydrate accepts carbon dioxide and is then reduced by NADPH derived from photophosphorylation.
   B. A 3C carbohydrate is regenerated and reduced by hydrogen molecules derived from photophosphorylation.
   C. Photolysis uses light to produce reduced NADP and oxygen which are used to reduce a 3C carbohydrate.
   D. Photolysis produces NADPH and ATP which are used to reduce a 5C carbohydrate.

5. In which phase of the cell cycle is DNA replicated?
   A. G1 phase
   B. S phase
   C. G2 phase
   D. M phase

6. All of the following are part of a prokaryotic cell except;
   A. DNA
   B. A cell wall
   C. Ribosomes
   D. An endoplasmic reticulum

7. In a plant cell, DNA may be found;
   A. Only in the nucleus and mitochondria
   B. Only in the nucleus and chloroplasts
   C. In the nucleus, mitochondria, and chloroplasts
   D. In the nucleus, mitochondria, chloroplasts, and peroxisomes

8. Which of the following comes under the category of cell surface receptor?
   A. Enzyme linked receptors
   B. Ion-channel linked receptors
   C. G protein linked receptors
   D. All of these

9. Primer used for the process of polymerase chain reaction are _____.

   A. Single stranded DNA oligonucleotide
   B. Double stranded DNA oligonucleotide
   C. Single stranded RNA oligonucleotide
   D. Double stranded RNA oligonucleotide

10. At what temperature do annealing of DNA and primer takes place?

   A. 42°
   B. 54°
   C. 74°
   D. 96°

11. Which of the following statements about the generation of ATP in the electron transport chain is correct?

   A. The generation of ATP from ADP coupled to electron transfer occurs by substrate level phosphorylation as in glycolysis
   B. Electron transport generates a proton gradient across the outer mitochondrial membrane
   C. ATP synthase generation of ATP involves a rotating structure outside the inner mitochondrial membrane
   D. ATP synthase generation of ATP involves a rotating structure inside the inner mitochondrial membrane

12. Which of the following microscopy techniques, relies on the specimen interfering with the wavelength of light to produce a high contrast image, without the need for dyes or any damage to the sample?

   A. Conventional bright field light microscopy
   B. Phase contrast microscopy
   C. Electron microscopy
   D. Fluorescence microscopy

13. Which structure is the site of the synthesis of proteins that may be exported from the cell?
    A. Rough ER
    B. Lysosomes
    C. Plasmodesmata
    D. Free cytoplasmic ribosomes

14. What are scaffolding proteins?
    A. Microtubular protein arrays that allow lipid-soluble hormones to get from the cell membrane to the nuclear pores
    B. Large molecules to which several relay proteins attach to facilitate cascade effects
    C. Relay proteins that orient receptors and their ligands in appropriate directions to facilitate their complexing
    D. Proteins that can reach into the nucleus of a cell to affect transcription

15. A gas is most soluble in a liquid at
    A. Low temperature and low pressure.
    B. High temperature and high pressure.
    C. High temperature and low pressure.
    D. Low temperature and high pressure.

16. Synaptic signaling between adjacent neurons is like hormone signaling in which of the following ways?
    A. It sends its signal molecules through the blood.
    B. It requires calcium ions.
    C. It requires binding of a signaling molecule to a receptor.
    D. It persists over a long period.

17. Which of the following is **NOT** a fat-soluble vitamin?
    A. Vitamins A
    B. Vitamins B
    C. Vitamins D
    D. Vitamins K

18. The ribonucleotide polymer (5')GTGATCAAGC(3') could only form a double-stranded structure with;
    A. (5')CACTAGTTCG(3')
    B. (5')CACUAGUUCG(3')
    C. (5')CACUTTCGCCC(3')
    D. (5')GCTTGATCAC(3')

19. Which of the following glycosidic linkage found in maltose?
    A. Glucose (α-1 – 2β) Fructose
    B. Glucose (α1 – 4) Glucose
    C. Galactose (β1 – 4) Glucose
    D. Glucose (β1 – 4) Glucose

20. Potassium cyanide interferes with the formation of ATP. The use of potassium cyanide reduces the rate at which molecules of a certain chemical enter the cell. Select the process by which the molecules would normally enter the cell.
    A. Simple diffusion
    B. Active transport
    C. Facilitated diffusion
    D. Osmosis

END OF SECTION A

SECTION B [80]

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

Question 1 [19]

a) State **SIX (6)** important enzymes responsible for Krebs cycle reactions. (6)

b) Briefly describe **FOUR (4)** demerits of the confocal microscope. (8)

c) State **FIVE (5)** functions of the Nervous tissue. (5)

Question 2 [15]

a) Explain the role of each of the following enzymes involved in DNA replication (4)

I. DNA Polymerase:

II. Primase:

III. Helicase:

IV. Topoisomerase:

b) What is the fate of absorbed glucose by tissues in Eukaryotes? (6)

c) State **FIVE (5)** applications of Polymerase Chain Reaction. (5)

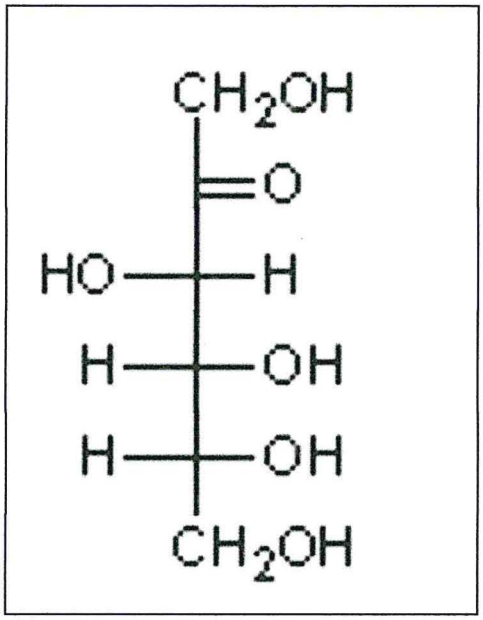
Question 3 [20]

a) State the **FOUR (4)** major Eukaryotic tissues types. (4)

b) Briefly describe **EIGHT (8)** functions of epithelial cells. (16)

Question 4 **[14]**

a) Using the line structure below draw both the α- form and β-form cyclic structures. (8)



b) Briefly delineate the main types of muscle tissue (6)

Question 5 **[12]**

a) Describe the **TWO (2)** types of Heterochromatin (4)

b) Briefly discuss the aerobic cellular respiration as a metabolic pathway that breaks down glucose and produces ATP (8)

END OF SECTION B

PERIODIC TABLE OF THE ELEMENTS

1	2											13	14	15	16	17	18
1 **H** 1.00794																	2 **He** 4.00260
3 **Li** 6.941	4 **Be** 9.01218											5 **B** 10.81	6 **C** 12.011	7 **N** 14.0067	8 **O** 15.9994	9 **F** 18.9984	10 **Ne** 20.179
11 **Na** 22.9898	12 **Mg** 24.305	3	4	5	6	7	8	9	10	11	12	13 **Al** 26.9815	14 **Si** 28.0855	15 **P** 30.9738	16 **S** 32.06	17 **Cl** 35.453	18 **Ar** 39.948
19 **K** 39.0983	20 **Ca** 40.08	21 **Sc** 44.9559	22 **Ti** 47.88	23 **V** 50.9415	24 **Cr** 51.996	25 **Mn** 54.9380	26 **Fe** 55.847	27 **Co** 58.9332	28 **Ni** 58.69	29 **Cu** 63.546	30 **Zn** 65.38	31 **Ga** 69.72	32 **Ge** 72.59	33 **As** 74.9216	34 **Se** 78.96	35 **Br** 79.904	36 **Kr** 83.8
37 **Rb** 85.4678	38 **Sr** 87.62	39 **Y** 88.9059	40 **Zr** 91.22	41 **Nb** 92.9064	42 **Mo** 95.94	43 **Tc** (98)	44 **Ru** 101.07	45 **Rh** 102.906	46 **Pd** 106.42	47 **Ag** 107.868	48 **Cd** 112.41	49 **In** 114.82	50 **Sn** 118.69	51 **Sb** 121.75	52 **Te** 127.6	53 **I** 126.9	54 **Xe** 131.29
55 **Cs** 132.905	56 **Ba** 137.33	71 **Lu** 174.967	72 **Hf** 178.49	73 **Ta** 180.948	74 **W** 183.85	75 **Re** 186.207	76 **Os** 190.2	77 **Ir** 192.22	78 **Pt** 195.08	79 **Au** 196.967	80 **Hg** 200.59	81 **Tl** 204.383	82 **Pb** 207.2	83 **Bi** 208.908	84 **Po** (209)	85 **At** (210)	86 **Rn** (222)
87 **Fr** (223)	88 **Ra** 226.025	103 **Lr** (260)	104 **Rf** (261)	105 **Db** (262)	106 **Sg** (263)	107 **Bh** (264)	108 **Hs** (265)	109 **Mt** (268)	110 Uun (269)	111 Uuu (272)	112 Uub (269)		114 Uuq		116 Uuh		118 Uuo

Lanthanides:	57 **La** 138.906	58 **Ce** 140.12	59 **Pr** 140.908	60 **Nd** 144.24	61 **Pm** (145)	62 **Sm** 150.36	63 **Eu** 151.96	64 **Gd** 157.25	65 **Tb** 158.925	66 **Dy** 162.50	67 **Ho** 161.930	68 **Er** 167.26	69 **Tm** 166.934	70 **Yb** 173.04

Actinides:	89 **Ac** 227.028	90 **Th** 232.038	91 **Pa** 231.036	92 **U** 238.029	93 **Np** 237.048	94 **Pu** (244)	95 **Am** (243)	96 **Cm** (247)	97 **Bk** (247)	98 **Cf** (251)	99 **Es** (252)	100 **Fm** (257)	101 **Md** (258)	102 **No** (259)