UNIVERSITY OF JOHANNESBURG

FACULTY OF SCIENCE

DEPARTMENT OF BOTANY

LS1AFET

LIFE SCIENCE 1A FET

APK CAMPUS

EXAM

19 JUNE 2014

SESSION:	**12H30 – 15H30**
ASSESSOR:	**Ms E PRETORIUS**
INTERNAL MODERATOR	**Dr A NEL**
DURATION:	**3 HOURS**
TOTAL MARKS:	**150**

NUMBER OF PAGES: 8 PAGES

Please read the following instructions carefully:

1. Answer all the questions in the question paper.
2. Answer ALL of the questions in the test book.
3. Work neatly.
4. Read your questions carefully.
5. Good Luck.

QUESTION 1 **[18]**

Choose the alternative that best completes the statement or answers the question. ***Only write down the correct letter next to the appropriate question number in your answer book.***

1.1 _____ consists of nucleotides.

a) Sugars
b) DNA
c) RNA
d) Both b and c

1.2 Which of the following is not found in DNA?

a) Amino acids.
b) Nucleotides.
c) Sugars.
d) Phosphate groups.

1.3 Which of these is an example of a hydrolysis reaction?

a) Amino acid + amino acid → dipeptide + water
b) Denaturation of a polypeptide
c) Dipeptide + water → amino acid + amino acid
d) Both a and b are correct

1.4 Cell membranes consist mainly of a _____.

a) Carbohydrate bilayer and proteins
b) Lipid bilayer and proteins
c) Protein bilayer and phospholipids
d) Phospholipid bilayer and proteins

1.5 No plant cell has a _____

a) centrosome
b) lysosome
c) cell membrane
d) plasma membrane

1.6 Which of the following clues would tell you whether a cell is prokaryotic or eukaryotic?

a) The presence or absence of a rigid cell wall.
b) Whether or not the cell carries out cellular metabolism.
c) The presence of absence of a nuclear membrane.
d) Whether or not the cell contains DNA.

1.7 Cytoplasmic extensions of _____ send and receive chemical messages.

a) neuroglial cells
b) fibroblasts
c) neurons
d) melanocytes

1.8 _____ muscle pulls on bones and _____ muscle regulates the diameter of blood vessels.

a) Skeletal / cardiac
b) Skeletal / smooth
c) Smooth / cardiac
d) Smooth / skeletal

1.9 Straps of dense, white connective tissues _____.

a) connect muscles to bones
b) underlie the skin
c) Produce blood cells
d) Lack fibroblasts

1.10 Mitosis is always responsible for the formation of:

a) daughter cells with the haploid chromosome number.
b) daughter cells with the diploid chromosome number.
c) cells in which the number of chromosomes is not constant.
d) cells with new hereditary characteristics.

1.11 Mitosis ensures that each new cell produced by cell division will have:

a) an equal share of cytoplasm.
b) twice the number of chromosomes.
c) half the number of chromosomes.
d) the same number of chromosomes as the parent cell.

1.12 The nucleus of a plant cell has 16 chromosomes. How many chromosomes will each new (daughter) cell's nucleus have after mitosis?

a) 8
b) 16
c) 32
d) 4

1.13 The following are all examples of plant organs except:

a) roothairs
b) leaves
c) stems
d) roots

1.14 The following form part of the stems in plants, except:

a) nodes
b) trichomes
c) internodes
d) mycorhiza

1.15 The apical meristem is located near the tip of the:

a) stem
b) node
c) root
d) stems and roots

1.16 Which one of the following will decrease during the day, in a cell where photosynthesis is taking place? The amount of

a) Carbon dioxide
b) Oxygen
c) Chlorophyll
d) Carbohydrates

1.17 Which one of the following atmospheric gasses will disappear first when all chlorophyll containing plants are removed from the earth?

a) Nitrogen
b) Oxygen
c) Carbon dioxide
d) Water vapour

1.18 When green plants photosynthesize, they produce complex organic compounds. This process consists of ____.

a) A. sunlight energy that is converted to kinetic energy.
b) sunlight energy that is converted and stored as chemical energy.
c) heat-energy that is converted and stored as chemical energy.
d) chemical energy that is converted and stored as sunlight energy.

QUESTION 2 **[18]**

Give the correct biological term for each of the following statements. ***Only write down the correct term next to the appropriate question number on the answer sheet.***

2.1 Region on the surface of an enzyme where the substrate binds and where the reaction occurs.

2.2 Strong but flexible nitrogenous polysaccharide found in the exoskeleton of arthropods and in the cell walls of fungi.

2.3 Loss of an enzyme's normal shape so that it no longer functions, caused by a less than optimal pH and temperature.

2.4 Organelle enclosed by a double membrane and contains grana.

2.5 The type of proteins that facilitate the transport of polar (water and glucose) molecules through a membrane.

2.6 Channel proteins for the transport of water only.

2.7 Non-living cells that allows for expansion and contraction of connective tissues

2.8 Connective tissue that consist of mainly white collagen non-elastic fibres.

2.9 Large, round cells (grouped together) filled with fat or oil.

2.10 Gene-containing thread-like structure in the cell nucleus that is conspicuous during mitosis.

2.11 Cell division associated with growth in somatic cells.

2.12 The fibres that form during cell division that pulls the daughter chromosomes to the opposite poles.

2.13 Tissue that carries out transport of materials between the root and the shoot system.

2.14 Ground tissue that is external to the vascular tissue.

2.15 The outer protective covering of a non-woody plant.

2.16 The gas that is absorbed during the process of photosynthesis.

2.17 The light independent reaction of photosynthesis.

2.18 The green pigment within plants that is necessary for the conversion of sun energy to chemical energy.

QUESTION 3 **[12]**

Provide a short definition for each of the following:

3.1 Polypeptide.

3.2 Enzyme.

3.3 Substrate.

3.4 Leucoplasts.

3.5 Stroma.

3.6 Carrier protein.

3.7 Hyaline cartilage

3.8 Perichondrium

3.9 Lacunae

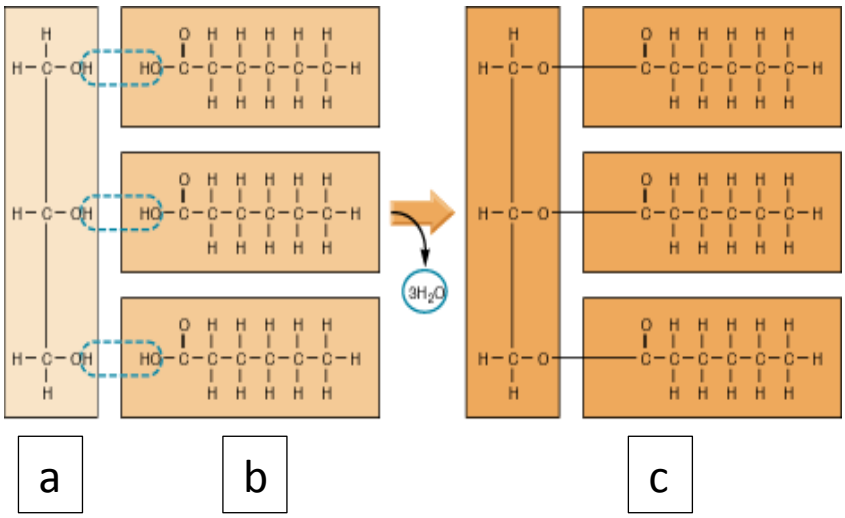
3.10 Centromere

3.11 Tumor

3.12 The coenzyme that is formed during the light dependent phase in photosynthesis.

QUESTION 4 **[17]**

4.1 Study the diagram below and answer the questions that follow:



4.1.1 Identify the process taking place in the diagram shown in 4.1? What type of bond is formed between two (2) and more of the final products. (3)

4.1.2 Provide labels for the molecules labelled (a to c) in the diagram in 4.1. (3)

4.1.3 The molecule labelled (b) in the diagram in 4.1 can either have double- or single bonds. List two differences between these three (3) types of molecules and supply an example of each? (8)

4.2 Identify the disease that will be caused by a deficiency in the following vitamins and/or minerals. (3)

4.2.1 Vitamin C (Ascorbic acid).

4.2.2 Vitamin B3 (Niacin).

4.2.3 Calcium/phosphor

QUESTION 5 **[17]**

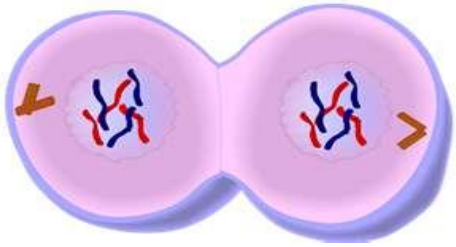
5.1 Tabulate three (3) differences between animal and plant cells. (6)

5.2.1 List two (2) organelles that consist of a double membrane and indicate in which cells they are found. (5)

5.2.2 One of these organelles referred to in 5.2.1 will only be present in one type of cell.
Make a labelled drawing of this specific organelle. (6)

QUESTION 6 **[17]**

6.1 Study the following diagram and answer the questions that follow.



6.1.1 Name the process that the cell in the diagram is undergoing. (1)

6.1.2 Which phase of the process in question 6.1.1 is depicted in the diagram? (2)

6.1.3 Draw and label the phase that will take place after the phase in the diagram. (5)

6.1.4 How many homologous chromosomes do humans have? (1)

6.1.5 How many chromosomes are present in the diagram above? (1)

6.1.6 Describe what happens during interphase of the cell cycle. (4)

6.1.7 Briefly discuss malignant tumors. (3)

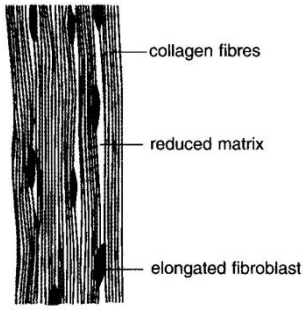
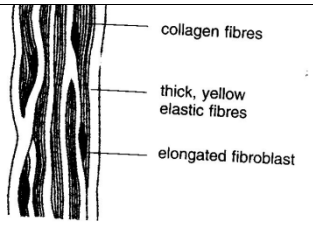
QUESTION 7 **[17]**

7.1 Name the specific type of connective tissue in which you would find fibroblasts and macrophages and provide a function for each. (3).

7.2 Study the pictures below to answer the questions that follow:

7.2.1 Identify the specific type of cell illustrated in each of the above pictures (A, B and C) and provide one (1) primary function of each cell. (6)

7.3 Redraw the table on your answer sheet and then complete the table by identifying the diagram. List ONE (1) LOCATION, AND TWO (2) FUNCTION of each of the two (2) different cells found in animal tissues: (8)

Tissue	Location	Function
		
		

QUESTION 8 **[16]**

8.1 Write down the letter of the description in Column B that fits the correct structure in Column A.
Only write down the correct answer next to the question number. (10)

COLUMN A	COLUMN B
8.1.1. Epidermis	A. Tissue that forms new cells.
8.1.2. Sieve-tubes	B. Make up the largest part of living tissue in plants.
8.1.3. Collenchyma	C. Single layer of cells that cover the entire plant.
8.1.4. Tracheids	D. Epidermal cells that can photosynthesise.
8.1.5. Xylem	E. Tissue group that includes fibres and stone cells
8.1.6. Parenchyma	F. Non-living cells found in Xylem.
8.1.7. Companion cells	G. Cells that have thickened walls and serves as mechanical strengthening.
8.1.8. Sclerenchyma	H. Consist of vessel elements.
8.1.9. Meristem	I. Transport sucrose and other organic substances.
8.1.10. Guard cells	J. Cells with nuclei that are found in phloem.
	K. The basic structural unit of tissue.

8.2 Draw and label the structures that play an important role in gaseous exchange in plants. (6)

QUESTION 9 **[18]**

9.1 Give two (2) examples of photosynthetic organisms. (2)

9.2 In what part of plant tissue and organelle does the process of photosynthesis take place? (1)

9.3 List the raw materials of photosynthesis. (3)

9.4 Explain the process of water absorption from the root to the cells of leaf. (5)

9.5 Explain the process of carbon dioxide uptake into leaf cells. (4)

9.6 Name the three (3) pigments involved in the process of photosynthesis. (3)

TOTAL 150