LSFT0A1

EXAM (UNIT 1-6)

JUNE 2017

TOTAL: 150

ASSESSOR:	**Ms E PRETORIUS**
INTERNAL MODERATOR	**Dr A NEL**
DURATION:	**3 HOURS**
TOTAL MARKS:	**150**

NUMBER OF PAGES: 11 PAGES

Please read the following instructions carefully:

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

QUESTION 1 **[18]**

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

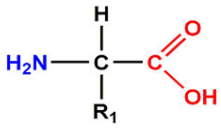
1.1 Peptide bonds are the bonds that forms in which macromolecule?

a. Carbohydrate.
b. DNA.
c. Lipid.
d. Protein.

1.2 Many aquatic birds secrete waxy organic substances that repel water. The birds use these substances to coat their feathers. An analysis of these substances would reveal that they are composed mostly of

a. lipids.
b. proteins.
c. carbohydrates.
d. nucleic acids.

1.3 The molecule shown below is the building block of



a. glucose.
b. water.
c. amino acid
d. protein.

1.4 What part of the cell will most likely contain polysaccharides such as starch?
a. Mitochondrion.
b. Chloroplast
c. Ribosome.
d. Nucleus.

1.5 Which structure regulates substances that enters and leaves the cell and provides protection and support?
a. Nucleus.
b. Ribosomes.
c. Cell wall.
d. Cell membrane

1.6 What organelle will contain digestive enzymes?
a. Nucleus.
b. Chloroplast.
c. Lysosome.
d. Golgi-apparatus.

1.7 The centromeres move toward the poles in _____
a. anaphase.
b. metaphase.
c. telophase
d.

1.8 In the life cycle of a human cell, each chromosome contains two chromatids by the end of the _____phase.
a. cytokinesis
b. mitosis
c. synthesis
d. growth 1

1.9 Each chromosome replicates to produce two (2) sister chromatids in _____
a. anaphase.
b. interphase.
c. prophase.
d. telophase.

1.10 The dark staining thread-like bodies within a cell nucleus are known as:

a. Centromeres.
b. Nucleoli.
c. Ribosomes.
d. Chromosomes.

1.11 The centrosome:

a. attaches two (2) chromatids together.
b. controls protein synthesis.
c. plays a role in cell division in plant cells.
d. plays a role in cell division in animal cells and lower plant only.

1.12 In a zygote, the chromosome number is:

a. always an odd number.
b. haploid.
c. half the number present in a gamete.
d. diploid.

1.13 The following are example of tissues in plants, except:

a. Protoderm
b. Vascular tissue
c. Ground tissue
d. Stomata

1.14 The following are example of modified roots, except:

a. Prop roots
b. Buttress roots
c. Strangling aerial roots
d. Mychorhiza

1.15 The following are example of ground tissue, except:

a. Epidermis
b. Collenchyma
c. Parenchyma
d. Sclerenchyma

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

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.

1.17 Which one of the following is NOT necessary for photosynthesis to take place?

a. Water
b. Chlorophyll
c. Oxygen
d. Carbon dioxide

1.18 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

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 The type of molecule with a distinct carbon skeleton of four (4) fused rings.
Steroids.
2.2 Type of molecule that could cause atherosclerosis.
Saturated fat.
2.3 Linear molecule called a strand.
Polynucleotide.
2.4 The structure that is filled with chlorophyll.
Thylakoids.
2.5 The membrane that encloses the organelle that contains chromatin.
Nucleomembrane.
2.6 The connections between cytoplasm of adjacent cells.
Plasmodesmata.
2.7 Type of cytoplasm division formed in animal cells.
Cleavage furrow.
2.8 The result of uncontrolled cell division.
Tumour.
2.9 The structure that forms between two (2) sister chromatids.
Centromere.
2.10 Carriers of the hereditary characteristics in nuclei.
Chromosomes.
2.11 The cytoplasmic organelle in animal cells that moves to the opposite poles during cell division.
Centriole/centrosome
2.12 Chromosomes arranged in identical pairs.
Homologous chromosome pairs.
2.13 Specialised epidermal cells on stems and leaves.
Trichomes
2.14 Specialised epidermal cells of roots.
Roothair
2.15 Spherical, loosely packed, big, thin-walled cells with large vacuoles.
Parenchyma cells

2.16 The green pigment within plants that is necessary for the conversion of sun energy to chemical energy.
Chlorophyll
2.17 The liquid part of a chloroplast.
Stroma
2.18 The part of a chloroplast where the light phase takes place.
Thylakoid

QUESTION 3 **[12]**

Provide a short definition for each of the following:

3.1 ATP / Adenosine triphosphate.
The energy molecule that contains a nitrogenous base.
3.2 Co-factors / co-enzymes.
Substances that help to bind the substrate to the active site.
3.3 Pentose sugar.
The polysaccharide that forms part of genetic material.
3.4 Pectin.
The polysaccharide responsible for elasticity in the cell wall.
3.5 Lignin.
The substance responsible for strengthening the cell wall found in woody plants.
3.6 Kinetochore fiber.
The spindle fibers that forms between centriole and centromeres of chromosomes.
3.7 Somatic cells.
Body cells.
3.8 Perichondrium
The fibrous capsule surrounding the cartilage tissue.
3.9 Lacunae
Small fluid-filled spaces in cartilage
3.10 Centromere
The structure connecting the duplicated chromosome.
3.11 Tumor
Cells that usually continue to divide well beyond a single layer, forming a clump of overlapping cells.
3.12 The coenzyme that is formed during the light dependent phase in photosynthesis.
NADPH

QUESTION 4 **[17]**

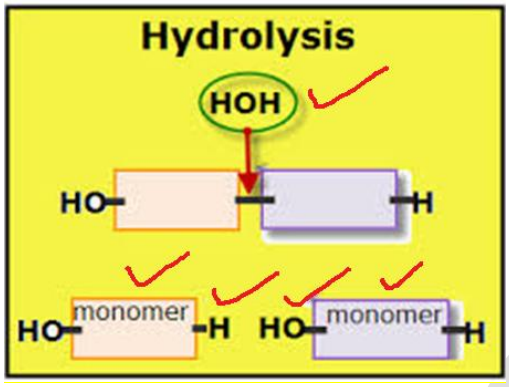
4.1 What type of disease will a person suffer from if the symptoms include distended abdomen, an enlarged liver, thinning hair and loss of teeth? (1)
Kwashiorkor.√

4.1.1 What causes the disease referred to in 4.1? (1)
Deficiency of proteins. √

4.2 What type of disease will a person suffer from if the symptoms include weak bones that crumbles and fractures easily? (1)
Osteoporosis. √

4.2.1 Provide three (3) examples of good food sources to avoid getting the disease referred to in 4.2? (3)
Any 3:
Calcium – milk, eggs, green vegetables.
Phosphorus – milk, eggs, grains, fish.

4.3 Use a diagram to discuss hydrolysis taking place in a macromolecule. (5)

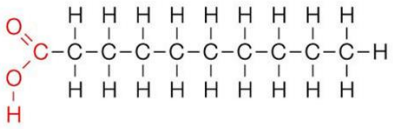


4.4 Provide one (1) **example and function** of a structural polysaccharide in plant and animal respectively. (4 x ½ = 2)

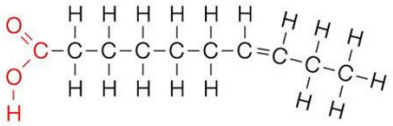
Plants: Cellulose √ (strengthen cell walls) √
Animals: Chitin √ (forms exoskeleton in crustaceans and insects) √

4.5 Draw two (2) different types of fat molecules and state another difference between each of the molecules. (4)

Saturated



Unsaturated



Saturated fats:
Any one (1):

- Solid/ hard fats at room temperature
- Fatty acid tails are able to pack together tightly
- From animals - like butter
- No double bonds between C-atoms – all carbons attached to hydrogen's (as many hydrogens atoms as possible are bonded to carbon skeleton saturated with hydrogen)
- No kinks in carbon chains
- cardiovascular diseases & complications (Cause atherosclerosis)

Unsaturated fats:
Any one (1):

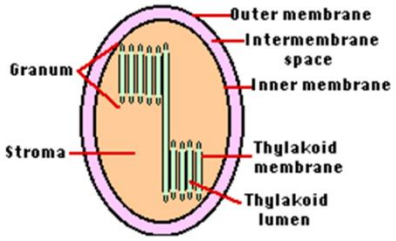
- Liquids at room temperature
- From plants and fish
- Kinks (double bonds) prevents fatty acids from packing together closely
- Form double bonds between some C-atoms (fewer hydrogen atoms on each double-bonded carbon)
- double bonds cause the kink
- Reduces chance of cardiovascular diseases & complications

QUESTION 5 [17]

5.1 Tabulate six (6) differences between plant and animal cells. (12 x ½ = 6)

PLANT CELL	ANIMAL CELL
Cell wall present	Cell wall absent
Regular shape	Irregular shape
Chloroplast present	Chloroplast absent
Large vacuoles	Small vacuoles
Stores starch molecules	Never store starch molecules, may have glygogen molecules.
Lysosomes present	Lysosome usually absent

5.2 Draw the organelle with a double membrane that will be present in plant cells only. (6)
Heading and any 5 labels.



The chloroplast

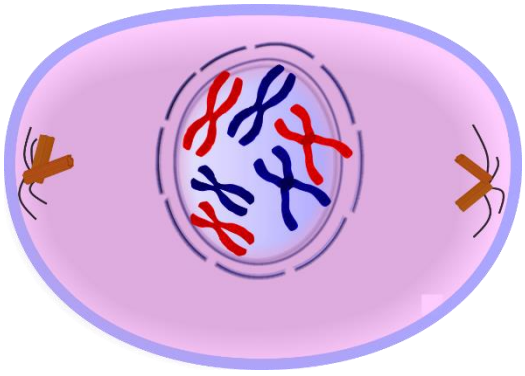
5.3 Write down in which organelle the following process takes place: (3)
a. Protein synthesis. - Ribosome
b. Photosynthesis. - Chloroplast
c. Cellular respiration. - Mitochondrion

5.4 Name and discuss the organelle where food particles can be digested. (4 x ½ = 2)
The vacuole:
Any 3 characteristics:

- Large vesicles (Membranous sac).
- Filled with cell sap (fluid inside vacuole).
- Causes turgor pressure in the vacuole.
- Different kinds of vacuoles: Food vacuole (digest food particles) + Contractile vacuole (regulate water concentration inside cell)
- Function: Stores various substances, including waste.
- Helps with osmotic potential of cell.

QUESTION 6 [17]

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



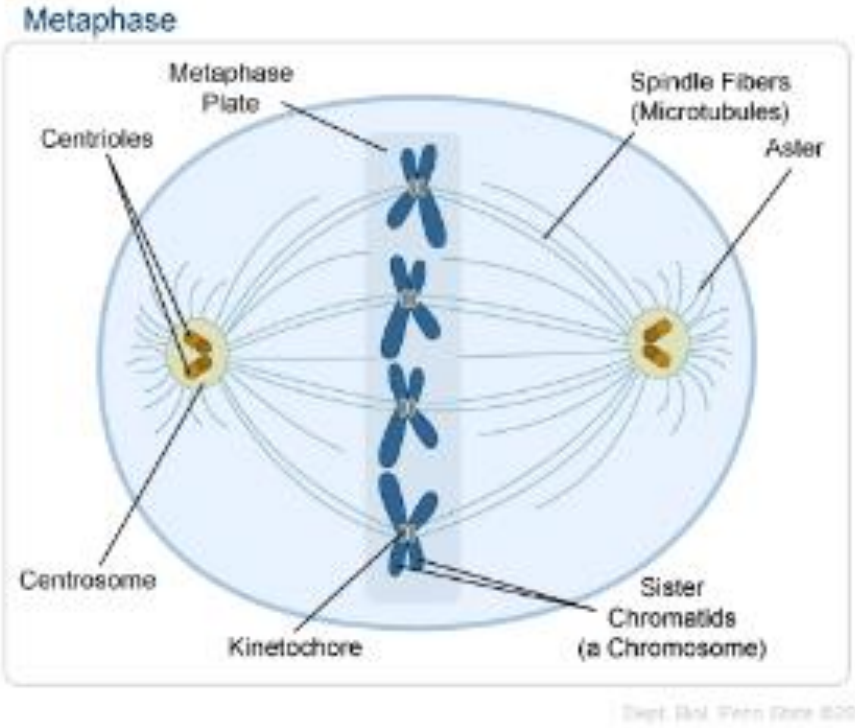
6.1.1 How many sister choromtids are present in the diagram above? (1)
Twelve (12) √

6.1.2 Name the process that the cell in the diagram is undergoing. (1)
Cell division. √

6.1.3 Which phase of the process in question 6.1.2 is depicted in the diagram? (2)
Mitosis: prophase. √

6.1.4 Name the phase that pave the way for the phase in the diagram above. (2)
Interphase √: (growth 1, synthesis and growth 2) √

6.1.5 Draw and label the phase that will take place after the phase in the diagram above. (4)
Heading: must be below diagram: 1 mark
Labels: any three (3) labels.



6.1.6 Give four (4) reasons why the process in question 6.1.2 is vital for survival of all living organisms. (4)

- Allow an organism to grow. √
- Repairs damaged cells/tissue. √
- Replace dead cells/tissue. √
- Reproduction in some simple organisms. √

6.2 Explain the disease known as cancer. (3)
Any 3:

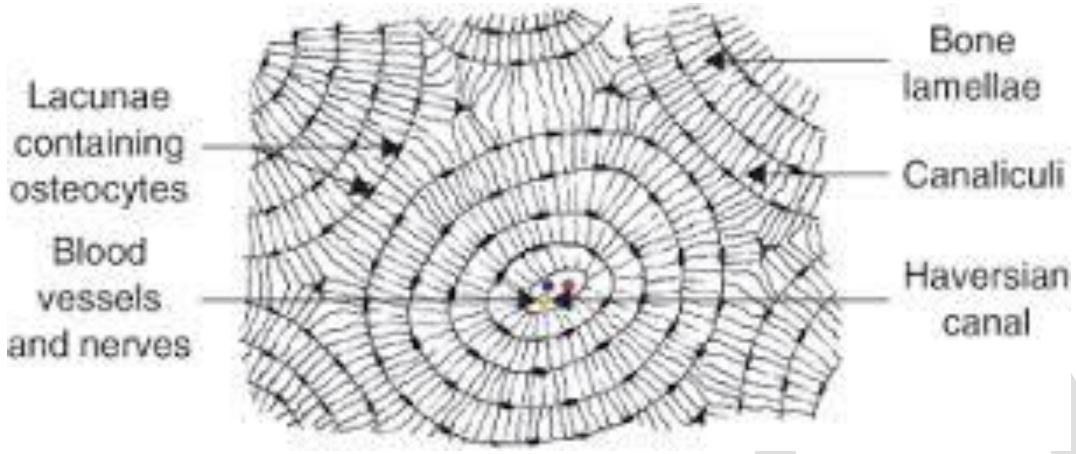
- Cancer is caused by the loss of cell cycle controls in cancer cells.
- Cancer cells usually continue to divide well beyond a single layer, forming a clump of overlapping cells called a tumour.
- Malignant tumors invade surrounding tissues and can metastasize (spread) exporting cancer cells to other parts of the body, where they may form secondary tumours.
- They do not exhibit anchorage dependence or density dependent inhibition.

QUESTION 7 **[17]**

7.1 Complete the following table by identifying three (3) types of cartilages, their structure, function and location in the body. (12)

	Type 1: Hyaline cartilage√	Type 2: White fibrous cartilage√	Type 3: Yellow elastic cartilage√
Structure	Any 1: √ • Contains fine collagen fibres. • White translucent matrix. (chondrin) • Cartilage tissue surrounded by fibrous capsule →perichondrium with blood vessels for nutrition. • Consists of living cells → chondrocytes. • Occur in small fluid-filled spaces →lacunae. (Cells are arranged singular or in groups).	Any 1: √ • Contains fine collagen fibres. • White translucent matrix. (chondrin) • Cartilage tissue surrounded by fibrous capsule →perichondrium with blood vessels for nutrition. • Consists of living cells → chondrocytes. • Occur in small fluid-filled spaces →lacunae. (Cells are arranged singular or in groups).	Any 1: √ • Contains fine collagen fibres. • White translucent matrix. (chondrin) • Cartilage tissue surrounded by fibrous capsule →perichondrium with blood vessels for nutrition. • Consists of living cells → chondrocytes. • Occur in small fluid-filled spaces →lacunae. (Cells are arranged singular or in groups).
Function	Any 1: √ • Reduce friction at joints • Attach bones firmly to other bones. • Keeps tubes open (C-shaped in trachea). • Forms permanent structures (nose). • Longitudinal growth of long bones.	Any 1: √ • It serves as shock absorbers between adjacent vertebrae. • It deepens sockets to make dislocation less easy.	Any 1: √ • Maintains shape & flexibility of ear lobe & tip of the nose. • It strengthens and supports ear, nose & epiglottis.
Specific location	Any 1: √ • Occurs at the ends of bones in movable joints. Parts of the larynx. • In the walls of the trachea and bronchi. • In between the ribs and the sternum. • On the tip of the nose	Any 1: √ • Occurs as disks between the vertebrae. • Surrounds the edges of the sockets of ball-and-socket joints. • Between the pubic bones in front of the pelvic girdle.	Any 1: √ • In the ear lobe • At the tip of the nose • In the epiglottis. • Septum of nose

7.2 Use a diagram with labels to show a cross section through bone. (6 x ½ = 3)



Cross section through bone

7.3 Where would you find the following connective tissues in your body?

7.3.1 Dense white fibrous connective tissue: (1)

Dermis of skin and tendons. √

7.3.2 Dense yellow fibrous connective tissue: (1)

In ligaments. √

QUESTION 8 **[16]**

8.1 Write down the letter of the description in Column B that fits the correct structure in Column A: (10)

COLUMN A		COLUMN B
1. Epidermis	C	A. Tissue that forms new cells.
2. Sieve-tubes	I	B. Make up the largest part of living tissue in plants.
3. Collenchyma	G	C. Single layer of cells that cover the entire plant.
4. Tracheids	F	D. Epidermal cells that can photosynthesise.
5. Xylem	H	E. Tissuegroup that includes fibers and stone cells
6. Parenchyma	B	F. Non-living cells found in Xylem.
7. Companion cells	J	G. Cells that have thickend walls and serves as mechanical strenghtening.
8. Sclernchyma	E	H. Consits of vessel elements.
9. Meristem	A	I. Transport sucrose and other organic substances.
10. Guard cells	D	J. Cells with nuclei that are found in phloem.
		K. The basic structural unit of tissue.

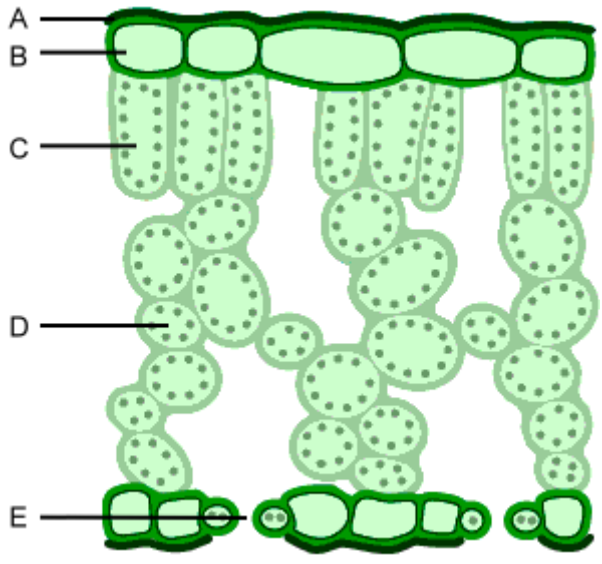
8.2 In the following table, the first column on each line consists of the names of two items, each represented by A or B. The second column contains a statement. Indicate by choosing (A) **or** (B) **or** (A and B) **or** (none) and then write down the correct answer next to the question number.

(6)

ITEM	STATEMENT
3.1 (A) Meristem (B) Epidermis	Contains outgrowths, like trichomes and thorns.
3.2 (A) Epidermal tissue (B) Collenchyma	Non-living cells.
3.3 (A) Collenchyma (B) Sclerenchyma	Gives mechanical strengthening and support.
3.4 (A) Xylem (B) Phloem	Photosynthetic tissue.
3.5 (A) Companion cells (B) Sieve-tubes	Components of vascular tissue.
3.6 (A) Sclerenchyma (B) Collenchyma	Cell walls with thickened corners

QUESTION 9 **[18]**

Study the diagram below (CROSS SECTION THROUGH A LEAF TO SHOW THE INTERNAL STRUCTURES). Answer the following questions.



9.1 Identify parts numbered (A) and (B) in the diagram. (2)

(A) - Cuticle √ and (B) upper epidermal cells. √

9.2 The organelle located inside the part numbered (C) in the diagram is mainly responsible for the process of photosynthesis.

(i) Name this organelle. (1)
Chloroplast. √

(ii) In what ways is this organelle best adapted for its specific function? (2)
*They have *thin cell membranes*, allows quick diffusion of CO_2, Water to inside and O_2 out of organelle, √
*They organize themselves for max absorption of light and contains grana with thylakoids that contain chlorophyll, chlorophyll is the photosynthesis pigment. √

9.3 (i) identify the cells numbered 4 in the diagram. (1)
Palisade mesophyll cells√

(ii) In what way are these cells best adapted for their role as photosynthetic tissue? (5)
*Found just underneath the epithelial cells in the leaf - for the efficient absorption of sunlight. √
*Is in close contact with the xylem and phloem - transport of water and products of photosynthesis, √
*Is in close contact with intercellular air spaces - for the quick transport of CO_2 and O_2 and water. √
*Long cells - Allow the diffusion of gasses in and out of cells. √
*Contain many chloroplast with chlorophyll – for max absorption of sunlight and thus max photosynthesis. √

9.4 Explain the process of carbon dioxide uptake into leaf cells. (4)
Diffuses from atmosphere√, stomata√, intercellular airspaces√, chloroplast√

9.5 Name the three (3) pigments involved in the process of photosynthesis. (3)
Chlorophyll a√, chlorophyll b√, carotenoids√

TOTAL 150