GREENBURY SECONDARY SCHOOL

DEPARTMENT OF MATHEMATICS AND SCIENCE

FINAL EXAM – 2016 - GRADE 10

LIFE SCIENCE – PAPER 1

Examiner: C.Jugdhaw **Duration: 2,5hrs**

Moderators: K. Govender , S.Singh, K Jairam **Marks: 150**

Name of Learner_____

Instructions to Learner:

1. This paper consists of FOUR questions and 11 printed pages.
2. Draw diagrams in pencil and label in ink
3. Write neatly and legibly
4. Answer ALL questions.

Section A

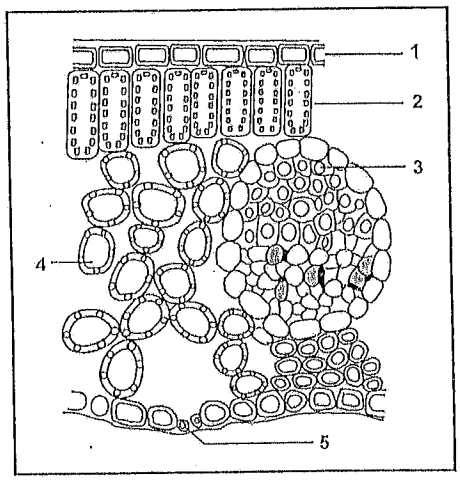
Question One

1.1 In each of the following questions, four possible answers are given. Choose the most appropriate answer and then write ONLY THE LETTER corresponding to it, next to the question number:

1.1.1 The so-called 'power-house' in a cell are known as
A. centriole
B. mitochondria
C. dictyosomes
D. vacuole

1.1.2 Which of the following is a function of the root-cap?
A. Produces new cells for the growing root.
B. Provides strength to the root
C. Protects the root apex.
D. Produces new cells for cell division.

1.1.3 Study the diagram below, which shows a cross section through a dicotyledonous leaf.



The cells labelled 2 are....

A. spongy mesophyll
B. palisade mesophyll
C. epidermal cells
D. guard cells

1.1.4 The organelle where proteins are synthesised:

A. nucleus
B. ribosomes
C. cytosol
D. mitochondria

1.1.5 Enzymes are specific in their functioning as a result of the...

A. influence of temperature
B. influence of pH
C. concentration of the enzyme
D. shape of the enzyme

1.1.6 Which one of the following is the site of photosynthesis in plant cells?

A. mitochondria
B. chloroplast
C. nucleus
D. cytoplasm

1.1.7 A ligament joins

A. two bones
B. bone to a muscle
C. two muscles
D. the femur to the radius

1.1.8 The reason for boiling the leaf in alcohol during the starch test is to...

A. break down the cell wall
B. remove starch from the leaf
C. make the leaf permeable to iodine solution
D. remove the chlorophyll from the leaf

1.1.9 A muscle cell is surrounded by a...

A. sarcoplasm
B. sarcolemma
C. neurilemma
D. myelin sheath (9x2)**18**

1.2 Give the correct biological term for each of the following descriptions.

1.2.1 Long, coil thread-like structures made up of DNA that are found in the nucleus.
1.2.2 Opening in a leaf through which gaseous exchange with the environment take place.
1.2.3 The model that describes the structure of cell membrane
1.2.4 Indicator used to test for starch.
1.2.5 The tiny pores found on woody stems.
1.2.6 Attractive forces between water molecules.
1.2.7 Collective term for chloroplast, chromoplast and leucoplast.
1.2.8 Organic catalysts that speed up chemical reactions
1.2.9 A bone disease that affects children because of a lack of vitamin D in their diets.
1.2.10 The structural and functional unit of life.

(10x1) **10**

1.3 Indicate whether each of the statements in Column 1 applies to **A only, B only, Both A and B** or **None** of the items in Column 11. Write **A only, B only, Both A and B or None** next to the question number.

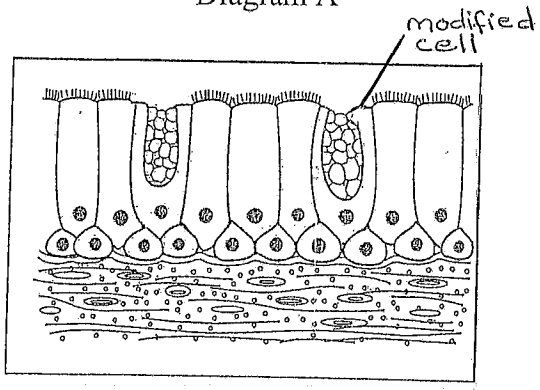
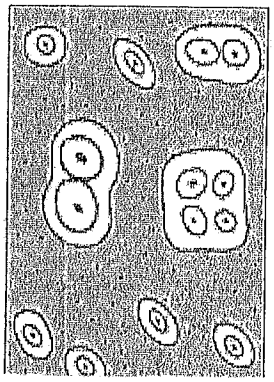
COLUMN 1	**COLUMN 11**
1.3.1 Vascular tissue in plants	A. xylem vessels B. sieve tubes
1.3.2 Neurons that carry impulses from receptors towards the central nervous system	A. sensory neuron B. motor neuron
1.3.3 Movement of water through a differentially permeable membrane	A. diffusion B. osmosis
1.3.4 The waxy layer on the outer surface of leaves	A. cuticle B. epidermis
1.3.5 Nutrients that are required in large amounts	A. micronutrient B. macronutrient

(5x2) **10**

PTO 1.4

1.4 Study the following diagrams of human tissue, that is found in the breathing system, and complete the table.

Write down only the numbers 1.4.1 to 1.4.6 one below the other and the correct answer next to it. **Do not redraw the table.**

	Diagram A	Diagram B
		
Type of tissue	1.4.1	1.4.2
Location	1.4.3	1.4.4
Function	1.4.5	1.4.6

(6)

1.4.7 Name the modified cell in diagram A. (1)**(7)**

1.5 The passage below is based on the modern biotechnology and cloning. Read the passage and answer the questions that follow.

As biotechnology has improved, scientists are now cloning animals. Scientists believe that once they have perfected the technique of cloning animals, they will be able to produce large numbers of good quality animals. At first scientists used cells from embryos to clone animals . Today clones are being produced from non-embryonic cells.

In South Africa, Futhi the cow is a cloned animal. "Futhi" means "again" in isiZulu. Futhi was cloned from a cell from the ear of a nine-year old cow that was a champion milk producer. Futhi is an identical copy of this cow.

1.5.1 What do you understand by the term "cloning"? (1)

1.5.2 Give TWO examples of what may be regarded as good quality animals other than the example given in the passage. (2)

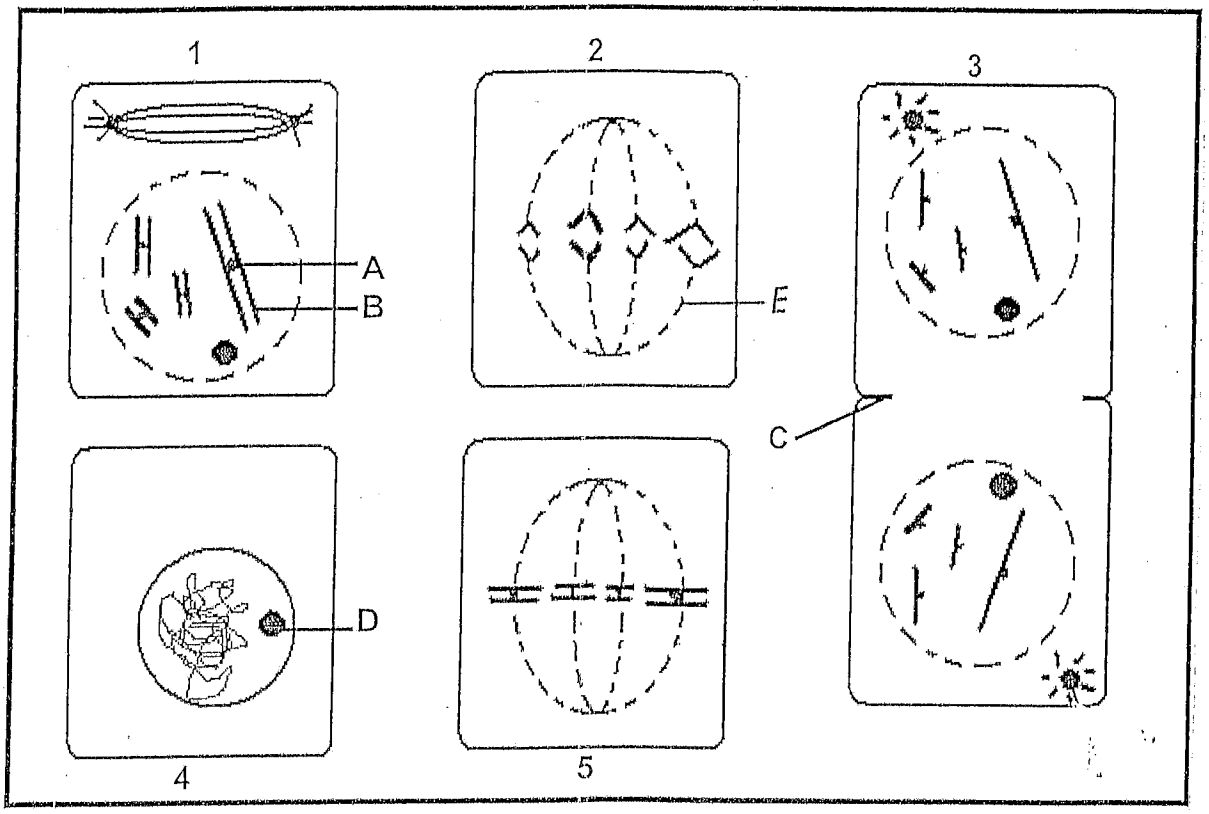
1.5.3 Predict TWO moral issues that people may raise as an objection to cloning. (2)**(5)**

TOTAL SECTION A: 50

PTO Section B

SECTION B
QUESTION TWO

2.1 Study the diagrams below which represent different phases of mitosis.



2.1.1 Provide a label for the marked structures **B** and **D.** (2)

2.1.2 List the function of structures **A** and **E.** (2)

2.1.3 By making use of NUMBERS ONLY, arrange the phases into the correct sequence. (1)

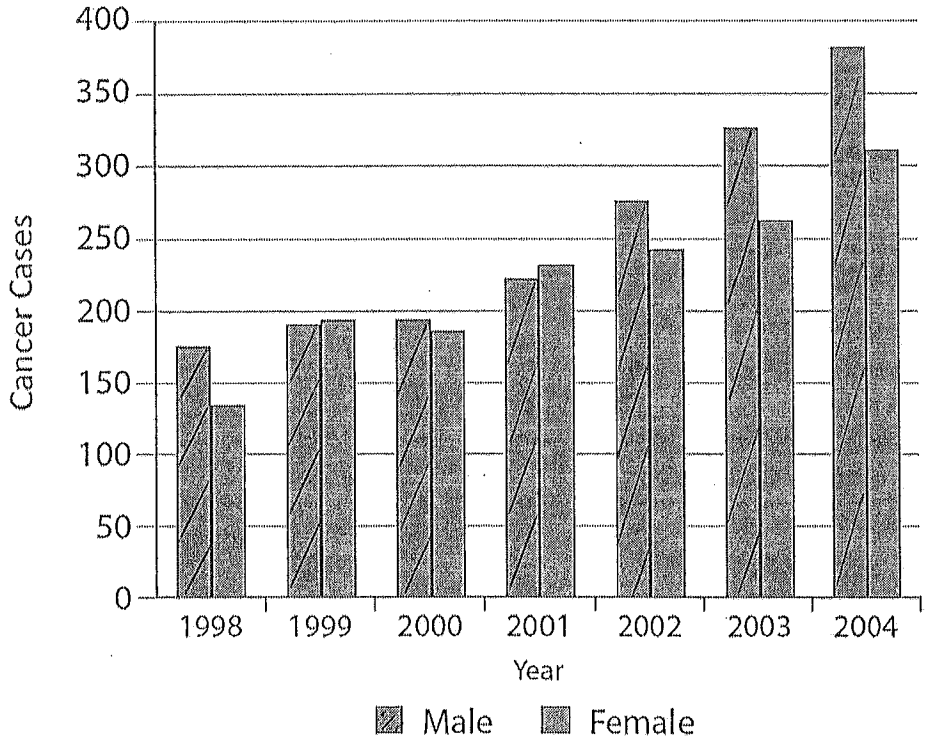
2.1.4 Write down the number of chromosomes in the daughter cell at the end of the process shown above. (1)

2.1.5 State ONE difference between plant and animal cells with regard to the process taking place at **C.** (2)

2.1.6 State TWO reasons why mitosis is a biologically important process. (2)

(10)

2.2 Cancer is a disease that begins in the cells. It affects both males and females alike. Study the bar graph below and answer the questions set.



2.2.1 What is cancer? (2)

2.2.2 (a) Name TWO female organs where cancer is common? (2)

(b) Name ONE male organ where cancer is common? (1)

2.2.3 Describe the trend of cancer in people from the above graph. (2)

2.2.4 State which gender is more prone to cancer in 2004 and suggest a reason for this. (2)

2.2.5 State ONE ways in which cancer can be treated. (1)

(10)

2.3 The table below shows the food value of a school lunch eaten by a 16-year old learner.

Food eaten	Protein (in grams)	Carbohydrates (in grams)	Fats (in grams)	Iron (in mg)	Vitamin C (in mg)
Sausages	9	5	24	1	0
Chips	8	70	20	2	20
Baked beans	10	20	1	3	4
Apple pie	5	60	25	1	1
Ice-cream	2	20	12	0	1
Fizzy drink	0	30	0	0	0

2.3.1 Which food eaten provides the most carbohydrates? (1)

2.3.2 State ONE reasons why carbohydrates are needed in the diet? (1)

2.3.3 The total energy value of his lunch is 6 600 kilojoules (kJ). In one day the learner needs 9 600 kilojoules.

(a) How many more kilojoules are needed by the learner to meet the daily requirements? (2)

(b) Explain what could possibly happen to the learner if more than 9 600 kilojoules of food is eaten per day over a period of time. (2)

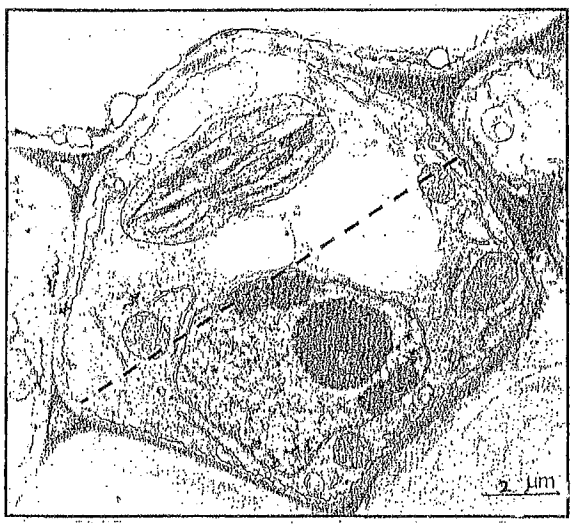
2.3.4 The learner was ill and stayed on a diet of ice-cream for one month.

2.3.4.1 Name the deficiency disease that the learner will suffer from. (1)

2.3.4.2 State ONE symptom of this disease (1)

2.3.4.3 Explain the consequences of disease mentioned in 2.3.4.1. (2) **(10)**

2.4 Study the electron micrographs and answer the questions set.

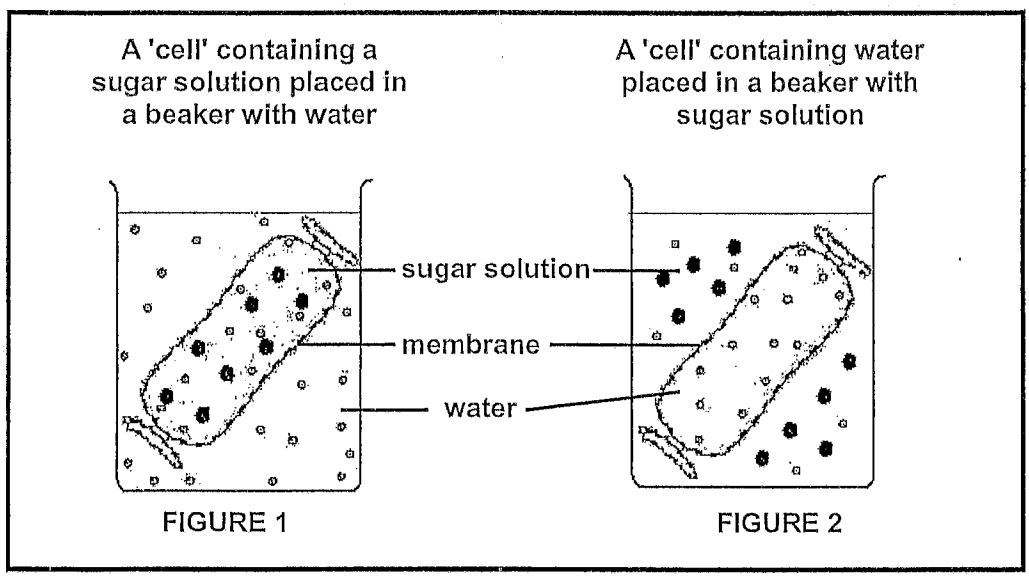


2.4.1 Is the electron micrograph of A that of a plant cell or an animal cell? (1)

2.4.2 Give ONE visible reasons for your answer. (1)

2.4.3 Use the scale line provided to find the actual width of the cell along the plane indicated by the dotted line. Show all working. (3) **5**

2.5 The diagram below illustrate a process through a differentially permeable membrane of a cell.

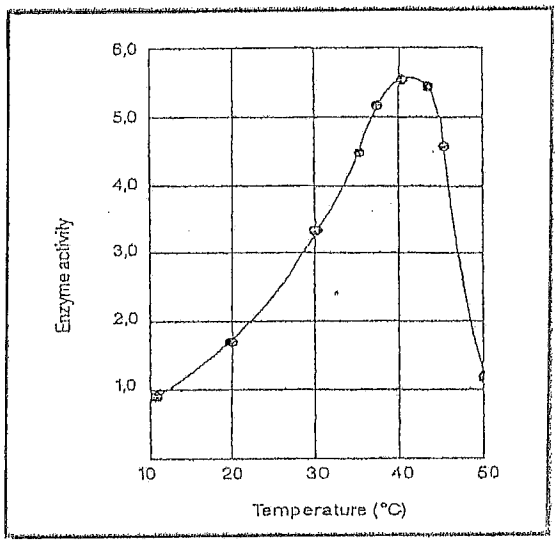


2.5.1 Describe what happens in FIGURE 2 and explain your answer by indicating in which direction the water moves and why. (5)

TOTAL 40 **(10)**

QUESTION 3

3.1 Study the following graph showing the effect of temperature on enzyme activity in an alkaline (base) medium.



3.1.1 Why does enzyme activity decrease when the temperature is greater than 40°C? (2)

3.1.2 From the graph, read off and write down the enzyme activity at 20°C. (2)

3.1.3 State the optimum temperature for enzyme activity. (2)

3.1.4 Name a substance you could add to the enzyme-substrate mixture in order to stop enzyme activity at 35°C. (2) **(8)**

3.2 A scientist investigated the effects of altitude on the number of red blood cells in a person's blood and got the following results.

Height above sea level (metres)	Millions of red blood cells in 1mm³of blood
1000	5.5
2000	6.1
3000	6.9
4000	8

3.2.1 Write a hypothesis for the scientist's investigation. (2)

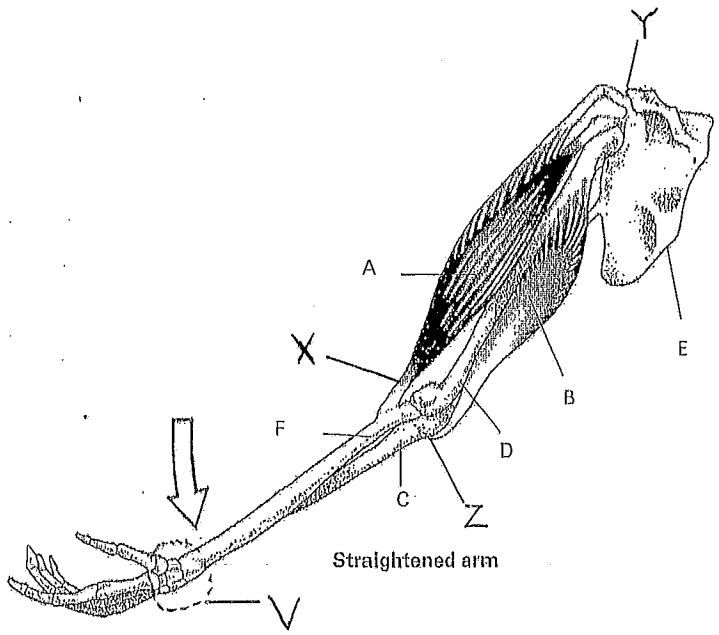
3.2.2 Identify the:

(i) Dependent variable (1)

(ii) Independent variable (1)

3.2.3 Draw a line graph to represent the data. (7) **(11)**

3.3 Study the diagram below and answer the questions that follow.



3.3.1 Provide labels for the muscles marked **A** and **B,** and the bones marked C, E and F.(5)

PTO 3.3.2...

3.3.2 Describe the function of part **X** when the arm is bent at the elbow. (4)

3.3.3 How does movement at joint **Y** differ from that at joint **Z?** (2)

3.3.4 What is osteoporosis and how is it caused? (2)

3.3.5 Name the joint found at point **V.** (2)

3.3.5 Draw and label a typical synovial joint. (6)

(21)

TOTAL 40

SECTION C

QUESTION 4

Describe the absorption of water by a root hair of a plant as well as the lateral movement of the absorbed water from the root hair to the xylem of the root. Also explain the different ways in which the xylem is structurally suited to transport water upwards in plants.

Content (17)

Synthesis (3)

Total (20)

NOTE: No marks will be awarded for answers in the form of tables, flow chart or diagrams.

GREENBURY SECONDARY SCHOOL
DEPARTMENT OF MATHS & SCIENCES
H.O.D. MR L PILLAY
28/10/2016

'CJ'

LIFE SCIENCE: GRADE 10 – PAPER 1 – 2016

SECTION A

1.1.1 B √√
1.1.2 C √√
1.1.3 B √√
1.1.4 B √√
1.1.5 D √√
1.1.6 B √√
1.1.7 A √√
1.1.8 D √√
1.1.9 B √√ (18)

1.2.1 chromatin material √
1.2.2 stomata √
1.2.3 fluid mosaic model √
1.2.4 iodine √
1.2.5 lenticel √
1.2.6 cohesive √
1.2.7 plastids √
1.2.8 enzymes √
1.2.9 rickets √
1.2.10 cell √ (10)

1.3.1 Both √√
1.3.2 A only √√
1.3.3 B only √√
1.3.4 A only √√
1.3.5 B only √√ (10)

1.4.1 ciliated √
1.4.2 hyaline √
1.4.3 trachea, nasal passage √
1.4.4 trachea rings/larynx √
1.4.5 traps dust particles from the air √
1.4.6 keeps the trachea open √
1.4.7 goblet cell √ (7)

1.5.1 - making an identical copy of itself/ duplicating an organism √

1.5.2 - high yield √
- good quality meat/lean meat √
- larger animals/more meat (2)

1.5.3 - against religion/don't play God √
- interferes with natural process √
- long term consequences
- is expensive (2)

SECTION A (50)

SECTION B

2.1.1 B – chromatid √ D – nucleolus √ (2)

2.1.2 A – holds the chromatids together √
E – contracts/ pulls the daughter chromosomes/chromatids to the poles √ (2)

2.1.3 4 1 5 2 3 √ (1)

2.1.4 4 √ (1)

2.1.5 plant – cell plate form/ cross wall √
Animal – invagination – furrow form at the equator/ √
- Cytoplasmic membrane constricts in the middle (2)

2.1.6 – growth √
- repair √ of worn or damaged tissue
- reproductive (2)

(10)

2.2.1 cells in the body starts to divide √ by mitosis in an uncontrolled manner √ (2)

2.2.2 a – breast cancer √ cervical cancer √ (2)

b – prostate cancer √ (1)

2.2.3 As the years increase √ the number of people with cancer increases √ (2)

2.2.4 male √ (1)

2.2.5 - chemotherapy √
- radiotherapy √
- surgery (2)

(10)

2.3.1 - chips √ (1)

2.3.2 - serve as a source of energy √
- serve as storage of fuel (energy) (1)

2.3.3 a – 3000 kJ√√ (2)
b – lead to obesity √
– increase in body weight √
– related to hypertension and
– cardiovascular disease (2)

2.3.4.1 - anaemia √ (1)

2.3.4.2 – weakness √, headaches, low blood pressure (1)

2.3.4.3 – shortage of haemoglobin √, leading to shortage of RBC √ (2)

2.4.1 - plant √ (1)

2.4.2 - chloroplast present √
- large vacuole
- cell wall (1)

2.4.3 $\frac{60/61\text{mm} \times 2}{10\text{mm}}$ √√
$= 12\mu m$√ (3)

2.5.1 - the cell shrinks √
- because the water is moving out √
- ex-osmosis √
- plasmolysis √
- water potential in the cell is higher √
- than the water potential outside √ Any 5 (5)

TOTAL 40

QUESTION 3

3.1.1 At temperature higher than the optimum, the enzymes become denatured √ thus slowing down √ the rate of enzyme activity. (2)

3.1.2 Approximately 1.7 √√ (2)

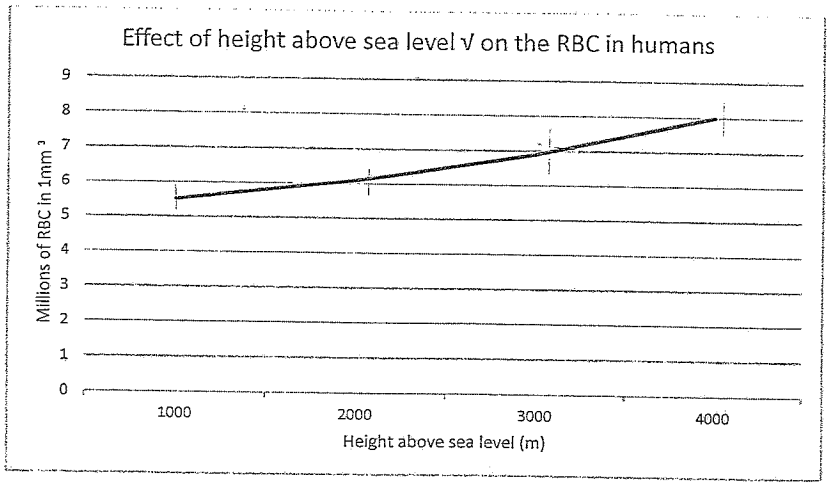
3.1.3 40 ° √C √ (2)

3.1.4 Any acid √√ (2)

3.2.1 An increase/decrease in altitude √ increase/ decrease √ the number of RBC in a person's blood. (2)

3.2.2 (I) Dependant – number of red blood cells √ (1)
(II) Independent – altitude √ (1)

3.2.3



3.3.1 A – bicep √
B – tri-cep √
C – ulna √
E – scapula √
F – radius √ (5)

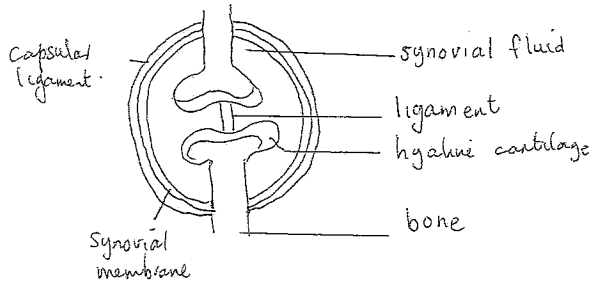
3.3.2 - connects muscle √ to bone √
- contraction of biceps √ cause the tendon to pull the radius towards the body √ (4)

3.3.3 Movement at Y is in all direction √/ 360°
X – movement at 180°/ up and down at one plane √ (2)

3.3.4 Weakening of bones √ / formation of pores in the bones/ brittle (1)
Cause – shortage of calcium √ in the body/vitamin D (1)

3.3.5 Gliding joint √√ (2)

3.3.6 Synovial joint ✓



TOTAL 40

Question 4 – ESSAY

Absorption of water

- Water potential of soil is high √
- water potential of root hair/vacuole is low √
- due to high solute in root hair √
- therefore water enters the root hair √
- by osmosis √ (5)

Lateral movement

- Major pathway √
- Most water moves from root hair/epidermis to endodermis by diffusion √
- Water moves along cell wall √
- Water moves via inter-cellular air spaces √

- Minor pathway √
- Some water moves through cortical cells/ cortex/vacuole/cell membrane √
- By osmosis √
- Water eventually enters endodermis √ and enter the stele/ xylem by osmosis √
- Passage cell √ Casparian strip prevents water entering phloem (6)

Structural suitability of xylem

Xylem vessel

- Are elongated/end to end √ - transport of water to great heights √
- Are non-living/dead √ - facilitate rapid movement of water √
- Have large lumen √ - allow unrestricted flow of water √
- Wall of the xylem elements are thickened/ contains lumen √
  - to withstand tension of cohesive and adhesive/strong force that cause the water to rise/prevent collapse √ (3 x 2 = 6)

RLC to do....