



# Atika School

Free Online Academy

231/2

Name ..... Index Number .....

School ..... Class .....

Candidates Signature..... Date .....

### INSTRUCTIONS TO CANDIDATES

- a) Write your name and index number in the spaces provided
- b) Sign and write the date of examination in the spaces provided
- c) Answer all questions in section A in the spaces provided
- d) In section B, answer question 6[COMPULSORY] and either question 7 or 8 in the spaces provided after question 8.

### For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A		8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
		20	
Total Score		80	

**SECTION A: 40 MARKS**

**ANSWER ALL QUESTIONS IN THIS SECTION IN THE SPACES PROVIDED**

1.[a] [i] State two functions of erythrocytes. [2 marks]

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[ii] Apart from the nucleus, which organelle is absent in erythrocytes but present in other animal cells? [1 mark]

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[b] In an investigation to determine the effect of exercise on pulse rate, students worked in pairs to determine their pulse rate before and after a vigorous exercise. Below is sample result obtained from one such pair:

Condition	Pulse rate[beats/min]	Average pulse rate
At rest	Student 1 = 62 beats/min Student 2 = 68 beats/min	
After exercise	Student 1 = 90 beats/min Student 2 = 86 beats/min	

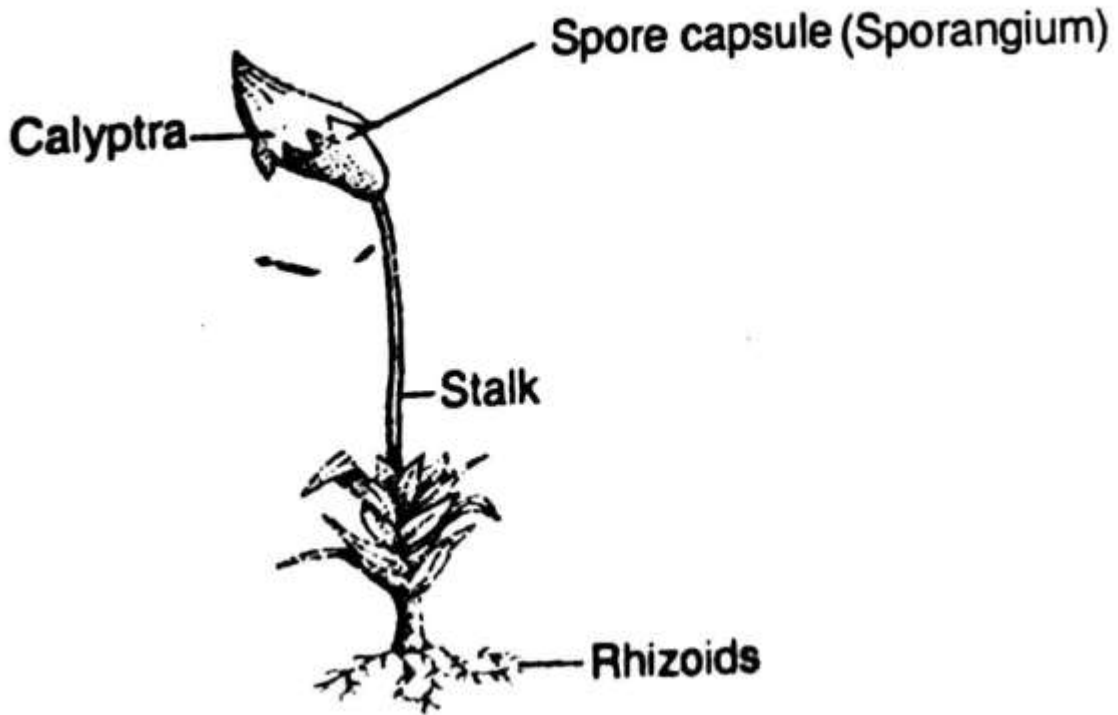
[i] Calculate the average pulse rate before and after the exercise. Show your working. [2 marks]

[ii] What is the effect of exercise on pulse rate? Explain [3 marks]

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2. The diagram below shows a plant specimen obtained from moist rock surface.



[a]

[i] State the division to which the specimen belongs [1 mark]

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[ii] Give two reasons[from the diagram] to support your answer in [i] above [2 marks]

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.....

[iii] What is the function of the Calyptra? [1 mark]

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[b] Give two reasons why the plant does not grow beyond 1cm tall [2 marks]

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[c] [i] What is alternation of generations? [1 mark]

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.....

[ii] Name the dominant generation for this plant [1 mark]

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3. [a] Sickle cell anaemia is a genetic condition in which the patient's red blood cells carry a defective haemoglobin called Haemoglobin S. Such red blood cells are sickle – shaped hence the name of the condition.

[i] Name the type of gene mutation that causes sickle cell anaemia [1 mark]

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[ii] Give three reasons why persons carrying haemoglobin S in their red blood cells may die easily under conditions of low oxygen levels. [3 marks]

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[iii] Apart from sickle cell anaemia, give one disorder resulting from gene mutation [1 mark]

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[b] State three key principles of Lamarck's theory of evolution [3 marks]

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4. [a] [i] Describe a simple laboratory test one would perform to confirm from a urine sample, if a person is suffering from *Diabetes mellitus*. [3 marks]

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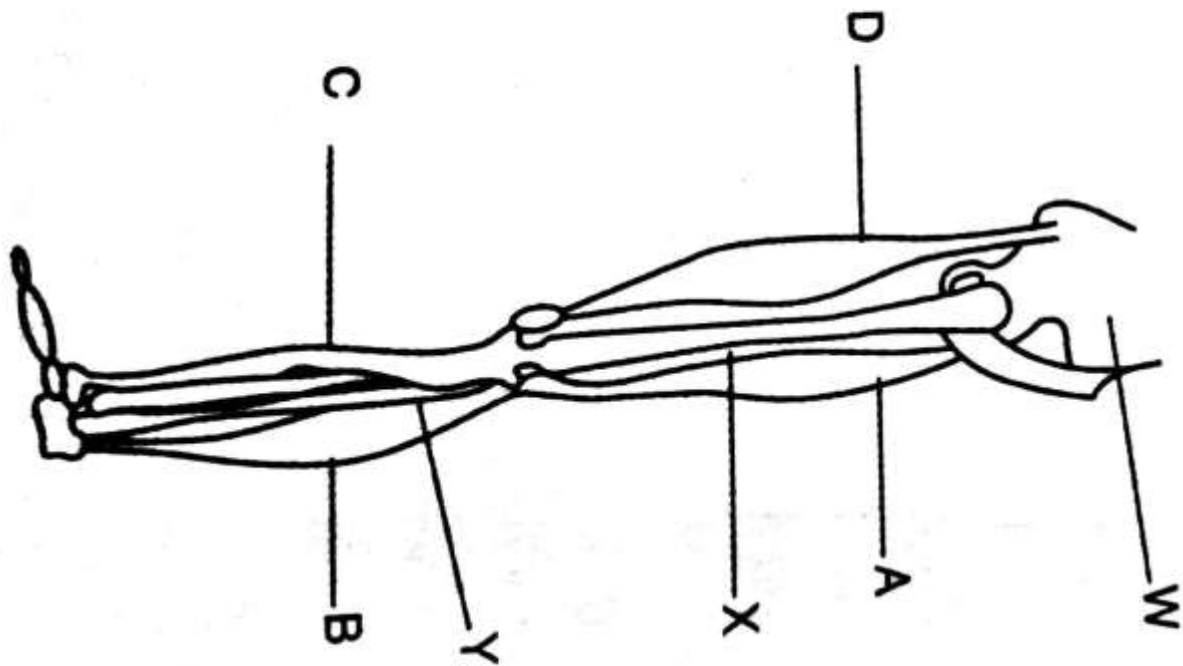
[ii] Which part of the nephron becomes defective in proteinuria patients? [1 mark]

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(b) State any four physiological mechanisms used by homoothermic mammals to regulate their body temperature on a hot sunny day

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5. The diagram below represents the structure of the human hind limb



[a]

Name the bones marked:

[3 Marks]

W.....

X.....

Y.....

[b] Which of the muscles A to D:

[2 marks]

[i] Must contract to raise the heel from the ground .....

[ii] Is antagonistic to the muscle named in [i] above.....

[c] Name the type of joint formed between

[2 marks]

[i] Bone X and Y.....

[ii] Bone X and W.....

[d] Name the structure that attaches muscles to bones in mammals

[1 mark]

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**SECTION B: 40 MARKS.**

ANSWER QUESTION 6[COMPULSORY] AND EITHER 7 OR 8 IN THE SPACES PROVIDED AFTER QUESTION 8.

6. In an experiment, 10 different strips of dandelion plant stems were placed into sugar solutions of different concentrations for about 30 minutes. Their lengths were determined before and after the treatment. All the strips were 50mm long before the experiment. The table below shows length of the strips in different sugar concentrations after the experiment.

7.

Sugar concentration [mg/mm <sup>3</sup> ]	0	20	40	60	80	100	120	140	160	180
Length of strip [mm]	58	56.5	54	53	51.5	48	46	43	41	40

[a] On the graph paper provided, plot a graph of length of strip against concentration of sugar solution. [6 marks]

[b] At what concentration would the length of the strip be: [2 marks]

[i] 55mm

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[ii] 44mm

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[c] From your graph, determine the cell sap concentration of the dandelion strip cells. Explain.

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.....[3 marks]

[d] Account for the length of the strips at:

[i] 0 mg/mm<sup>3</sup>

[3 marks]

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