Muscle

Question Paper 3

Level	International A Level
Subject	Biology
Exam Board	Edexcel
Topic	Respiration, Muscle and Internal Environment
Sub-Topic	Muscle
Booklet	Question paper 3

Time Allowed: **59 minutes**

Score: **/49**

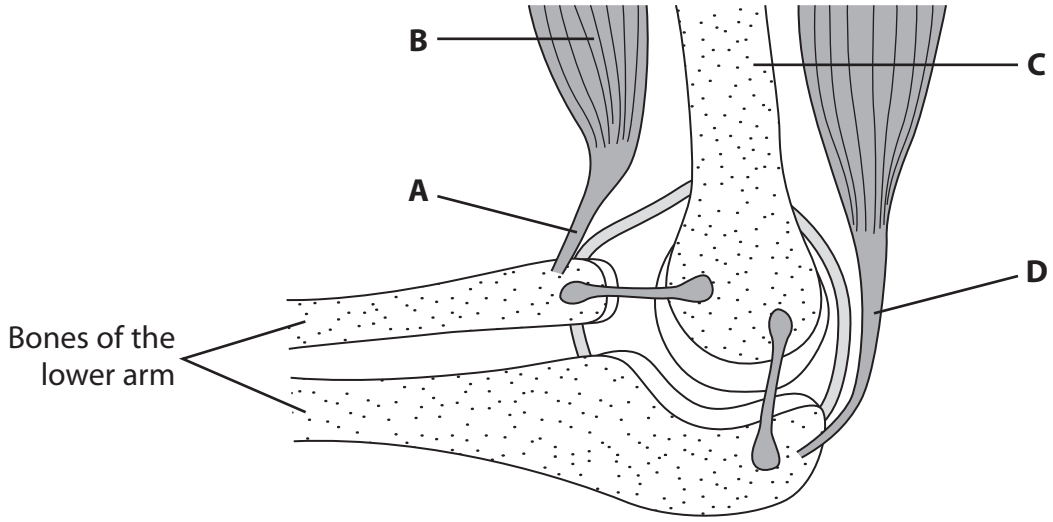
Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

1 (a) The knee and the elbow are both hinge joints.

The diagram below shows an elbow joint.



For each of the following questions, place a cross ☒ in the box that identifies the structure.

(i) The tendon attached to the flexor muscle is

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(ii) A ligament is attached to

(1)

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(iii) The structure with cells containing many nuclei is

(1)

- ☒ **A**
- ☒ **B**
- ☒ **C**
- ☒ **D**

(b) Moderate exercise is good for the health of a person.

(i) Give **two** reasons why too little exercise may not be good for the health of a person.

(2)

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(ii) Give **two** reasons why too much exercise may not be good for the health of a person.

(2)

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(Total for Question 1 = 7 marks)

2 The photograph below shows Usain Bolt, an elite sprinter. He won a gold medal in the 100 metre final at the 2012 Olympic Games in a time of 9.63 seconds.

(a) The skeletal muscles of elite sprinters are likely to have many fast twitch muscle fibres. Suggest why these muscles are less red in colour than muscles with many slow twitch muscle fibres.

(2)

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(b) The pH of the blood of a sprinter falls during a race and returns to its original level after the race.

(i) State the homeostatic control mechanism that returns the pH of blood to its original level.

(1)

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*(ii) Explain how the pH of the blood of a sprinter is returned to its original level after a race.

(5)

(iii) During the race, heat is generated and is lost from the body through the skin.

Describe how muscle, present in blood vessels in the skin, helps to increase heat loss from the body.

(4)

(Total for Question 2 = 12 marks)

3 The scientific article you have studied is adapted from the book called The Immortal Life of Henrietta Lacks by Rebecca Skloot. Published by Pan Books in 2011.

(a) Explain what is meant by the term **mitosis** (paragraph 7).

(2)

(b) The genome makes sure that cells 'do their jobs, whether that's controlling your heartbeat or helping your brain understand the words on this page' (paragraph 10).

Describe how cells in the sino-atrial node (SAN) are involved in controlling heart rate.

(3)

(c) Henrietta's cells have 'been used to study lactose digestion' (paragraph 16).

Suggest how her cells may have digested lactose.

(3)

(d) 'Like guinea pigs and mice, Henrietta's cells have become the standard laboratory workhorse' (paragraph 16).

Suggest **two** reasons why it is preferable to use Henrietta's cells in medical research, rather than using guinea pigs and mice.

(2)

*(e) 'By the end of 1951, the world was in the midst of the biggest polio epidemic in history' (paragraph 19). This was caused by poliovirus which can lead to paralysis (paragraph 20).

The virus infects motor neurones which can stop skeletal muscles from working.

Suggest how an infection of motor neurones by the virus can stop the transmission of nerve impulses and lead to muscle paralysis.

(6)

(f) Poliovirus, like Human Immunodeficiency Virus, is a retrovirus. Poliovirus was able to infect HeLa cells (paragraph 25).

Give **three** similarities between the structure of the genetic material in poliovirus and the genetic material in HeLa cells.

(3)

(g) Scientists had studied genes by breeding plants 'then breeding their offspring to see how genetic traits are passed from one generation to the next' (paragraph 33).

When this was done using a smooth pea and a wrinkled pea, it was found that in the F2 generation (second generation of offspring), 75% were smooth.

In the space below, draw genetic diagrams to describe and explain the genotypes of the parents and their offspring in the previous **two** generations.

(4)

(h) Explain what is meant by the term **human genome map** (paragraph 37).

(2)

(i) Suggest how the 'p53 tumor suppressor gene' (paragraph 43) could stop a potential tumour cell forming.

(2)

(j) Using paragraph 46, suggest what the 'specific DNA sequence from a blood cell' coded for.

(2)

(k) A human telomere (paragraph 60) contains 10 000 nucleotides. Using information from paragraph 58, state the number of telomere nucleotides lost per cell division.

(1)

Answer ..... nucleotides

(Total for Question 3 = 30 marks)