



**EXAM PAPERS PRACTICE**

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## **11.2 Movement**

Medium



# **BIOLOGY**

## **IB HL**

# 11.2 Movement

## Question Paper

Course	DPIB Biology
Section	11. Animal Physiology (HL Only)
Topic	11.2 Movement
Difficulty	Medium

Time allowed: 20

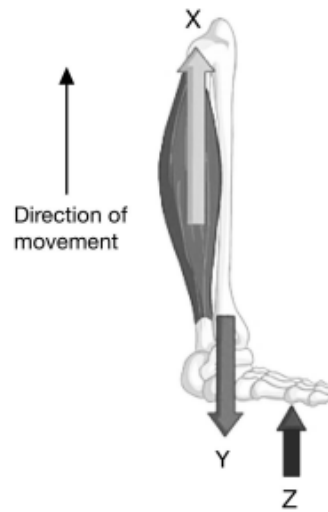
Score: /10

Percentage: /100



### Question 1

Identify which answer gives the correct labels when describing how the skeleton can act as a lever.

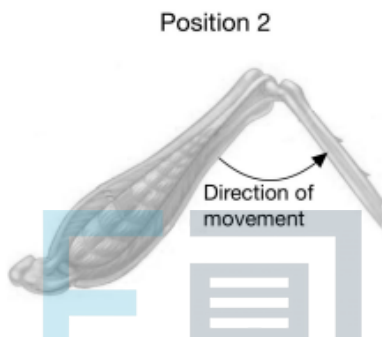
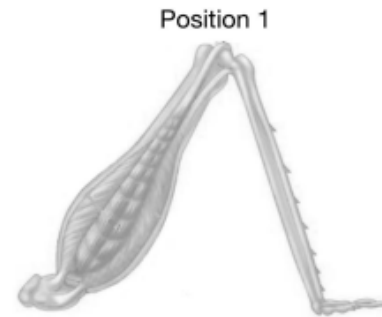


	X	Y	Z
A	Fulcrum	Effort	Load
B	Effort	Load	Fulcrum
C	Fulcrum	Load	Effort
D	Load	Fulcrum	Effort

[1 mark]

## Question 2

Select the correct answer to describe what is happening to the muscles in the insect leg to move from position 1 to position 2.



A	Flexor contracts	Extensor relaxes
B	Flexor relaxes	Extensor Relaxes
C	Flexor Contracts	Extensor contracts
D	Flexor relaxes	Extensor contracts

[1 mark]

## Question 3

Which of the following is **not** a range of movement demonstrated by a synovial joint such as an elbow or knee joint?

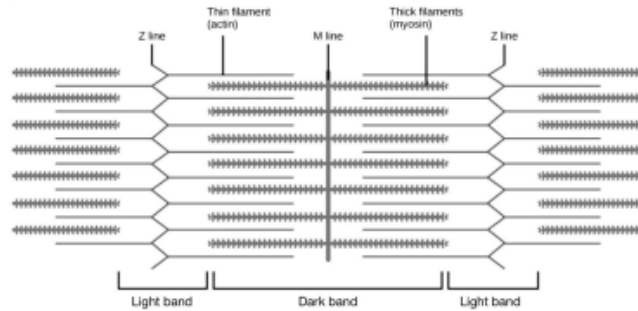
- A. Abduction
- B. Flexion
- C. Extension
- D. Inversion

[1 mark]



#### Question 4

The diagram below shows the sarcomere of a muscle fibre.



Which of the following statements correctly describes the events observed during a muscle contraction?

- A. The length of the sarcomere stays the same, the dark band gets longer and the light bands stay the same
- B. The length of the sarcomere gets shorter, the dark band gets shorter and the distance between the two Z lines gets shorter
- C. The length of the sarcomere stays the same, the dark band gets longer and the distance between the two Z lines gets shorter
- D. The length of the sarcomere gets shorter, the dark band stays the same and the light bands get shorter

[1 mark]

#### Question 5

One myosin powerstroke requires hydrolysis of one molecule of ATP and moves one actin filament 20 nm.

How many ATP molecules would be required to move a single actin filament 0.3  $\mu\text{m}$  when the sarcomere contracts?

- A. 150 ATP
- B. 15 ATP
- C. 20 ATP
- D. 1.5 ATP

[1 mark]

### Question 6

What is the role of calcium in muscle contraction?

- A. It initiates hydrolysis of ATP to ADP and phosphate
- B. It binds to tropomyosin causing a conformational change in the tropomyosin protein
- C. It binds to troponin resulting in myosin binding sites being exposed
- D. It binds to receptors on the myosin causing cocking of the myosin head

[1 mark]

### Question 7

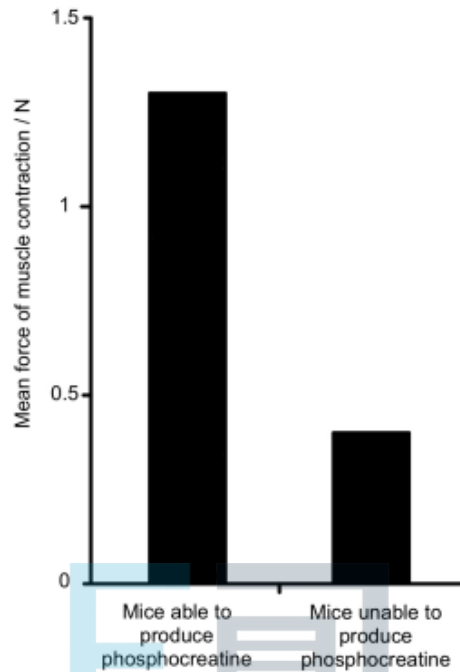
Which of the following describes a function of ATP in muscle contraction?

- A. To actively transport calcium ions into myofibrils from the sarcoplasmic reticulum
- B. To move tropomyosin and expose myosin binding sites
- C. To allow crossbridge formation
- D. To cause cocking of the myosin head

[1 mark]

### Question 8

Phosphocreatine is a chemical found in the muscles of vertebrates. It provides a store of phosphate ions used during muscle contraction. The graph shows the effect of phosphocreatine production on the force of muscle contraction in mice.



Which of the following best explains the results shown in the graph?

- A. Mice that can produce phosphocreatine can run faster.
- B. Phosphate ions can be combined with ADP to make ATP for contraction.
- C. Phosphate ions initiate the formation of crossbridges.
- D. Phosphate ions inhibit muscle contraction by creating an electrochemical gradient.

[1 mark]

### Question 9

Fluorescent proteins can be used to study muscle fibres during contraction.

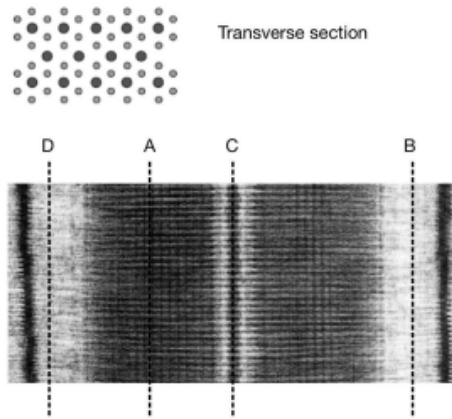
What is the reason for the fluorescence shown as the muscle contracts?

- A. Fluorescent protein reacts with calcium ions released during contractions
- B. Fluorescent protein binds to the myosin filaments when cross-bridges form
- C. Fluorescent proteins bind to the ADP released during muscle contraction
- D. Energy from ATP activates fluorescent proteins during muscle contraction

[1 mark]

**Question 10**

Identify the correct label from the electron micrograph which correctly represents the transverse section of muscle fibre shown.



[1 mark]