

Names' of student.....
School Name.....

BIOLOGY
PAPER II
P530/2
SENIOR SIX
JULY-AUGUST.



COMPREHENSIVE BIOLOGY TRANSFORMATION INITIATIVE.
UACE
RESOURCEFUL EXAMINATION
S.6 CANDIDATES-2023
PAPER 2
2 HOURS AND 30 MINUTES

INSTRUCTIONS TO THE CANDIDATES:

This paper consists of section A and B.

Answer question one in section A plus 3 questions in section B

Candidates are advised to read questions carefully, organize their answers and present them precisely and logically, illustrating with well labelled diagram wherever necessary.

N.B – QUESTION ONE IS COMPULSORY TO ALL CANDIDATES.

1. In an experiment to investigate the properties of skeletal muscles, skeletal gastrocnemius was carefully removed from the frog. The muscles was placed in a buffered well oxygenated saline solution and held by its tendons so that the changes in the tension can be measured by stimulating muscle using electric shocks to its motor nerve as shown in the fig 1.0A

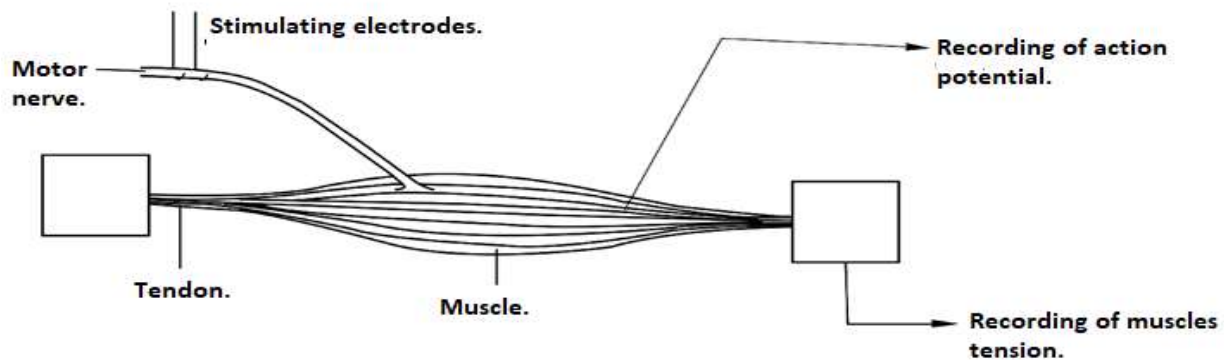


Fig 1.0A

Fig 1.0B shows the relationship between this contraction and action potential triggered by stimulus. Study the figures carefully and answer questions

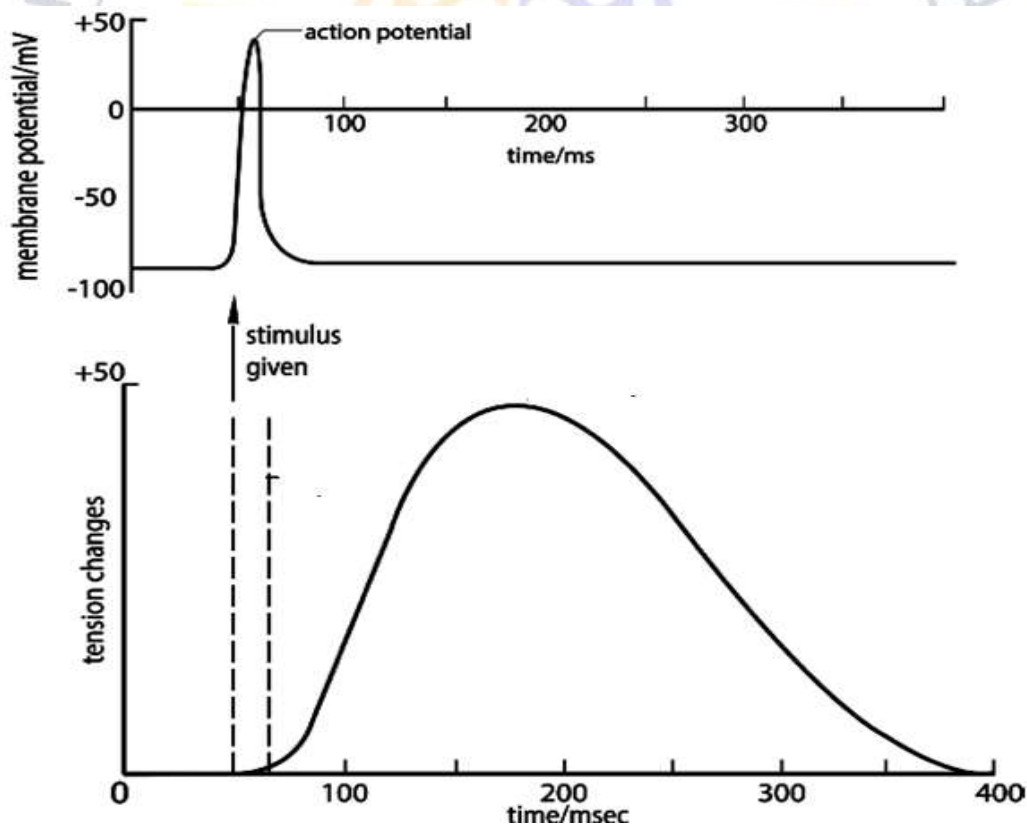


Fig 1.0B

- a) Compare the Curve for the action potential with that of the tension changes. (07 marks)
- b(i) Describe the relationship between action potential and tension. (10 marks)
- c) Account for
- (i) the relationship between action potential and tension changes. (15 marks)
- (ii) Time course of contraction is much slower than action potential. (03 marks)
- d(i) Explain why the muscle was bathed with a buffered well oxygenated saline solution. (05 marks)

SECTION B

- 2a) Describe the properties of the Cell Membrane. (05 marks)
- b (i) Explain the advantages of Milk being made up of lactose instead of glucose. (08 marks)
- (ii) Describe how the tertiary structure of enzymes is formed. (07 marks)
- 3a) Differentiate between the behavior of Rod cells in dark and light. (05 marks)
- b(i) Describe the electrical changes that can be measured during an action potential. (10 marks)
- (ii) Action Potentials are described as all or nothing. Suggest an explanation for the meaning of term. (05 marks)
- 4a) Explain the mechanism by which Genetic drift establishes a genetically unique population. (10 marks)
- b) The inheritance of banding in garden Snail, *Cepaea nemoralis* is controlled by two unlinked genes. Gene A/a and Gene B/b.
Gene A/a, A-Unbanded and a-Banded.
Gene B/b, B- Single banded and b-Five banded.
The presence of dominant allele, A blocks the functioning of alleles, B and b.
- (i) Provide F₁ individuals by considering a cross between pure breeding of the Unbanded and five banded parents. (05 marks)
- (ii) Work out the F₂ ratio by selfing the F₁ individuals. (05 marks)

5a) Explain the significances of the following metabolic pathways.

(i) Hatch slack pathway. (05 marks)

(ii) CAM pathway. (05 marks)

b) Describe the physical and chemical mechanisms by which solar energy is converted into chemical energy of ATP during the light stage of photosynthesis. (10 marks)

6a) what is meant by Pulmonary ventilation? (02 marks)

b(i) Explain Factors that affect the pulmonary ventilation of an organism. (10 marks)

(ii) Suggest why mountaineers have to ascend slowly. (08 marks)



Contributions made by Mugwe Martin Kampala-Uganda.