

NEET LOCOMOTION AND MOVEMENT — MECHANISM OF MUSCLE CONTRACTION (SLIDING FILAMENT THEORY) — PYQS

Max. Marks: 48

Questions: 12

Section A (MCQ) — 12 questions

Q.1 Choose the correct statements regarding muscle contraction.

Choose the correct answer from the options given below:

- A. A motor neuron carries a signal sent by the Central Nervous System (CNS) to the sarcolemma of the muscle fibre.
- B. The neural signal generates an action potential which causes the release of Ca^{++} into sarcoplasm.
- C. Increase in Ca^{++} inactivates the actin for breaking cross bridges.
- D. Actin binds to the myosin head to form a cross bridge.
- E. Shortening of sarcomere takes place, by pulling actin filaments towards the centre of 'A' band.

[NEET (UG) 2026]

- (1) A and B only
- (2) C and E only
- (3) C and D only
- (4) A, B, D and E only

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Q.2 Muscle contraction is initiated by a signal sent by the central nervous system by the release of ____.

[RE-NEET (UG) 2026]

- (1) cyclic adenosine monophosphate
- (2) acetylcholine
- (3) acetyl coenzyme A
- (4) cyclic guanosine monophosphate

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Q.3 Select the correct statements regarding mechanism of muscle contraction.

Choose the most appropriate answer from the options given below:

- A. It is initiated by a signal sent by CNS via sensory neuron.
- B. Neurotransmitter generates action potential in the sarcolemma.
- C. Increased Ca^{++} level leads to the binding of calcium with troponin on actin filaments.
- D. Masking of active site for actin is activated.
- E. Utilising the energy from ATP hydrolysis to form cross bridge.

[RE-NEET (UG) 2024]

- (1) B, C and E only
- (2) C, D and E only
- (3) A and D only
- (4) B, D and E only

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Q.4 According to the sliding filament theory:

[NEET (UG) 2022 (Phase 2)]

- (1) The actin filaments slide away from A-band resulting in shortening of sarcomere.
- (2) Actin and myosin filaments slide over each other to increase the length of the sarcomere.
- (3) Length of A-band does not change
- (4) I-band increases in length.

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Q.5 During muscular contraction which of the following events occur?

- A. 'H' zone disappears
- B. 'A' band widens
- C. 'I' band reduces in width
- D. Myosin hydrolyzes ATP, releasing the ADP and P_i .

E. Z-lines attached to actins are pulled inwards.

Choose the correct answer from the options given below.

[NEET (UG) 2021]

- (1) B, D, E and A only
- (2) A, C, D and E only
- (3) A, B, C and D only
- (4) B, C, D and E only

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Q.6 Calcium is important in skeletal muscle contraction because it

[NEET 2018]

- (1) detaches the myosin head from the actin filament
- (2) binds to troponin to remove the masking of active sites on actin for myosin
- (3) prevents the formation of bonds between the myosin cross bridges and the actin filament
- (4) activates the myosin ATPase by binding to it

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Q.7 Lack of relaxation between successive stimuli in sustained muscle contraction is known as

[NEET 2016 (Phase 1)]

- (1) tetanus (2) tonus (3) spasm (4) fatigue.

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Q.8 Name the ion responsible for unmasking of active sites for myosin for cross-bridge activity during muscle contraction.

[NEET 2016 (Phase 2)]

- (1) Calcium (2) Magnesium
(3) Sodium (4) Potassium

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Q.9 Sliding filament theory can be best explained as

[AIPMT 2015 (Cancelled)]

- (1) actin and myosin filaments do not shorten but rather slide past each other
(2) when myofilaments slide past each other, myosin filaments shorten while actin filaments do not shorten
(3) when myofilaments slide past each other actin filaments shorten while myosin filaments do not shorten
(4) actin and myosin filaments shorten and slide past each other.

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Q.10 Stimulation of a muscle fiber by a motor neuron occurs at

[AIPMT 2014]

- (1) the neuromuscular junction
(2) the transverse tubules
(3) the myofibril
(4) the sarcoplasmic reticulum.

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Q.11 During muscle contraction in humans, the

[NEET 2013 (Karnataka)]

- (1) sarcomere does not shorten
(2) A band remains same
(3) A, H and I bands shorten
(4) actin filaments shorten.

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Q.12 Which statement is correct for muscle contraction?

[AIPMT 2001]

- (1) Length of H-zone decreases
(2) Length of A-band remains constant
(3) Length of I-band increases
(4) Length of two Z-line increases

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ANSWER KEY

Ques.	1	2	3	4	5	6	7
Ans.	4	2	1	3	2	2	1
Ques.	8	9	10	11	12		
Ans.	1	1	1	2	1, 2		