

Locomotion and Movement — NEET Biology PYQ (2005–2021)

Class 11 Biology · 34 real NEET & AIPMT questions, year-tagged · answers checked by RankUp

NEET 2021

1. Chronic auto immune disorder affecting neuro muscular junction leading to fatigue, weakening and paralysis of skeletal muscle is called as :

- (A) Arthritis
- (B) Muscular dystrophy
- (C) Myasthenia gravis
- (D) Gout

NEET 2021

2. Match List - I with List - II.

List - I | List - II

- (a) Scapula | (i) Cartilaginous joints**
- (b) Cranium | (ii) Flat bone**
- (c) Sternum | (iii) Fibrous joints**
- (d) Vertebral column | (iv) Triangular flat bone**

Choose the correct answer from the options given below.

- (A) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)
- (B) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)
- (C) (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)
- (D) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

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3. During muscular contraction which of the following events occur ?

- (a) 'H' zone disappears**
- (b) 'A' band widens**
- (c) 'I' band reduces in width**
- (d) Myosine hydrolyzes ATP, releasing the ADP and Pi**
- (e) Z-lines attached to actins are pulled inwards**

Choose the correct answer from the options given below.

- (A) (a), (c), (d), (e) only
- (B) (a), (b), (c), (d) only
- (C) (b), (c), (d), (e) only
- (D) (b), (d), (e), (a) only

NEET 2020 · Q84

4. Match the following columns and select the correct option.

Column - I | Column - II

- (a) Floating Ribs | (i) Located between second and seventh ribs**
- (b) Acromion | (ii) Head of the Humerus**
- (c) Scapula | (iii) Clavicle**
- (d) Glenoid cavity | (iv) Do not connect with the sternum**

- (A) (a)-ii, (b)-iv, (c)-i, (d)-iii
- (B) (a)-i, (b)-iii, (c)-ii, (d)-iv
- (C) (a)-iii, (b)-ii, (c)-iv, (d)-i
- (D) (a)-iv, (b)-iii, (c)-i, (d)-ii

NEET 2019 · Q103

5. Which of the following muscular disorders is inherited ?

- (A) Tetany
- (B) Muscular dystrophy
- (C) Myasthenia gravis
- (D) Botulism

NEET 2019 · Q180

6. Select the correct option.

- (A) 8th, 9th and 10th pairs of ribs articulate directly with the sternum.
- (B) 11th and 12th pairs of ribs are connected to the sternum with the help of hyaline cartilage.
- (C) Each rib is a flat thin bone and all the ribs are connected dorsally to the thoracic vertebrae and ventrally to the sternum.
- (D) There are seven pairs of vertebrosteral, three pairs of vertebrochondral and two pairs of vertebral ribs.

NEET 2018 · Q141

7. Which of the following hormones can play a significant role in osteoporosis?

- (A) Estrogen and Parathyroid hormone
- (B) Progesterone and Aldosterone
- (C) Aldosterone and Prolactin
- (D) Parathyroid hormone and Prolactin

NEET 2018 · Q168

8. Calcium is important in skeletal muscle contraction because it

- (A) detaches the myosin head from the actin filament.
- (B) activates the myosin ATPase by binding to it.
- (C) binds to troponin to remove the masking of active sites on actin for myosin.
- (D) prevents the formation of bonds between the myosin cross bridges and the actin filament.

NEET 2017 · Q81

9. The pivot joint between atlas and axis is a type of:

- (A) fibrous joint
- (B) cartilaginous joint
- (C) synovial joint
- (D) saddle joint

NEET 2017 (Gujarati paper) · Q72

10. Which of the following type of muscle fibres will be the first one to undergo fatigue?

- (A) Slow oxidative fibres
- (B) Fast oxidative - glycolytic fibres
- (C) Fast glycolytic fibres
- (D) Aerobic fibres

NEET 2017 (Gujarati paper) · Q81

11. Which of the following is not a ciliary movement?

- (A) Removal of dust particles in trachea.
- (B) Passage of ova through female reproductive tract.
- (C) Movement of macrophages and leucocytes.
- (D) Food gathering in Paramecium.

NEET 2016 Phase 2 · Q151

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

- (A) Calcium
- (B) Magnesium
- (C) Sodium
- (D) Potassium

NEET 2016 Phase 2 · Q154

13. Osteoporosis, an age-related disease of skeletal system, may occur due to

- (A) immune disorder affecting neuro-muscular junction leading to fatigue
- (B) high concentration of Ca^{++} and Na^+
- (C) decreased level of estrogen
- (D) accumulation of uric acid leading to inflammation of joints

14. Lack of relaxation between successive stimuli in sustained muscle contraction is known as:

- (A) Spasm
- (B) Fatigue
- (C) Tetanus
- (D) Tonus

AIPMT 2015

15. Sliding filament theory can be best explained as:

- (A) When myofilaments slide past each other, Myosin filaments shorten while Actin filaments do not shorten
- (B) When myofilaments slide past each other, Actin filaments shorten while Myosin filaments do not shorten
- (C) Actin and Myosin filaments shorten and slide past each other
- (D) Actin and Myosin filaments do not shorten but rather slide past each other

AIPMT 2015

16. Glenoid cavity articulates:

- (A) humerus with scapula
- (B) clavicle with acromion
- (C) scapula with acromion
- (D) clavicle with scapula

AIPMT 2014

17. Select the correct matching of the type of the joint with the example in human skeletal system:

- (A) Pivot joint – between third and fourth cervical vertebrae
- (B) Hinge joint – between humerus and pectoral girdle
- (C) Gliding joint – between carpals
- (D) Cartilaginous joint – between frontal and parietal

AIPMT 2014

18. Stimulation of a muscle fiber by a motor neuron occurs at:

- (A) the transverse tubules
- (B) the myofibril
- (C) the sarcoplasmic reticulum
- (D) the neuromuscular junction

NEET 2013

19. Select the correct statement with respect to locomotion in humans:

- (A) A decreased level of progesterone causes osteoporosis in old people
- (B) Accumulation of uric acid crystals in joints causes their inflammation
- (C) The vertebral column has 10 thoracic vertebrae
- (D) The joint between adjacent vertebrae is a fibrous joint

NEET 2013

20. The characteristic and an example of a synovial joint in humans is

- (A) Fluid cartilage between two bones, limited movements – Knee joint
- (B) Fluid filled between two joints, provides cushion – Skull bones
- (C) Fluid filled synovial cavity between two bones – Joint between atlas and axis
- (D) Lymph filled between two bones, limited movement – Gliding joint between carpals

AIPMT 2012 Mains

21. Which one of the following pairs of chemical substances is correctly categorised?

- (A) Calcitonin and thymosin – Thyroid hormones
- (B) Pepsin and prolactin – Two digestive enzymes secreted in stomach
- (C) Troponin and myosin – Complex proteins in striated muscles
- (D) Secretin and rhodopsin – Polypeptide hormones

22. Select the correct statement regarding the specific disorder of muscular or skeletal system

- (A) Gout-inflammation of joints due to extra deposition of calcium
- (B) Muscular dystrophy-age related shortening of muscles
- (C) Osteoporosis-decrease in bone mass and higher chances of fractures with advancing age
- (D) Myasthenia gravis-Auto immune disorder which inhibits sliding of myosin filaments

23. Three of the following pairs of the human skeletal parts are correctly matched with their respective inclusive skeletal category and one pair is not matched.

Identify the non-matching pair.

- (A) Humerus and ulna - Appendicular skeleton
- (B) Malleus and stapes - Ear ossicles
- (C) Sternum and ribs - Axial skeleton
- (D) Clavicle and glenoid cavity - Pelvic girdle

24. The type of muscles present in our

- (A) Thigh are striated and voluntary
- (B) Upper arm are smooth muscle fibres fusiform in shape
- (C) Heart are involuntary and unstriated smooth muscles
- (D) Intestine are striated and involuntary

25. Which one of the following pairs of structures is correctly matched with their correct description?

Structures - Description

- (A) Tibia and fibula - Both form parts of knee joint
- (B) Cartilage and cornea - No blood supply but do require oxygen for respiratory need
- (C) Shoulder joint and elbow joint - Ball and socket type of joint
- (D) Premolars and molars - 20 in all and 3-rooted

26. Which one of the following is the correct description of a certain part of a normal human skeleton?

- (A) Parietal bone and the temporal bone of the skull are joined by fibrous joint
- (B) First vertebra is axis which articulates with the occipital condyles
- (C) The 9th and 10th pairs of ribs are called the floating ribs
- (D) Glenoid cavity is a depression to which the thigh bone articulates

27. Low Ca^{++} in the body fluid may be the cause of

- (A) Gout
- (B) Tetany
- (C) Anaemia
- (D) Angina pectoris

28. Which one of the following is the correct matching of three items and their grouping category?

- (A) ilium, ischium, pubis - coxal bones of pelvic girdle
- (B) actin, myosin, rhodopsin - muscle proteins
- (C) cytosine, uracil, thiamine - pyrimidines
- (D) malleus, incus, cochlea - ear ossicles

29. Elbow joint is an example of:

- (A) hinge joint
- (B) gliding joint
- (C) ball and socket joint
- (D) pivot joint

30. Which one of the following items gives its correct total number?

- (A) Cervical vertebrae in humans - 8
- (B) Floating ribs in humans - 4
- (C) Amino acids found in proteins - 16
- (D) Types of diabetes - 3

31. In human body, which one of the following is anatomically correct?

- (A) Collar bones - 3 pairs
- (B) Salivary glands - 1 pair
- (C) Cranial nerves - 10 pairs
- (D) Floating ribs - 2 pairs

32. The contractile protein of skeletal muscle involving ATPase activity is :

- (A) tropomyosin
- (B) myosin
- (C) α -actinin
- (D) troponin

33. An acromian process is characteristically found in the :

- (A) pelvic girdle of mammals
- (B) skull of frog
- (C) pectoral girdle of mammals
- (D) sperm of mammals

34. Which of the following pairs is correctly matched ?

- (A) Cartilaginous joint — skull bones
- (B) Hinge joint — between vertebrae
- (C) Fibrous joint — between phalanges
- (D) Gliding joint — between zygapophyses of the successive vertebrae

Answer key and explanations

1. Answer: (C) Myasthenia gravis

Myasthenia gravis is an autoimmune disorder of the neuromuscular junction causing fatigue, weakening and paralysis of skeletal muscle. Muscular dystrophy is a genetic degeneration of muscle, and arthritis and gout affect joints.

2. Answer: (D) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

The scapula is a large triangular flat bone, the cranial bones are joined by fibrous (immovable) joints, the sternum is a flat bone, and vertebrae are joined by cartilaginous joints. Hence (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i).

3. Answer: (A) (a), (c), (d), (e) only

During contraction myosin heads hydrolyse ATP, releasing ADP and P_i , and pull the actin filaments so the Z-lines move inward, the I band shortens and the H zone disappears; so (a), (c), (d) and (e) occur. The A band keeps its length, so its widening does not occur.

4. Answer: (D) (a)-iv, (b)-iii, (c)-i, (d)-ii

Floating ribs (11th and 12th pairs) do not connect with the sternum, the acromion process of the scapula meets the clavicle, the scapula lies between the second and seventh ribs, and the glenoid cavity receives the head of the humerus. Hence not joined to sternum, clavicle, between second and seventh ribs, head of humerus is correct.

5. Answer: (B) Muscular dystrophy

Muscular dystrophy is a genetic disorder causing progressive degeneration of skeletal muscle. Myasthenia gravis is an autoimmune disease, tetany comes from low blood Ca^{2+} , and botulism is a bacterial toxin poisoning.

6. Answer: (D) There are seven pairs of vertebrosteral, three pairs of vertebrochondral and two pairs of vertebral ribs.

Ribs 1–7 join the sternum directly (vertebrosteral), ribs 8–10 join the 7th rib through hyaline cartilage (vertebrochondral or false ribs) and ribs 11–12 are free ventrally (vertebral or floating ribs). So the 11th and 12th pairs are not connected to the sternum and not all ribs reach it.

7. Answer: (A) Estrogen and Parathyroid hormone

Osteoporosis is loss of bone mass, common after menopause when estrogen, which protects bone, falls; parathyroid hormone raises blood calcium by bone resorption, so its excess also weakens bone. Aldosterone, progesterone and prolactin have no major role in bone mineral balance.

8. Answer: (C) binds to troponin to remove the masking of active sites on actin for myosin.

Ca^{2+} released from the sarcoplasmic reticulum binds to troponin C, which moves tropomyosin and unmasks the myosin-binding active sites on actin so that cross bridges can form. Calcium does not bind myosin ATPase directly, and detachment of the myosin head requires a fresh ATP, not calcium.

9. Answer: (C) synovial joint

The joint between atlas and axis is a pivot joint, one kind of synovial joint with a fluid-filled cavity that allows rotation of the head. A saddle joint is a different synovial joint, found between the carpal and metacarpal of the thumb.

10. Answer: (C) Fast glycolytic fibres

Fast glycolytic (white) fibres have little myoglobin and few mitochondria and rely on anaerobic glycolysis, so lactic acid builds up quickly and they fatigue first. Slow oxidative (red, aerobic) fibres are rich in myoglobin and mitochondria and resist fatigue.

11. Answer: (C) Movement of macrophages and leucocytes.

Macrophages and leucocytes move by pseudopodia, which is amoeboid movement. Cilia lining the trachea and the fallopian tube, and those of Paramecium driving food into the gullet, all show ciliary movement.

12. Answer: (A) Calcium

Ca^{2+} released from the sarcoplasmic reticulum binds troponin, which moves tropomyosin and uncovers the myosin-binding sites on actin so cross-bridges can form. Sodium and potassium handle the action potential, and magnesium supports ATP binding but does not unmask actin.

13. Answer: (C) decreased level of estrogen

Osteoporosis is an age-related loss of bone mass with more fractures, commonly caused by a fall in oestrogen after menopause. An immune disorder at the neuromuscular junction describes myasthenia gravis, and uric acid crystals in joints cause gout.

14. Answer: (C) Tetanus

When stimuli come so rapidly that the muscle cannot relax between them, the twitches fuse into a smooth sustained contraction called tetanus. Fatigue is reduced response after repeated contraction and tonus is the mild resting contraction of muscle.

15. Answer: (D) Actin and Myosin filaments do not shorten but rather slide past each other

In sliding filament theory, thin actin filaments slide over thick myosin filaments toward the centre of the sarcomere; the I band and H zone shorten but the filaments themselves keep their length. The options in which one or both filaments shorten are wrong.

16. Answer: (A) humerus with scapula

The glenoid cavity is a depression on the scapula that receives the head of the humerus, forming the shoulder joint. The clavicle articulates with the acromion process, not with the glenoid cavity.

17. Answer: (C) Gliding joint - between carpals

Gliding joints occur between the carpals, allowing small sliding movements. The pivot joint is between atlas and axis (not the third and fourth cervical vertebrae), the humerus and pectoral girdle form a ball and socket joint, and frontal and parietal bones meet at a fibrous (suture) joint.

18. Answer: (D) the neuromuscular junction

A motor neuron releases acetylcholine at the neuromuscular junction (motor end plate), where it generates an action potential in the sarcolemma. The impulse then travels through transverse tubules and causes Ca^{2+} release from the sarcoplasmic reticulum, but these are later steps, not the site of stimulation.

19. Answer: (B) Accumulation of uric acid crystals in joints causes their inflammation

Gout is inflammation of joints caused by accumulation of uric acid crystals. Osteoporosis in old age is linked to decreased oestrogen, there are 12 thoracic vertebrae, and joints between vertebrae are cartilaginous, not fibrous.

20. Answer: (C) Fluid filled synovial cavity between two bones - joint between atlas and axis

Synovial joints have a fluid-filled synovial cavity between the articulating bones, and the pivot joint between atlas and axis is an example. Skull bones are joined by immovable fibrous sutures, and synovial fluid is not lymph.

21. Answer: (C) Troponin and myosin - Complex proteins in striated muscles

Troponin and myosin are both proteins of the contractile machinery of striated muscle. Thymosin comes from the thymus, not the thyroid; prolactin is a pituitary hormone; and rhodopsin is a visual pigment, not a hormone.

22. Answer: (C) Osteoporosis-decrease in bone mass and higher chances of fractures with advancing age

Osteoporosis is an age-related loss of bone mass that raises the chance of fractures. Gout is caused by uric acid crystals (not calcium) in joints, muscular dystrophy is a genetic degeneration of muscle, and myasthenia gravis is an autoimmune disorder of the neuromuscular junction.

23. Answer: (D) Clavicle and glenoid cavity - Pelvic girdle

The clavicle and the glenoid cavity (on the scapula) belong to the pectoral girdle, not the pelvic girdle, so this pair is mismatched. Humerus and ulna are limb bones of the appendicular skeleton, malleus and stapes are ear ossicles, and sternum and ribs belong to the axial skeleton.

24. Answer: (A) Thigh are striated and voluntary

Thigh muscles are skeletal muscles: striated and voluntary. Upper arm muscles are also skeletal, not smooth; heart muscle is striated though involuntary; and intestinal muscle is smooth (unstriated) and involuntary.

25. Answer: (B) Cartilage and cornea - No blood supply but do require oxygen for respiratory need

Cartilage and the cornea are avascular tissues: they have no blood vessels, yet their living cells still respire and obtain oxygen by diffusion (from perichondrium, aqueous humour and air). The knee joint is formed by the femur, tibia and patella; the fibula does not take part. The elbow is a hinge joint, not ball and socket, and premolars plus molars ($8 + 12 = 20$) are not all three-rooted.

26. Answer: (A) Parietal bone and the temporal bone of the skull are joined by fibrous joint

Skull bones such as the parietal and temporal are joined by sutures, which are fibrous, immovable joints. The first vertebra is the atlas (not the axis), the floating ribs are the 11th and 12th pairs, and the glenoid cavity takes the head of the humerus, whereas the femur fits into the acetabulum.

27. Answer: (B) Tetany

Tetany is rapid spasms (wild contractions) of muscles caused by low Ca^{2+} in body fluids, for example when parathyroid hormone is deficient. Gout is caused by uric acid crystals building up in joints.

28. Answer: (A) ilium, ischium, pubis - coxal bones of pelvic girdle

Each coxal (hip) bone of the pelvic girdle is formed by fusion of the ilium, ischium and pubis. Rhodopsin is a visual pigment, thiamine is a vitamin (thymine is the pyrimidine) and the cochlea is part of the inner ear, not an ossicle.

29. Answer: (A) hinge joint

The elbow (like the knee) allows movement in one plane only, so it is a hinge joint. The shoulder is a ball and socket joint, and the joint between atlas and axis is a pivot joint.

30. Answer: (B) Floating ribs in humans - 4

Humans have 12 pairs of ribs, and the last 2 pairs (11th and 12th), which are not joined to the sternum, are the floating ribs, giving 4 in total. There are 7 cervical vertebrae, and proteins are built from 20 amino acids.

31. Answer: (D) Floating ribs - 2 pairs

The 11th and 12th pairs of ribs are not joined to the sternum and are called floating ribs, so there are 2 pairs. Humans have 1 pair of clavicles, 3 pairs of salivary glands and 12 pairs of cranial nerves.

32. Answer: (B) myosin

The head of myosin has ATPase activity and binds actin to make cross-bridges, driving contraction. Troponin and tropomyosin are regulatory proteins on the thin filament with no ATPase activity.

33. Answer: (C) pectoral girdle of mammals

The acromion is the flat projection at the end of the scapular spine, so it belongs to the pectoral girdle of mammals. Do not confuse it with the acrosome of a sperm.

34. Answer: (D) Gliding joint — between zygapophyses of the successive vertebrae

The articular processes (zygapophyses) of adjacent vertebrae meet at gliding joints. Skull bones are joined by fibrous sutures, the bodies of vertebrae by cartilaginous joints, and phalanges by hinge joints.

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