# Exercise-1

✍ **Marked Questions are for Revision Questions.**

## ONLY ONE OPTION CORRECT TYPE

### SECTION - A # MUSCLES

**1.** Sarcolemma is a membrane found over
(1) Nerve fibre (2) Smooth muscle
(3) Skeletal muscle fibre (4) Heart

**2.** When there is a drop in the force of contraction after prolonged stimulation, it is known as
(1) Muscle tone (2) Muscle atrophy (3) Muscle fatigue (4) Muscle dystrophy

**3.** What is sprain
(1) More pulling of tendon (2) Less pulling of tendon
(3) More pulling of ligament (4) Less pulling of ligament

**4.** The functional unit of the contractile system in the striped muscle is
(1) Z–band (2) A–band (3) Myofibril (4) Sarcomere

**5.** During muscle contraction
(1) Chemical energy is changed into electrical energy
(2) Chemical energy is changed into mechanical energy
(3) Chemical energy is changed into physical energy
(4) Mechanical energy is changed into chemical energy

**6.** Major protein in the thick filament of skeletal muscle fibre is
(1) Tropomysin (2) Myosin (3) Actin (4) Troponin

**7.** The special contractile protein actin is found in
(1) Thick filaments of A–bands (2) Thin filaments of I–bands
(3) Both thick and thin filaments (4) Whole of myofibril

**8.✍** During muscular contraction, the
(1) I–zone will decrease in length (2) A–zone will decrease in length
(3) Z–zone will decrease in length (4) H–zone will increase in length

**9.** The muscular contraction in which the tension remains the same and the mechanical work is also done is called
(1) Isotonic contraction (2) Tetanus
(3) Isometric contraction (4) Single muscle twitch

**10.✍** Striated muscles contract by -
(1) Sliding of actin filament upon myosin filaments
(2) Sliding of myosin filaments upon actin filaments
(3) Pulling together of myosin filaments
(4) Pulling together of actin filaments

**11.** In a relaxed fibril, H–zone, a lighter region of low density can be seen in the centre of
(1) Anisotropic or A–band (2) Isotropic or I–band
(3) *Z*–band (4) Both in *A* and I–band

**11.** An all out sprint can not continue for more than 40 seconds because
(1) Run out of oxygen (2) Accumulation of creatine
(3) Muscles collapse (4) All of these

**12.** Ions that must be present for binding the cross bridges is
(1) $Na^{+}$ (2) $Ca^{++}$ (3) $K^{+}$ (4) $Mg^{++}$

**13.** Match the columns.

| Column I | Column II |
|---|---|
| (a) Longest smooth muscle | (i) Stapedius muscle |
| (b) Strongest muscle | (ii) Uterus muscle |
| (c) Smallest muscle | (iii) Jaw muscle |
| (d) Largest muscle | (iv) Gluteus maximus |

(1) a –i, b – ii, c – i, d – iv
(2) a –ii, b – iii, c – i, d – iv
(3) a –iii, b – ii, c – iv, d – i
(4) a –ii, b – iv, c – iii, d – i

**14.** Tetanus is sustained contraction of muscle, due to-
(1) Parathyroid deficiency (2) $Ca^{2+}$ deficiency
(3) Bacterial disease (4) Auto immune disease

**15.** Find out the incorrect statement-
(1) Muscle fibre is a syncitium as the sarcoplasm contains many nuclei.
(2) A characterstic feature of the muscle fibre is the presence of a large number of parallely arranged filaments in the sarcoplasm called myofilaments or myofibrils.
(3) Actin & myosin are rod like structures, arranged perpendicular to each other and also to the longitudnal axis of myofibrils
(4) The protein of the myofibril between two successive Z-line is considered as the functional unit of contraction, is called a sarcomere.

**16.** Find out the set of correct statements
(A) Meromyosin is the monomeric protein of myosin.
(B) Each meromyosin has head as HMM and tail as LMM
(C) Increase in $Ca^{2+}$ level leads to binding of Ca with a subunit of tropomyosin on actin filament
(D) ATP hydrolysis is done by myosin head to make cross bridge.
(1) A, D (2) A, B, C (3) B, C, D (4) A, B, D

## SECTION - B # AXIAL SKELETON

**1.** In the case of most of the mammals including man and Giraffe, the number of cervical vertebrae are
(1) 8 (2) 7 (3) 9 (4) 10

**2.** Coccygeal bone is formed by the fusion of ..... bones in man
(1) 3 vertebrae (2) 6 vertebrae (3) 5 vertebrae (4) 4 vertebrae

**3.** Inter-vertebral disc is a
(1) Fibro cartilage between the centrum of vertebrae
(2) Pad in the centrum of bone
(3) Cartilage bone in the body
(4) Body of vertebrae

**4.** The smallest bone in rabbit's or man's skeleton is
(1) Nasal (2) Stapes (3) Patella (4) Palatine

**5.** The number of floating ribs in human body is
(1) 6 pairs (2) 3 pairs (3) 5 pairs (4) 2 pairs

**6.** Cervical vertebrae are located in
(1) Thoracic region (2) Abdominal region (3) Neck region (4) Lumbar region

**7.** How many ribs are present in human beings?
(1) 6 pairs (2) 9 pairs (3) 12 pairs (4) 15 pairs

**8.** Find out the correct option regarding true sentence/s from the followings-
(i) Human skull is dicondylic like reptiles.
(ii) Foramen of Magnum is found at the anterior side of skull
(iii) Atlas vertebrae helps in rotation of neck.
(iv) Spinal cord passes to the brain through Foramen of Magnum.
(1) only iv (2) i, ii, iv (3) i, iii, iv (4) iii and iv

**9.** Largest foramen of human body is -
(1) Foramen of Monro (2) Foremen ovalis
(3) Foramen of Magendie (4) Foramen of Magnum

## SECTION - C # APPENDICULAR SKELETON

**1.** A shallow depression in the scapula which receives the head of the upper arm bone is known as the
(1) Acetabulum (2) Neural arch (3) Glenoid cavity (4) None of these

**2.** The protein present in the bones is known as
(1) Chondrin (2) Ossein (3) Sclero protein (4) Globulin

**3.** The cup-shaped cavity for the articulation of the head of the femur is called
(1) Glenoid cavity (2) Acetabulum (3) Obturator (4) Sigmoid notch

**4.** The total number of ear bones in man is
(1) 3 (2) 6 (3) 4 (4) 2

**5.** The pectoral and pelvic girdles and the bones of limb form
(1) Axial skeleton (2) Appendicular skeleton
(3) Visceral skeleton (4) Outer skeleton

**6.** Number of bones in human body is
(1) 260 (2) 206 (3) 306 (4) 203

**7.** An acromian process is characterisically found in rabbit/mammals in
(1) Pelvic girdle (2) Pectoral girdle (3) Skull (4) Sternum

**8.** Which pair does not have corresponding bones?
(1) Humerus and femur (2) Pectoral and pelvic girdle
(3) Atlas and coccyx (4) Carpals and tarsals

**9.** Ends of long bones are covered with
(1) Cartilage (2) Muscles (3) Ligaments (4) Blood cells

**10.** Pelvic girdle consist of
(1) ilium, ischium & pubis (2) ilium, ishcium & coracoid
(3) Coracoid, scapula & clavicle (4) ilium, coracoid & scapula

**11.** In children the bones are more flexible and less brittle because their bones have
(1) Large quantity of salts and little organic substances
(2) Large quantity of organic substances and little salts
(3) Well developed Haversian system
(4) Large number of osteoblasts

**12.** Bones act as reservoir of which mineral salts
(1) Sodium and magnesium (2) Calcium and sodium
(3) Calcium and magnesium (4) Copper and iron

**13.** The pelvic girdles of females are .....than those of males
(1) Narrower (2) Broader (3) Stoughter (4) No difference

**14.** The function of skeleton bone in vertebrates is/are
(1) Support (2) Vision (3) Sound production (4) Digestion

**15.** Patella is associated with
(1) Elbow (2) Knee (3) Neck (4) Wrist

**16.** Which one of the cartilage helps in early birth of a child, without damage to the pelvic girdle
(1) Hyaline cartilage (2) Elastic cartilage (3) Calcified cartilage (4) Fibrous cartilage

**17.** Red bone marrow is present in
(1) Tips of long bones (2) Tips of short bones
(3) Bones of birds (4) Shaft of long bones

**18.** Total number of bones in the single hind limb of a man is
(1) 14 (2) 21 (3) 24 (4) 30

**19.** Which of the following is an example of appendicular skeleton
(1) Bones of skull (2) Bones of vertebral column
(3) Ribs (4) Bones of fore and hind limbs

**20.** Appendicular skeleton is
(1) Girdles and limbs (2) Vertebrae (3) Rib and sternum (4) Skull

**21.** Match the columns.

| Column I | Column II |
|---|---|
| (a) Largest & Heaviest Vertebrae | (i) Stapes |
| (b) Strongest & longest bone | (ii) Femur |
| (c) Smallest bone | (iii) Fibula |
| (d) Weakest bone | (iv) Lumbar |

(1) a – iii ; b – ii ; c – i ; d – iv
(2) a – ii ; b – iv ; c – iii ; d – i
(3) a – iii ; b – i ; c – iv ; d – ii
(4) a – iv ; b – ii ; c – i ; d – iii

## SECTION - D # JOINTS

**1.** Synovial membrane is found in
(1) Neuromotor junction (2) Synaptic junction
(3) Joints (4) All the nerves

**2.** Joints are lubricated by
(1) Epidermis (2) Dermis
(3) Tympanic membrane (4) Synovial fluid

**3.** Ball and socket joints can be seen in
(1) Wrist (2) Fingers (3) Neck (4) Shoulders

**4.** Joint capsules are made up of
(1) Cardiac muscles (2) Elastin fibres
(3) Skeletal muscle fibres (4) Collagen fibres

**5.** When the head of humerus fits into glenoid cavity, joint is
(1) Ball and socket joint (2) Hinge joint
(3) Pivot joint (4) Saddle joint

**6.** When joint becomes inflamed and painful, condition is called
(1) Rheumatism (2) Sprain (3) Osteoarthritis (4) Gouty arthritis

**7.** Joint between femur and acetabulum of pelvic girdle is
(1) Pivotal (2) Ball and socket (3) Hinge (4) Saddle

**8.** Joint between femur and tibio–fibula is
(1) Hinge joint (2) Saddle joint (3) Pivot joint (4) Imperfect joint

**9.** Synovial joints is
(1) Pivot joint (2) Hinge joint (3) Ball and socket joint (4) All of these

**10.** .....acts as a shock absorber to cushion when tibia and femur came together
(1) Ligament (2) Cartilage (3) Tendon (4) Disc

**11.** Match the columns.

| Column I | Column II |
|---|---|
| (a) Saddle joint | (i) Skull bones |
| (b) Fibrous joint | (ii) between metacarpals & carpals of thumb. |
| (c) Cartilagenous joint | (iii) between vertebraes |
| (d) Gliding joint | (iv) between sternum & ribs |

| | A | B | C | D |
|---|---|---|---|---|
| (1) | ii | i | iv | iii |
| (2) | i | ii | iv | iii |
| (3) | iii | iv | ii | i |
| (4) | iv | iii | ii | i |

## MISCELLANEOUS QUESTIONS

**1.** Sutural joints are found between:
(1) parietals of skull (2) thumb and metatarsal
(3) humerus and radio-ulna (4) glenoid cavity and pectoral girdle

**2.** Gout is a disease that affects the joints and leads to arthritis. It is associated with an abnormality of:
(1) fat metabolism (2) purine metabolism
(3) protein metabolism (4) pyrimidine metabolism

**3.** Synovial fluid is found in:
(1) cranial cavity (2) spinal cavity
(3) immovable joints (4) freely movable joints

**4.** Which yield ATP during muscle contraction?
(1) Glycogen (2) Creatine phosphate
(3) Myoglobin (4) Cholesterol

**5.** Myoglobin is found abundantly in:
(1) all muscle fibres (2) red muscle fibres
(3) white muscle fibres (4) both red and white muscle fibres

**6.** Patella, the knee cap is the example of
(1) Cartilage gland (2) Replacing bone (3) Sesamoid bone (4) None of the above

**7.** Vertebral column of new born human body is made up of:
(1) 33 vertebrae (2) 52 vertebrae (3) 45 vertebrae (4) 23 vertebrae

**8.** Muscle activity of our body:
(1) decreases BMR (2) decreases venous return
(3) increases body temperature (4) reduces blood and lymph flow

**9.** Which of the following proteins is found in the thick/filaments of skeletal muscles?
(1) Actin (2) Myosin (3) Troponin (4) Tropomyosin

**10.** Colle's fracture is associated with:
(1) femur (2) ulna (3) radius (4) humerus

**11.** Muscle fatigue is due to:
(1) Na (2) K (3) Lactic acid (4) Citric acid

**12.** The muscle band that remains unchanged during contraction and relaxation of the skeletal muscle is:
(1) I (2) H (3) A (4) Z line

**13.** Knee joint is:
(1) synovial joint (2) fibrous joint (3) hyaline joint (4) cartilaginous joint

**14.** If a muscle undergoes rapid contraction and relaxation, the sarcoplasmic reticulum extension:
(1) requires constant plugging in and out of $Ca^{2+}$
(2) rapid synthesis of myosin
(3) do not require energy
(4) all of the above

**15.** During strenuous exercise, glucose is converted into:
(1) starch (2) glycogen (3) pyruvic acid (4) lactic acid

**16.** During fatigue:
(1) muscle fails to relax (2) muscle fails to be stimulated
(3) blood circulation in muscles stop (4) motor nerve does not respond to muscles

**17.** During contraction of skeletal muscle, $Ca^{2+}$ bind to:
(1) actin (2) troponin (3) tropomyosin (4) myosin ATPase

**18.** Stimulus several times greater than threshold stimulus is provided to muscle fibre. It will:
(1) undergo tetany (2) contract slightly
(3) contract forcefully (4) contract with same force

**19.** The number of vertebrae present in cervical, thoracic, lumbar, sacral and coccyx regions are respectively:
(1) 12,7,5, 1, 1 (2) 1,7,5, 12, 1 (3) 7,12,5,1,1 (4) 7,5, 1, 12, 1

**20.** In mammals, the lower jaw is made of:
(1) medulla (2) maxilla (3) mandible (4) ethmoid

**21.** Name the part of body which have single pair of bones:
(1) wrist (2) lower jaw (3) external ear (4) pelvic girdle

**22.** Hyoid bone is located at the:
(1) front of the skull (2) behind the skull
(3) top of the buccal cavity (4) floor of the buccal cavity

# Exercise-2

**1.** Which of the following animals is correctly matched with its types of skeleton? **(1st ABO)**

(1) Crab – Exoskeleton
(2) Earthworm – Exoskeleton
(3) Fly – Endoskeleton
(4) Dog – Exoskeleton

**2.** Which state of a living muscle, are the following events associated? **(3rd NSEB)**

A. $Ca^{+2}$ released by sarcoplasmic reticulum
B. Actin complexes with myosin
C. ATPase is activated
D. Troponin binds $Ca^{+2}$
(1) Relaxed state
(2) Muscle at the beginning of contraction
(3) Muscle in tetanus
(4) Muscle at the end of contraction

**3.** A myofibril has the proteins-actin, myosin, tropomyosin and troponin. The ratio of actin : myosin is :

(1) 1 : 2 (2) 2 : 1 (3) 2 : 5 (4) 5 : 2

**4.** Rigor mortis (stiffness after death) occurs due to muscle contraction. However, it lasts for 24 hours and then disappears. This is because

(1) $Ca^{2+}$ channels in the sarcoplasmic reticulum are closed after 24 hrs
(2) Contraction is an energy requiring process. Since ATP synthesis ceases after death, contraction also ceases
(3) Proteolytic enzymes from lysosomes digest the cross linkages between myosin and actin
(4) All of the above

# Exercise-3

## PART - I : NEET / AIPMT QUESTION (PREVIOUS YEARS )

**1.** What is the joint between sternum and the ribs in humans? **(CBSE 2000)**

(1) Fibrous joint (2) Gliding joint (3) Cartilaginous joint (4) Angular joint

**2.** ATPase enzyme needed for muscle contraction is located in: **(CBSE 2004)**

(1) Actin (2) Actinin (3) Myosin (4) Troponin

**3.** Which of the following pairs, is correctly matched? **(CBSE 2005)**

(1) Hinge joint – Between vertebrae
(2) Gliding joint – Between zygapophyses of the successive vertebrae
(3) Fibrous joint – Between phalanges
(4) Cartilaginous joint – Skull bones

**4.** The contractile protein of skeletal muscle involving ATPase activity is : **(CBSE 2006)**

(1) Myosin (2) Troponin (3) $\alpha$-actinin (4) Tropomyosin

**5.** In human body, which one of the following is anatomically correct? **(CBSE 2007)**

(1) Salivary glands - 1pair (2) Floating ribs - 2 pairs

(3) Collar bones - 3 pairs (4) Cranial nerves - 10 pairs

**6.** Which one of the following is the correct matching of three items and their grouping category? **(CBSE 2009)**

| | **Items** | **Group** |
|---|---|---|
| (1) | Cytosine, Uracil, Thiamine | – Pyrimidines |
| (2) | Malleus, Incus, Cochlea | – Ear ossicles |
| (3) | Ilium, Ischium, Pubis | – Coxal bones of pelvic girdle |
| (4) | Actin, Myosin, Rhodopsin | – Muscle proteins |

**7.** Which one of the following is the correct description of a certain part of a normal human skeleton? **(CBSE 2010)**

(1) Parietal bone and the temporal bone of the skull are joined by fibrous joint

(2) First vertebra is axis which articulates with the occipital condyles

(3) The 9th and 10th pairs of ribs are called the floating ribs

(4) Glenoid cavity is a depression to which the thigh bone articulates

**8.** The type of muscles present in our: **(CBSE Mains 2011)**

(1) upper arm are smooth muscle fibres fusiform in shape

(2) heart are involuntary and unstriated smooth muscles

(3) intestine are striated and involuntary

(4) thigh are striated and voluntary

**9.** 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 nonmatching pair: **(CBSE Mains 2011)**

| | **Pairs of skeletal parts** | **Category** |
|---|---|---|
| (1) | Malleus and stapes | Ear ossicles |
| (2) | Sternum and ribs | Axial skeleton |
| (3) | Clavicles and glenoid cavity | Pelvic girdle |
| (4) | Humerus and ulna | Appendicular skeleton |

**10.** Select the correct statement regarding the specific disorder of muscular or skeletal system: **(CBSE 2012)**

| | | |
|---|---|---|
| (1) | Muscular dystrophy | Age related shortening of muscles |
| (2) | Osteoporosis | Decrease in bone mass and higher chances of fractures with advancing age |
| (3) | Myasthenia gravis | Auto-immune disorder which inhibits sliding of myosin filaments |
| (4) | Gout | Inflammation of joints due to extra deposition of calcium |

**11.** Elblow joint is an example of **(AIPMT 2009)**

(1) Pivot joint (2) Hinge joint

(3) Gliding joint (4) Ball and socket joint

**12.** Which one of the following is the correct pairing of a body part and the kind of muscle tissue that moves it? **(AIPMT 2009)**

(1) Heart wall – Involuntary unstriated muscle

(2) Biceps of upper arm – Smooth muscle fibres

(3) Abdominal – Smooth muscle

(4) Iris – Involuntary smooth muscle

**13.** Low $Ca^{++}$ in the body fluid may be the cause of **(AIPMT 2010)**

(1) Anaemia (2) Angina pectoris (3) Gout (4) Tetany

**14.** The characteristics and an example of a synovial joint in humans is : **(AIPMT-2013)**

| | **Characteristics** | **Examples** |
|---|---|---|
| (1) | Fluid filled between two joints, provides cushion | Skull bones |
| (2) | Fluid filled synovial cavity between two bones | joint between atlas and axis |
| (3) | Lymph filled between two bones, limited movement | gliding joint between carpals |
| (4) | fluid cartilage between two bones, limited movements | Knee joint |

**15.** The H-zone in the skeletal muscle fibre is due to: **(AIPMT-2013)**

(1) The central gap between myosin filaments in the A-band.

(2) The central gap between actin filaments extending through myosin filaments in the A band.

(3) Extension of myosin filaments in the central portion of the A - band.

(4) The absence of myofibrils in the central portion of A - band.

**16.** Select the correct matching of the types of the joint with the example in human skeletal system: **(AIPMT-2014)**

| | **Types of joint** | **Examples** |
|---|---|---|
| (1) | Cartilagenous joint | between frontal and parietal |
| (2) | Pivot joint | between third and fourth cervical vertebrae |
| (3) | Hinge joint | between humerus and pectoral girdle |
| (4) | Gliding joint | between carpels |

**17.** 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 sacroplasmic reticulum

**18.** Sliding filament theory can be best explained as: **(AIPMT-2015)**

(1) Actin and Myosin filaments shorten and slide pass each other

(2) Actin and Myosin filaments do not shorten but rather slide pass each other

(3) When myofilaments slide pass other, Myosin filaments shorten while Actin filaments do not shorten

(4) When myofilaments slide pass each other Actin filaments shorten while Myosin filament do not shorten

**19.** Glenoid cavity articulated : **(AIPMT-2015)**

(1) scapula with acromion (2) clavicle with scapula

(3) humerus with scapula (4) clavicle with acromion

**20.** Which of the following joints would allow no movement? **(Re-AIPMT-2015)**

(1) Cartilaginous joint (2) Synovial joint (3) Ball and Socket joint (4) Fibrous joint

**21.** Which of the following is not a function of the skeletal system? **(Re-AIPMT-2015)**

(1) Storage of minerals (2) Production of body heat

(3) Locomotion (4) Production of erythrocytes

**22.** Lack of relaxation between successive stimuli in sustained muscle contraction is known as: **(NEET-1-2016)**

(1) Tonus (2) Spasm (3) Fatigue (4) Tetanus

**23.** Name the ion responsible for unmasking of active sites for myosin for cross-bridge activity during muscle contraction. **(NEET-2-2016)**

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

**24.** Osteoporosis, an age related disease of skeletal system , may occur due to **(NEET-2-2016)**

(1) accumulation of uric acid leading to inflammation of joints

(2) immune disorder affecting neuromuscular junction leading to fatigue

(3) high concentration of $Ca^{++}$ and $Na^{+}$

(4) decreased level of estrogen

**25._** Out of 'X' pairs of ribs in humans only 'Y' pairs are true ribs. Select the option that correctly represents values of X and Y and provides their explanation: **(NEET-2017)**

| | | |
|---|---|---|
| (1) | X = 12, Y = 7 | True ribs are attached dorsally to vertebral column and ventrally to the sternum. |
| (2) | X = 12, Y = 5 | True ribs are attahced dorsally to vertebral column and sternum on the two ends. |
| (3) | X = 24, Y = 7 | True ribs are dorsally attached to vertebral column but are free on ventral side. |
| (4) | X = 24, Y = 12 | True ribs are dorsally attached to vertebral column but are free on ventral side |

**26._** The pivot joint between atlas and axis is a type of **(NEET-2017)**

(1) Fibrous joint (2) Cartilaginous joint (3) Synovial joint (4) Saddle joint

**27.** Calcium is important in skeletal muscle contraction because it **(NEET-2018)**

(1) binds to troponin to remove the masking of active sites on actin for myosin.

(2) prevents the formation of bonds between the myosin cross bridges and the actin filament.

(3) detaches the myosin head from the actin filament.

(4) activates the myosin ATPase by binding to it.

**28.** Which of the following muscular disorders is inherited? **(NEET-1-2019)**

(1) Botulism (2) Tetany (3) Muscular dystrophy (4) Myasthenia gravis

**29.** Select the correct option. **(NEET-1-2019)**

(1) There are seven pairs of vertebrosternal, three pairs of vertebrochondral and pairs of vertebral ribs

(2) $8^{th}$, $9^{th}$ and $10^{th}$ pairs of ribs articulate directly with the sternum.

(3) $11^{th}$ and $12^{th}$ pairs of ribs are connected to the sternum with the help of hyaline cartilage.

(4) Each rib is a flat thin bone and all the ribs are connected dorsally to the thoracic vertebrae and ventrally to the sternum.

**30.** Match the following joints with the bones involved: **(NEET-2-2019)**

| | **Column-I** | | **Column-II** |
|---|---|---|---|
| (a) | Gliding joint | (i) | Between carpal and metacarpal of thumb |
| (b) | Hinge joint | (ii) | Between Atlas and Axis |
| (c) | Pivot joint | (iii) | Between the Carpals |
| (d) | Saddle joint | iv | Between Humerus and Ulna |

Select the correct option from the following:

(1) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

(2) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

(3) (a)-(iv), (b(-(ii), (c)-(iii), (d)-i)

(4) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

**31.** Which of the following diseases is an auto-immune disorder **(NEET-2-2019)**

(1) Myasthenia gravis (2) Arthritis (3) Osteoporosis (4) Gout

## PART - II : AIIMS QUESTION (PREVIOUS YEARS)

**1.** At times the ligaments are overstretched or torn. It is called **(AIIMS-1984)**

(1) Dislocation (2) Fracture (3) Sprain (4) Tension

**2.** Which of the following is not found in birds **(AIIMS-1999)**

(1) Pectoral girdle (2) Pelvic girdle (3) Hind limb (4) Fore limb

**3.** A cricket player is fast chasing a ball in the field. Which one of the following groups of bones are directly contributing in this movement? **(AIIMS-2006)**

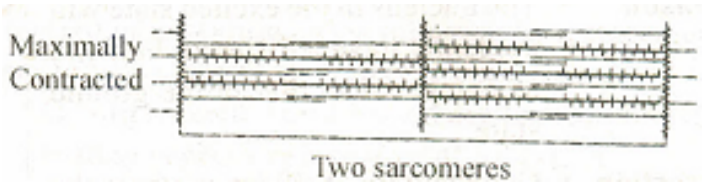
(1) Pelvis, Ulna, Patella, Tarsals (2) Sternum, Femur, Tibia, Fibula

(3) Tarsals, Femur, Metatarsals, Tibia (4) Femur, Malleus, Tibia, Metatarsals

**4.** Which one of the following is a sesamoid bone? **(AIIMS-2009)**

(1) pelvis (2) patella (3) pterygoid (4) pectoral girdle

**5.#** Which of the following is correct about the given figure? **(AIIMS-2010)**




(1) the length of the thick and thin myofilaments has changed

(2) length of both an isotropic and anisotropic band has changed.

(3) the myosin cross-bridges move on the surface of actin and the thin and thick myofilaments slide past each other.

(4) length of the sarcomere remains same.

**6.** Sesamoid bone is derived from- **(AIIMS-2012)**

(1) Cartilage (2) Areolar tissue (3) Tendon (4) Ligament

**7.** The contraction of the muscle continues in sliding filament theory **(AIIMS-2017)**

(1) till ATP binds to myosin head

(2) till ADP binds to myosin head

(3) till $Ca^{2+}$ is present in sarcoplasm

(4) till polymerisation of myosin head is going on

**8.** Creatinine is formed by – **(AIIMS-2018-III)**

(1) Urea

(2) Uric acid

(3) Breakdown of creatine phosphate in muscle

(4) Kidney

**9.** Cross bridges between actin and myosin is broken up by – **(AIIMS-2018-IV)**

(1) Hydrolysis of ATP

(2) Binding of ATP to the myosin head

(3) Binding of calcium to the subunit of troponin

(4) Exposure of tropmyosin

# Answers

## EXERCISE - 1

### SECTION – A

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (3) | **3.** | (3) | **4.** | (4) | **5.** | (2) | **6.** | (2) | **7.** | (2) |
| **8.** | (1) | **9.** | (1) | **10.** | (1) | **11.** | (1) | **12.** | (1) | **13.** | (2) | **14.** | (2) |
| **15.** | (3) | **16.** | (3) | **17.** | (1) | | | | | | | | |

### SECTION - B

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (2) | **2.** | (4) | **3.** | (1) | **4.** | (2) | **5.** | (4) | **6.** | (3) | **7.** | (3) |
| **8.** | (4) | **9.** | (4) | | | | | | | | | | |

### SECTION - C

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (2) | **3.** | (2) | **4.** | (2) | **5.** | (2) | **6.** | (2) | **7.** | (2) |
| **8.** | (3) | **9.** | (1) | **10.** | (1) | **11.** | (2) | **12.** | (3) | **13.** | (2) | **14.** | (1) |
| **15.** | (2) | **16.** | (4) | **17.** | (1) | **18.** | (4) | **19.** | (4) | **20.** | (1) | **21.** | (4) |

### SECTION - D

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (4) | **3.** | (4) | **4.** | (4) | **5.** | (1) | **6.** | (3) | **7.** | (2) |
| **8.** | (1) | **9.** | (4) | **10.** | (2) | **11.** | (1) | | | | | | |

## MISCELLANEOUS QUESTIONS

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (1) | **2.** | (2) | **3.** | (4) | **4.** | (2) | **5.** | (2) | **6.** | (3) | **7.** | (1) |
| **8.** | (3) | **9.** | (2) | **10.** | (3) | **11.** | (3) | **12.** | (3) | **13.** | (1) | **14.** | (1) |
| **15.** | (4) | **16.** | (2) | **17.** | (2) | **18.** | (4) | **19.** | (3) | **20.** | (3) | **21.** | (4) |
| **22.** | (4) | | | | | | | | | | | | |

## EXERCISE - 2

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1.** | (1) | **2.** | (2) | **3.** | (4) | **4.** | (3) |

## EXERCISE - 3

### PART- I

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (3) | **3.** | (2) | **4.** | (1) | **5.** | (2) | **6.** | (3) | **7.** | (1) |
| **8.** | (4) | **9.** | (3) | **10.** | (2) | **11.** | (2) | **12.** | (4) | **13.** | (4) | **14.** | (2) |
| **15.** | (2) | **16.** | (4) | **17.** | (1) | **18.** | (2) | **19.** | (3) | **20.** | (4) | **21.** | (2) |
| **22.** | (4) | **23.** | (2) | **24.** | (4) | **25.** | (1) | **26.** | (3) | **27.** | (1) | **28.** | (3) |
| **29.** | (1) | **30.** | (1) | **31.** | (1) | | | | | | | | |

### PART- II

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (4) | **3.** | (3) | **4.** | (2) | **5.** | (3) | **6.** | (3) | **7.** | (3) |
| **8.** | (3) | **9.** | (2) | | | | | | | | | | |

## Self Practice Paper (SPP)

**1.** The number of lumbar vertebrae in human vertebral column is
(1) 12 (2) 7 (3) 5 (4) 2

**2.** Elastic cartilage is found in
(1) The trachea (2) The auditory tube
(3) The intervertebral disc (4) None of these

**3.** In man the axial skeleton is made up of
(1) 80 bones (2) 100 bones (3) 103 bones (4) 106 bones

**4.** Name the connective tissue sheath which surrounds the muscle bundles
(1) Epimysium (2) Endomysium (3) Perimysium (4) Sarcomere

**5.** Axial skeleton is made up of
(1) Skull only (2) Sternum only
(3) Complete vertebral column (4) All of the above

**6.** What is the right sequence of bones in the ear ossicles of a mammal starting from the tympanum in wards
(1) Malleus, Incus, Stapes (2) Malleus, Stapes, Incus
(3) Incus, Malleus, Stapes (4) Stapes, Incus, Malleus

**7.** The contraction of muscle of shortest duration is seen in
(1) Heart (2) Jaws (3) Intestine (4) Eyelids

**8.** The hardest substance present in the
(1) Bone– Ossein (2) Chitin – Protein (3) Tooth– Enamel (4) Muscle–Myosin

**9.** Which one is odd pair
(1) Femur-Humerus (2) Tibia-Radius (3) Axis-Atlas (4) Tarsal-Carpals

**10.** Match the columns -

| Column I | Column II |
|---|---|
| (a) Myasthenia gravis | (i) uric acid crystals |
| (b) Muscular dystrophy | (ii) $Ca^{2+}$ deficiency |
| (c) Tetany | (iii) Autoimmune disorder |
| (d) Gout | (iv) degeneration of muscle |

| | A | B | C | D |
|---|---|---|---|---|
| (1) | iv | iii | ii | i |
| (2) | iii | iv | ii | i |
| (3) | iii | iv | i | ii |
| (4) | iv | iii | i | ii |

**11.** Humerus bone is situated in
(1) Thigh (2) Lower arm (3) Upper arm (4) Shank

**12.** The knee joint in between the thigh and lower leg is a

(1) Hinge joint (2) Gliding joint (3) Pivot joint (4) Fixed joint

**13.** In mammals each half of pelvic girdle consists of
(1) Ilium (2) Ischium (3) Pubis (4) All the above

**14.** The total number of vertebrae in new born man is
(1) 30 (2) 31 (3) 32 (4) 33

**15.** In man ribs are attached to
(1) Clavicle (2) Ileum (3) Sternum (4) Scapula

**16.** Smallest muscle in the human body
(1) Sartorius (2) Spinal muscle (3) Stapes (4) Stapedius

**17.** Which one of the following is the incorrect matching of three items and their grouping category?

| **Items** | **Groups** |
|---|---|
| (1) Malleus, incus, stapes | Ear ossicles |
| (2) Ilium, ischium, pubis | Coxal bones of pelvic girdle |
| (3) Actin, myosin, actinin | Muscle proteins |
| (4) Cytosine, uracil, thiamine | Pyrimidines |

**18.** Vertebrochondral ribs are –
(1) $11^{th}$ & $12^{th}$ pair ribs (2) $8^{th}$, $9^{th}$ & $10^{th}$ pair ribs
(3) $1^{st}$ – $7^{th}$ pair ribs (4) $8^{th}$– $12^{th}$ pair ribs

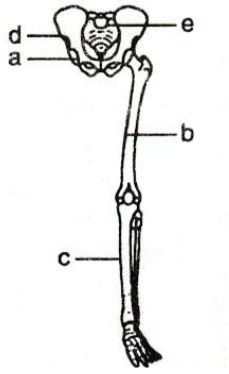
**19.** High serum uric acid in the body may be the cause of
(1) Anaemia (2) Angina pectoris (3) Gout (4) Tetany

**20.** 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.

| | **Pairs of skeletal parts** | **Category** |
|---|---|---|
| (1) | Sternum and Ribs | Axial skeleton |
| (2) | Clavicle and Glenoid Cavity | Pelvic girdle |
| (3) | Humerus and ulna | Appendicular skeleton |
| (4) | Malleus and stapes | Ear ossicles |

**21.** The last two pairs of ribs are named floating ribs because
(1) Their sternal parts are attached to the sternum directly
(2) Their sternal parts are attached on the $7^{th}$ pair of ribs
(3) Their sternal parts remain free and do not even reach the sternum
(4) They float in the body cavity

**22.#** Consider the diagram given below-




Parts labelled as (a), (b), (c), (d) and (e) respectively indicate-

(1) ilium, femur, tibia, pubis and sacrum

(2) Pubis, femur, tibia, ilium and sacrum

(3) Pubis, tibia, femur, ilium and sacrum

(4) ilium, femur, tibia, pubis and sacrum

**23.** The vertebral column is connected to the pelvic girdle in the

(1) Coccygeal region (2) Sacral region (3) Lumbar region (4) Cervical region

**24.** Bone dissolving cells are known as :

(1) Osteoblasts (2) Chondroblasts (3) Osteoclasts (4) Chondroclasts

**25.** Biceps and triceps surround:

(1) femur (2) ulna (3) humerus (4) radius

**26.** The joint between incus and stapes is :

(1) hinge joint (2) gliding joint (3) pivot joint (4) ball and socket joint

**27.** Which of the following lubricates ligament and tendons and is an important constituent of synovial fluid of bones

(1) Pectins (2) Lipids (3) Hyaluronidase (4) Hyaluronic acid

**28.** Extremities of long bones posses.....cartilage.

(1) calcified (2) fibrous (3) hyaline (4) elastic

**29.** In locomotion, movement between two structures of which one of the following sets takes part in man?

(1) skull and atlas (2) Femur and pelvic girdle

(3) humerus and pectoral girdle (4) 2 and 3 both

**30.** Which one of the following pair is incorrect in relation to disease and related symptoms-

(1) Rheumatoid arthritis-accumulation of pannus granules

(2) Rickets-Incomplete and insufficient deposition of calcium and phosphate in to bones

(3) Osteoporosis-Deficiency of vitamin D

(4) Gouty Arthritis-Deposition of urea into joints

**31.** The dark bands (A–bands) of a skeletal muscle are known as

(1) Isotropic bands (2) Anisotropic bands

(3) Intercalated disc (4) Cross bridges

**32.** Old people are, more liable to fracture of their bones because

(1) Bones become soft and elastic

(2) Bones become hard and brittle

(3) Bones contain large quantity of organic matter

(4) None of the above

**33.** The first and second vertebrae respectively called-

(1) Atlas and axis (2) Axis and atlas (3) Atlas and mechelian (4) Mechelian and hyode

**34.** Lactic acid is generally formed in very fast acting muscle but exceptional muscle is-

(1) Muscles of Iris and pupil (2) Muscles of heart

(3) Muscles of jaw (4) No exception is found

**35.** Total number of bones found in right upper limb is:

(1) 24 (2) 26 (3) 30 (4) 60

**36.** Vertebral and fore limb digital formula of man is-

(1) $C_7\ T_{12}\ L_5\ S_{(5)}\ Co_{(4)}$ - 2, 3, 3, 3, 3 (2) $C_7\ T_{12}\ L_5\ S_{(1)}\ Co_{(1)}$ -0, 2, 3, 3, 3

(3) $C_8\ T_{12}\ L_6\ S_4\ Co_{(s)}$ -0, 3, 3, 3, 3 (4) None

**37.** Acetabulum occurs in:

(1) cranium (2) vertebrae (3) pelvic girdle (4) pectoral girdle

**38.** Which of the following form thoracic cage of man?

(1) Ribs and Sternum (2) Ribs and Thoracic vertebrae

(3) Ribs, Sternum and Lumber vertebrae (4) Ribs, Sternum and Thoracic vertebrae

**39.** Digit formula of forelimbs in human is:

(1) 2, 3, 3, 3, 3 (2) 2, 2, 3, 3, 3 (3) 2, 3, 2, 3, 3 (4) 2, 2, 3, 3, 2

**40.** Which one of the following takes place in a myofibril when skeletal muscle contracts

| | Light band | Dark band | H–zone |
|---|---|---|---|
| (1) | Shortens | Shortens | Shortens |
| (2) | Shortens | Unchanged | Unchanged |
| (3) | Shortens | Unchanged | Disappears |
| (4) | Unchanged | Shortens | Shortens |

**41.** Lumbar vertebra are found in

(1) Neck region (2) Abdominal region (3) Hip rigion (4) Thorax

**42.** What is correct about human body

(1) There are 5 vertebra in the neck (2) Brain box is made up of 4 bones

(3) There are 15 pairs of ribs (4) There are 12 thoracic vertebra

**43.** The distance or length of the myofibril between two adjacent *Z*–bands is called

(1) Sarcomere (2) Sarcolemma (3) Fibril (4) Sarcoplasm

**44.** Contraction of a muscle is caused by

(1) Myosin (2) Actin (3) ATP (4) Actomyosin

**45.** The dark bands in a myofibril are due to overlapping of

(1) Only thick bands (2) Only thin bands

(3) Both thick and thin bands (4) None of the above

## SPP Answers

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (2) | **3.** | (1) | **4.** | (1) | **5.** | (4) | **6.** | (1) | **7.** | (4) |
| **8.** | (3) | **9.** | (3) | **10.** | (2) | **11.** | (3) | **12.** | (1) | **13.** | (4) | **14.** | (4) |
| **15.** | (3) | **16.** | (4) | **17.** | (4) | **18.** | (2) | **19.** | (3) | **20.** | (2) | **21.** | (3) |
| **22.** | (2) | **23.** | (2) | **24.** | (3) | **25.** | (3) | **26.** | (4) | **27.** | (4) | **28.** | (3) |
| **29.** | (4) | **30.** | (4) | **31.** | (2) | **32.** | (2) | **33.** | (1) | **34.** | (2) | **35.** | (3) |
| **36.** | (1) | **37.** | (3) | **38.** | (4) | **39.** | (1) | **40.** | (3) | **41.** | (2) | **42.** | (4) |
| **43.** | (1) | **44.** | (4) | **45.** | (3) | | | | | | | | |