DPP - Daily Practice Problems

Chapter-wise Sheets

Date : | Start Time : | End Time :

BIOLOGY CB20

SYLLABUS : Locomotion and Movement

Max. Marks : 180 **Marking Scheme :** + 4 for correct & (–1) for incorrect **Time : 60 min.**

INSTRUCTIONS : This Daily Practice Problem Sheet contains 45 MCQs. For each question only one option is correct. Darken the correct circle/ bubble in the Response Grid provided on each page.

1. Which ion is essential for muscle contraction?
(a) Na^+ (b) K^+
(c) Ca^{2+} (d) Cl^-

2. Elbow joint is an example of:
(a) hinge joint (b) gliding joint
(c) ball and socket joint (d) pivot joint

3. Two of the body parts which do not appear in MRI may be
(a) molar teeth and eye lens
(b) scapula and canines
(c) ligaments and ribs
(d) tendons and premolars

4. Which of the following is made up of a single bone in mammal ?
(a) Dentary (b) Hyoid
(c) Upper jaw (d) All of these

5. Intercoastal muscles are found attached with
(a) diaphragm (b) ribs
(c) pleura (d) lungs

6. Ball and socket joint is found between
(a) ribs and vertebral
(b) femur and tibio-fibula
(c) humerus and olecranon fossa
(d) humerus and pectoral girdle

7. Which of the following is the contractile protein of a muscle?
(a) Myosin (b) Tropomyosin
(c) Actin (d) Tubulin

RESPONSE GRID					
	1. ⓐⓑⓒⓓ	2. ⓐⓑⓒⓓ	3. ⓐⓑⓒⓓ	4. ⓐⓑⓒⓓ	5. ⓐⓑⓒⓓ
	6. ⓐⓑⓒⓓ	7. ⓐⓑⓒⓓ			

Space for Rough Work

8. Myofibrils are made up of
(a) Myosin and actin
(b) Myosin and troponin
(c) Actin and tropomyosin
(d) All the above components

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

	Items		Group
(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

10. The number of floating ribs, in the human body, is
(a) 6 pairs (b) 5 pairs
(c) 3 pairs (d) 2 pairs

11. Select the **correct** statement regarding the specific disorder of muscular or skeletal system :
(a) *Myasthenia gravis* - Autoimmune disorder which inhibits sliding of myosin filaments.
(b) *Gout* - inflammation of joints due to extra deposition of calcium.
(c) *Muscular dystrophy* - age related shortening of muscles.
(d) *Osteoporosis* - decrease in bone mass and higher chances of fractures with advancing age.

12. The sensation of fatigue in the muscles after prolonged strenuous physical work, is caused by
(a) a decrease in the supply of oxygen
(b) minor wear and tear of muscle fibres
(c) the depletion of glucose
(d) the accumulation of lactic acid

13. Synovial fluid is found in
(a) cranial cavity (b) spinal cavity
(c) immovable joints (d) freely movable joints

14. Humerus differs from the femur in having:
(a) Sigmoid notch (b) Trochanter
(c) Deltoid ridge (d) None of these

15. The most abundant mineral in human body is
(a) Magnesium (b) Sodium
(c) Calcium (d) Potassium

16. Ankle joint is
(a) Pivot Joint (b) Ball and socket joint
(c) Hinge joint (d) Gliding joint

17. The major function of the intervertebral disc is to
(a) Absorb shock
(b) String the vertebrae together
(c) Prevent injuries
(d) Prevent hyperextension

18. Which one of the following pairs of chemical substances is correctly categorized?
(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

19. The functional unit of contractile system of a striated muscle is
(a) Sarcomere (b) Z-band
(c) Sarcosome (d) Myofibril

20. Joint between bones of human skull is
(a) Hinge joint (b) Synovial joint
(c) Cartilaginous joint (d) Fibrous joint

RESPONSE GRID

8. ⓐⓑⓒⓓ	9. ⓐⓑⓒⓓ	10. ⓐⓑⓒⓓ	11. ⓐⓑⓒⓓ	12. ⓐⓑⓒⓓ
13. ⓐⓑⓒⓓ	14. ⓐⓑⓒⓓ	15. ⓐⓑⓒⓓ	16. ⓐⓑⓒⓓ	17. ⓐⓑⓒⓓ
18. ⓐⓑⓒⓓ	19. ⓐⓑⓒⓓ	20. ⓐⓑⓒⓓ		

Space for Rough Work

21. Which one of the following is the *correct description* of a certain part of the 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 9^{th} and 10^{th} pairs of ribs are called the floating ribs
(d) Glenoid cavity is a depression to which the thigh bone articulates.

22. Which of the following is an autoimmune disorder ?
(a) Myasthenia gravis (b) Osteoporosis
(c) Muscular dystrophy (d) Gout

23. The joint in our neck which allows us to rotate our head left to right is
(a) pivot joint (b) hinge joint
(c) saddle joint (d) ellipsoid joint

24. Read the following statements carefully and select the correct ones.
(i) Cardiac fibres are branched with one or more nuclei
(ii) Smooth muscles are unbranched and cylindrical
(iii) Skeletal muscles can be branched or unbranched
(iv) Smooth muscles are non-striated
(a) only (iv) (b) (ii) and (iii)
(c) (iii) and (iv) (d) only (iii)

25. A cricket player is fast chasing a ball in the field. Which one of the following groups of bones is directly contributing in this movement?
(a) Femur, malleus, tibia, metatarsals
(b) Pelvis, ulna, patella, tarsals
(c) Sternum, femur, tibia, fibula
(d) Tarsals, femur, metatarsals, tibia

26. Which of the following statement is incorrect w.r.t. bone?
(a) If born is kept in HCl it becomes soft
(b) Bone is made up of 60&70% organic matter and 30&40% inorganic matter
(c) If bone is heated then the organic part disappears and inorganic part is retained
(d) Hydroxyapatite salts and fluorapatite salts are found in matrix

27. One of the following is a location of most abundant cartilage in the human body.
(a) Tracheal rings and costal cartilages
(b) Intevertebral disc and public symphysis
(c) Pinna and tip of nose
(d) Pectoral girdle and pelvic girdle

28. Upon preventing acetylcholine from diffusing across a neuromuscular junction, which of the following will *not* result?
(a) No action potential will be produced in the affected muscle fibre's plasma membrane.
(b) The endoplasmic reticulum releases calcium ions (Ca^{2+}) into the cytoplasm.
(c) Myosin will not bind to actin in the affected muscle fibre.
(d) The affected muscle fiber will fail to contract.

29. Muscle A and muscle B are the same size, but muscle A is capable of much finer control than muscle B. Which one of the following is likely to be true of muscle A?
(a) It contains fewer motor units than muscle B.
(b) It has larger sarcomeres than muscle B.
(c) It is controlled by more neurons than muscle B.
(d) It is controlled by fewer neurons than muscle B.

30. Much discussion of muscle is related to 'striated' muscle, but 'smooth' muscles are also important for
(a) protecting and nourishing striated muscle cells.
(b) conveying action potentials from nerve endings to the deepest parts of striated muscle.
(c) involuntary activities, such as movement of food in the gut and controlling blood pressure.
(d) sheathing the striated muscles so that they do not damage each other as they slide past one another.

RESPONSE GRID					
	21. (a)(b)(c)(d)	**22.** (a)(b)(c)(d)	**23.** (a)(b)(c)(d)	**24.** (a)(b)(c)(d)	**25.** (a)(b)(c)(d)
	26. (a)(b)(c)(d)	**27.** (a)(b)(c)(d)	**28.** (a)(b)(c)(d)	**29.** (a)(b)(c)(d)	**30.** (a)(b)(c)(d)

Space for Rough Work

31. What is a hydrostatic skeleton largely composed of?
(a) Bone (b) Fluid
(c) Cartilage (d) Connective tissue

32 The only movable bone in the skull is:
(a) Mandible (b) Maxilla
(c) Ethmoid (d) None

33. The smallest irregular bone in man is:
(a) Patella (b) Stapes
(c) Nasal (d) Palatine

34. ATP provides the energy for muscle contraction by allowing for
(a) an action potential formation in the muscle cell.
(b) cross-bridge detachment of myosin from action.
(c) cross-bridge attachment of myosin to actin
(d) release of calcium by sarcoplasmic reticulum.

35. The primary difference between an endoskeleton and an exoskeleton has to do with
(a) the presence of both circular and longitudinal muscles.
(b) whether or not the skeleton is on the inside of the body.
(c) the presence or absence of joints.
(d) the amount of fluid in the body.

36. Deposition of uric acid crystals within the synovial joint causes:
(a) osteoarthritis (b) rheumatoid arthritis
(c) gout (d) paralysis

37. Total no. of muscles in our body is
(a) 256 muscles (b) 639 muscles
(c) 400 muscles (d) 421 muscles

38. The muscle band that remains unchanged during contraction and relaxation of the skeletal muscle is
(a) I (b) H
(c) A (d) Z line

39. What is not true about human skull ?
(a) It is dicondylic
(b) It includes 6 ear ossicles
(c) It includes 14 facial bones
(d) Hyoid is not included in skull bones

40. Which is part of pectoral girdle?
(a) Glenoid cavity (b) Sternum
(c) Ilium (d) Acetabulum

41. Number of bones in hind limb of human is-
(a) 21 (b) 24
(c) 30 (d) 14

42. Haversian system is diagnostic feature of-
(a) Avian bones (b) Reptilian bones
(c) Mammalian bones (d) Bones of all animal

43. In children the bones are more flexible and brittle because their bones have
(a) large quantity of salts and little organic substances
(b) large quantity of organic substances and little salts
(c) well developed haversian system
(d) large number of osteoblasts

44. Pneumatic bones are found in
(a) House lizard (b) Pigeon
(c) Flying fish (d) Frog's tadpole

45. Actin protein occurs in two forms
(a) Polymeric F- actin and monomeric G- actin
(b) Monomeric F- actin and polymeric G-actin
(c) The tail and a head
(d) F-actin and G- actin, but both globular

RESPONSE GRID					
	31. ⓐⓑⓒⓓ	**32.** ⓐⓑⓒⓓ	**33.** ⓐⓑⓒⓓ	**34.** ⓐⓑⓒⓓ	**35.** ⓐⓑⓒⓓ
	36. ⓐⓑⓒⓓ	**37.** ⓐⓑⓒⓓ	**38.** ⓐⓑⓒⓓ	**39.** ⓐⓑⓒⓓ	**40.** ⓐⓑⓒⓓ
	41. ⓐⓑⓒⓓ	**42.** ⓐⓑⓒⓓ	**43.** ⓐⓑⓒⓓ	**44.** ⓐⓑⓒⓓ	**45.** ⓐⓑⓒⓓ

Space for Rough Work

DAILY PRACTICE PROBLEM DPP CHAPTERWISE 20 - BIOLOGY			
Total Questions	45	Total Marks	180
Attempted		Correct	
Incorrect		Net Score	
Cut-off Score	45	Qualifying Score	60
Success Gap = Net Score – Qualifying Score			
Net Score = (Correct × 4) – (Incorrect × 1)			

HINTS & SOLUTIONS

DPP /CB20

1. (c) Movement of Ca^{2+} out in sarcoplasmic reticulum controls the making and breaking of actin and myosin complex actomyosin due to which muscle contraction and relaxation takes place. Albert Szent Gyorgyi worked out biochemical events of muscle contraction.

2. (a) Elbow joint is an example of hinge joint. The elbow is a hinge joint; it can open and close like a door. Hinge joint is a form of diarthrosis (freely movable joint) that allows angular movement in one plane only, increasing or decreasing the angle between the bones e.g. elbow joint, knee joint etc.

3. (b) MRI machine does not show face image of bone and calcium, *e.g*. scapula, canine. It is also not suitable for patients with cardiac pacemakers.

4. (b) Hyoid is a horse shoe shaped bone present in neck between lower law and sound box (larynx). It is not articulated to any bone, but is simply suspended, from temporal bones by means of ligaments. Hyoid provides surface for the attachment of tongue muscles.

5. (b)

6. (d) Ball and socket joint is a type of synovial joint in which two bones are articulated. Shoulder joint is an example of ball and socket joint in which humerus is joined with pectoral girdle.

7. (a) Actin and tropomyosin are part of thin filaments of skeletal muscle. Tubulin is presents in microtubules. Myosin is muscle protein.

8. (d)

9. (a) The pelvic girdle is formed by two innominate bones consists of three separate bones ilium, ischium and the pubis.

10. (d) The last two pairs *i.e.* 11th and 12th pairs ribs remain free anteriorly, hence, they are called as floating ribs.

11. (d)

12. (d) The sensation of fatigue in the muscles after prolonged strenuous physical work is caused by the accumulation of lactic acid.

13. (d) **14. (c)** **15. (c)** **16. (c)** **17. (a)**

18. (c) Troponin is a protein which is found on actin filament and myosin protein is found in myosin filament. Both actin and myosin are complex proteins in striated muscles.
Thymosin is a hormone secreted by the thymus that stimulates development of T-cells. Prolactin is a hormone released by the pituitary gland that stimulates breast development and milk production in women. Rhodopsin, also known as visual purple, is not a hormone. It is a biological pigment in photoreceptor cells of the retina that is responsible for the first events in the perception of light.

19. (a) **20. (d)** **21. (a)** **22. (a)** **23. (a)**

24. (a) Smooth muscles are non-straited, unbranched and spindle shaped. Skeletal muscles are unbranched. Cardiac muscles fibres are uni-nucleated.

25. (d) Tarsals, femur, metatarsals and tibia are boned of the legs which are involved in running during chasing the ball by cricket player.

26. (b) Bone is made up of 60&70% inorganic matter and 30&40% organic matter.

27. (a) Hyaline cartilage is most abundant cartilage in body.

28. (b) The ER releases calcium ions only if stimulated by an action potential, which requires acetylcholine to diffuse across the neuromuscular junction.

29. (c) Fine motor control is accomplished by the presence of smaller, more numerous motor units. Each motor unit requires an individual motor neuron.

30. (c) Smooth muscle is found mainly in the walls of hollow organs, such as digestive tract organs and blood vessels. Smooth muscles propel substances through the hollow organ by alternately contracting and relaxing.

31. (b) A hydrostatic skeleton consists of fluid held under pressure in a closed body compartment.

32. (a) Mandible is a large bone constituting the lower jaw.

33. (b) Stapes is one of the three ear ossicles in the middle ear resembling a tiny stirrup. It transmits sound vibrations from the incus to the internal ear.

34. (b) ATP provides energy that is used to detach myosin from actin.

35. (b) Endoskeletons (such as those of mammals) are found inside the body, and exoskeletons (such as those of insects) are found outside the body.

36. (c) In gout, there occurs a defect in uric acid metabolism resulting into its elevated level in blood (hyperuricemia). This is followed by precipitation of excessive uric acid which gets deposited in the joint spaces. These deposited crystals of uric acid causes pain in different bony joints.

37. (b) **38. (c)** **39. (d)**

40. (a) Glenoid cavity is a shallow concavity on the lateral side of pectoral girdle in which the head of humerus fits making the shoulder joint.

41. (c) **42. (c)** **43. (b)** **44. (b)** **45. (a)**