BIOLOGY

Worksheet-2

STEP

A PROJECT BY PUNJAB GROUP

Worksheet-2

(Muscles and Movement)

Q.1 The muscles that are attached to the skeleton are:
A) Smooth muscles
B) Skeletal muscles
C) Cardiac muscles
D) Involuntary muscles

Q.2 Generally, each end of the entire muscle is attached to bone by a bundle of collagen, non-elastic fibres known as:
A) Ligament C) Tendon
B) Capsule D) Connective tissue

Q.3 It is a long cylindrical cell with multiple oval nuclei arranged just beneath its sarcolemma:
A) Muscle fibre C) Myofibril
B) Muscle bundle D) Myofilament

Q.4 Sarcoplasm of muscle fibres differs from the cytoplasm of the other cells as it contains usually:
A) Large amount of stored starch
B) A unique oxygen binding protein, myoglobin
C) Hemoglobin that stores oxygen
D) Large amount of stored lipids

Q.5 Myofibrils run in parallel fashion and extend entire length of the:
A) Muscle bundle
B) Muscle
C) Muscle fibre or muscle cell
D) Myofilament

Q.6 Bundles of myofibrils are enclosed by the:
A) Muscle cell membrane
B) Nuclear membrane
C) Sarcolemma
D) Muscle cell membrane or sarcolemma

Q.7 The light band of sarcomere is called:
A) H band C) I band
B) A band D) M band

Q.8 Light and dark bands of muscles give the muscle cell as a whole its:
A) Strength
B) Nourishment
C) Striped appearance
D) Protection

Q.9 A sarcomere is the region of a myofibril between two successive:
A) A-lines C) Z-lines
B) H-lines D) M-lines

Q.10 Myofibrils contain:
A) Myofilaments C) Thin filaments
B) Thick filaments D) Muscle fibres

Q.11 It is made up of thick and thin filament:
A) Myofibril C) Muscle bundle
B) Muscle fibre D) Myofilament

Q.12 The diameter of thick filament is:
A) 16 μm C) 1-2 μm
B) 7-8 nm D) 16 nm

Q.13 Each myosin molecule has a tail terminating in:
A) Two globular heads
B) Two linear heads
C) A globular head
D) A linear head

Q.14 Globular heads of myosin filaments link the thick and the thin myofilaments together during contraction, that is why they are sometimes called:
A) Cross links C) Cross connection
B) Cross bridges D) Cross heads

Q.15 Thin filaments have a diameter of:
A) 1-2 μm C) 7-8 nm
B) 10-60 μm D) 16 nm

Q.16 Thin filaments are composed chiefly of:
A) Actin
B) Troponin
C) Tropomyosin
D) Actin, tropomyosin and troponin

Q.17 Out of three polypeptides of troponin one binds to actin chain, another binds to tropomyosin while third binds:
A) Myosin C) Sodium ions
B) Collagen D) Calcium ions

Q.18 The hypothesis to explain all events involved in muscle contraction was suggested by:
A) H. Huxley
B) H. Huxley and A.F Huxley
C) A.F. Huxley
D) H. Huxley and A.F Huxley and their colleagues

Q.19 During muscle contraction the cross bridges of thick filaments become attached to:
A) Myosin filament
B) Binding sites of myosin filament
C) Binding sites on actin filament
D) Actin filament

Q.20 Calcium ions bind with the troponin molecule and cause them to:
A) Extend
B) Move slightly
C) Contract
D) Remain in the same position

Q.21 Once the myosin head has become attached to the actin filament:
A) ATP is synthesized and the bridge goes to its cycle
B) ATP is hydrolyzed and the bridge goes to its cycle
C) ATP is synthesized and the bridge becomes fixed
D) ATP is hydrolyzed and the bridge becomes fixed

Q.22 All the fibres innervated by a single motor neuron contract:
A) One after other
B) Simultaneously
C) Separately
D) Now or then simultaneously

Q.23 T-system extends and encircles the myofibril at the level of:
A) Z-line
B) A and I junction
C) Z-line or A and I Junctions
D) M-line or A and I Junctions

Q.24 It causes muscle pH to drop when the muscle suffers from:
A) Accumulation of ATPs
B) Aerobic breakdown of glucose
C) Overactive metabolism
D) Lactic acid accumulation

Q.25 It increases the excitability of neurons and result in loss of sensation:
A) Cramp C) Tetany
B) Muscle fatigue D) Tetanus

Q.26 The vertebrates possess _____ kinds of muscles:
A) Two C) Three
B) Four D) Six

Q.27 It has regular stripes:
A) Cardiac muscles
B) Skeletal muscles
C) Voluntary muscles
D) Involuntary muscles

Q.28 It has many nuclei per cell:
A) Smooth muscles
B) Cardiac muscles
C) Skeletal muscles
D) Involuntary muscles

Q.29 Contraction of smooth muscles is caused by following causes:
A) Spontaneous stimuli
B) Nervous system & hormonal stimuli
C) Stretch stimuli
D) Spontaneous, stretch, nervous & hormones

Q.30 The contraction of cardiac muscles is caused by:
A) Spontaneous stimuli
B) Nervous stimuli
C) Stretch stimuli
D) Hormonal stimuli

Q.31 The function of cardiac muscles is to:
A) To pump blood
B) To move the skeleton
C) To control movement of substances through hollow organs
D) To pump the lymph

Q.32 The function of skeletal muscles is to:
A) To pump blood
B) To move the skeleton
C) To control movement of substances through hollow organs
D) To pump the lymph

Q.33 A smallest contractile unit of muscle contraction called sarcomere is the area between two:
A) H- zone C) Z- Line
B) M- Line D) A band

Q.34 The thousands of T-tubules of each muscle cell are collectively called:
A) Triad
B) Sarco-tubules
C) T-system
D) Neuromuscular junction

Q.35 If a cross section of a sarcomere is seen, each myosin is surrounded by how many actin molecules:
A) 9 C) 6
B) 5 D) 7

Q.36 The protein filament which binds to the calcium:
A) Actin C) Troponin
B) Myosin D) Tropomyosin

Q.37 Muscle fatigue is caused by:
A) CO_2
B) Accumulation lactic acid
C) Fumaric acid
D) Ethyl alcohol

Q.38 Twisting around the actin chains there are two strands of another protein:
A) Myosin C) Troponin
B) Tropomyosin D) Creatine

Q.39 It remains fixed during muscle contraction:
A) Origin C) Belly
B) Insertion D) Bone

Q.40 _____ can polarize visible light:
A) M-line of sarcomere
B) I-band of sarcomere
C) H-band of sarcomere
D) A-band of sarcomere

Q.41 It length of myofibril from one Z-line to the next:
A) Plasma membrane C) Sarcoplasm
B) Sarcomere D) Sarcolemma

Q.42 Muscle cell is considered as:
A) Muscle fiber
B) Sarcomere
C) Muscle bundle
D) Myofibril

Q.43 Smooth reticulum are similar in structure to:
A) RER
C) Golgi bodies

B) Microfilaments
D) Sarcoplasmic reticulum

Q.44 Pickup the ranges of muscle fibre:
A) 5 – 10 µm C) 10 – 100 µm
B) 1 – 2 µm D) 50 – 100 nm

Q.45 The thin filaments extends across the I-band and partly in to:
A) Z-line C) A-band
B) H-zone D) M-line

Q.46 The _____ have mid-section called H zone:
A) H-zone C) Z-zone
B) M-zone D) A-zone

Q.47 Pick up a complex of three polypeptide chains protein:
A) Tropomyosin B) Actin
C) Myosin D) Troponin

Q.48 Each myosin filament is surrounded by _____ actin filaments on both ends:
A) 5 B) 6
C) 10 D) 12

Q.49 After death, the amount _____ in the body falls:
A) Water C) Oxygen
B) Calcium D) ATP

Q.50 Majority of muscles tissue in human body are _____ type:
A) Smooth C) Cardiac
B) Circular D) Skeletal

ANSWER KEY (Worksheet-2)					
1	B	21	B	41	B
2	C	22	B	42	A
3	A	23	C	43	D
4	B	24	D	44	C
5	C	25	C	45	C
6	D	26	C	46	A
7	C	27	B	47	D
8	C	28	C	48	D
9	C	29	D	49	D
10	A	30	B	50	D
11	D	31	A		
12	D	32	B		
13	A	33	C		
14	B	34	C		
15	C	35	C		
16	A	36	C		
17	D	37	B		
18	D	38	B		
19	C	39	A		
20	B	40	D		

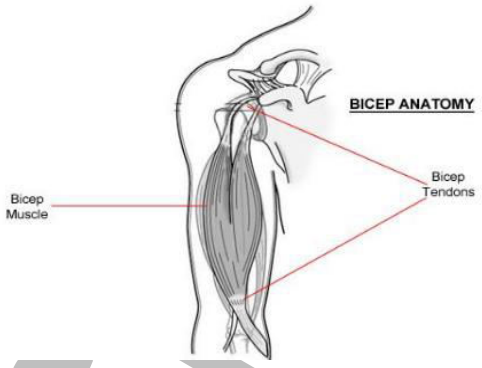
EXPLANATION

Q.1 **Answer is "Skeletal muscles"**

Explanation: Skeletal muscles are called so because of their association on with skeleton.

Q.2 **Answer is "Tendon"**

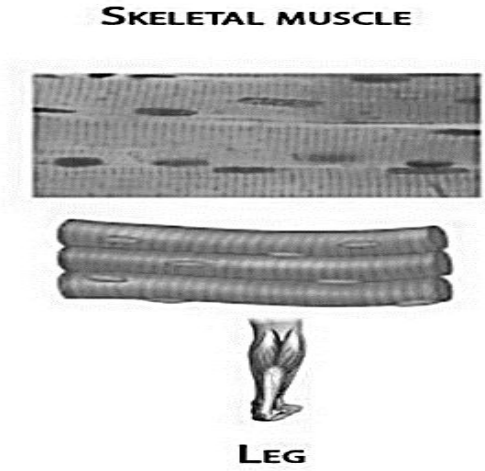
Explanation:



Tendon makes the ends of origin and ends of insersion of a skeletal muscles.

Q.3 **Answer is "Muscle fibre"**

Explanation: A muscle cell or muscle fibre of skeletal muscle have such features.



Q.4 **Answer is "A unique oxygen binding protein myoglobin"**

Explanation: It is called muscle hemoglobin.

Q.5 **Answer is "Muscle fibre or muscle cell"**

Explanation: Myofibrils have same length as held by muscle cell.

Q.6 **Answer is "Muscle cell membrane or sarcolemma"**

Explanation: The plasma membrane of muscle cell is called sarcolemma.

Q.7 **Answer is "I-band"**

Explanation: It consists of thin (actin) filaments only.

Q.8 **Answer is "Striped appearance"**

Explanation: That is why they are called striped or striated muscles.

Q.9 **Answer is "Z-line"**

Explanation: An area between two Z-lines or Z disc is called sarcomere.

Q.10 **Answer is "Myofilaments"**

Explanation: Actin and myosin filaments.

Q.11 Answer is "Myofilament"

Explanation: Actin filament is thin while myosin filament is thick. They collectively (six thin myofilaments and one thick myofilament) give rise to a myofibril.

Q.12 Answer is "16nm"

Explanation: As per measurement.

Q.13 Answer is "Two globular heads"

Explanation: These are looping ends which make cross bridges with thin myofilament.

Q.14 Answer is "Cross bridges"

Explanation: Bond between myosin head and thin filament is called cross bridge.

Q.15 Answer is "7-8 nm"

Explanation: As per measurement.

Q.16 Answer is "Actin"

Explanation: Thin myofilaments consist of actin, tropomyosin and troponin, however the chief protein is actin. So thin myofilament is chiefly made up of actin.

Q.17 Answer is "Calcium ions"

Explanation: Calcium ions after making bond with troponin drag the tropomyosin away from the slot where myosin head makes bond.

Q.18 Answer is "H. Huxley and A-F Huxley and their colleagues"

Explanation: As per historical fact.

Q.19 Answer is "Binding sites on actin filament"

Explanation: Myosin heads bind to the binding sites on actin filaments to make cross bridges. These myosin heads bring the actin filaments towards the centre of the sarcomere by contracting.

Q.20 Answer is "Move slightly"

Explanation: When the muscle is required to contract, calcium ions bind with the troponin molecule and cause them to move slightly. This has the effect of displacing the tropomycin and exposing the binding sites for the myosin head.

Q.21 Answer is "ATP is hydrolyzed and bridge goes to its cycle"

Explanation: Muscle contraction is highly active process and ATPs are consumed at each step i.e. making bond with actin filament, moving or bending and detaching from actin filament.

Q.22 Answer is "Simultaneously"

Explanation: the contraction of each muscle fibre is based on "All or none" principle i.e. all of its fibrils participate in contraction. The degree of contraction depends at once upon the number of fibres that participate in the contraction.

Q.23 Answer is "Z-line or A and I junctions"

Explanation: It is to ensure the transmission of impulse.

Q.24 Answer is "Lactic acid accumulation"

Explanation: It accumulates as a result of anaerobic respiration and accumulation of acid lowers the pH.

Q.25 Answer is "Tetany"

Explanation: As per symptoms of tetany.

Q.26 Answer is "Three"

Explanation: Skeletal, smooth and cardiac.

Q.27 Answer is "Skeletal muscles"

Explanation: Skeletal muscles have regular striations or strips converting the surface into alternating light and dark bands.

Q.28 Answer is "Skeletal muscle"

Explanation: Skeletal muscle cells are multinucleate.

Q.29 Answer is "Spontaneous, stretch, nervous and hormones"

Explanation: Causes of contraction of smooth muscles are diverse.

Q.30 Answer is "Nervous stimuli"

Explanation: It is autonomic nervous system, which send rythonic stimuli.

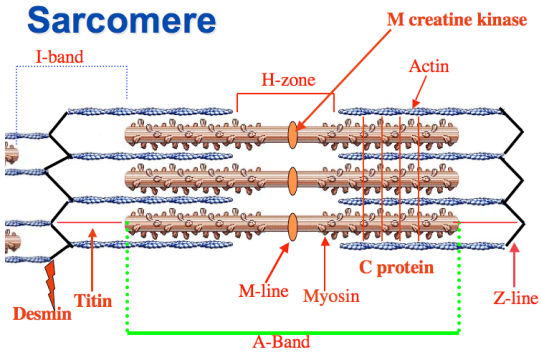
Q.31 Answer is "To pump blood"

Explanation: As per function of the heart.

Q.32 Answer is "To move the skeleton"

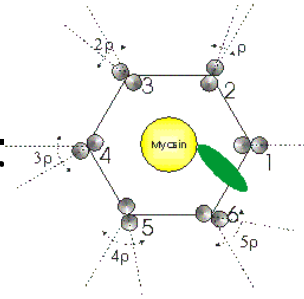
Explanation: As per function of the skeletal muscles.

Q.33 Answer is "Z- Line"
Explanation:



Q.34 Answer is "T-system"
Explanation: The thousands of T-tubules of each muscle cell are collectively called T-system.

Q.35 Answer is "6"
Explanation:



Each myosin filament is surrounded by 6 actin filaments on each end.

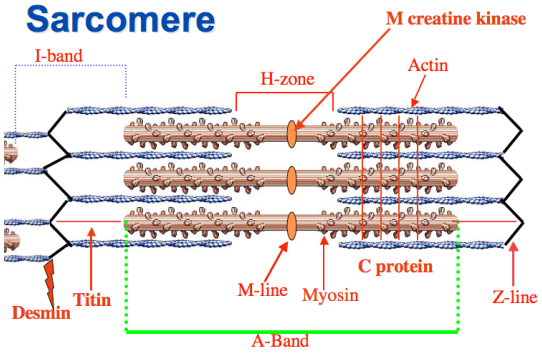
Q.36 Answer is "Troponin"
Explanation: The protein filament which binds to the calcium troponin.

Q.37 Answer is "Accumulation lactic acid"
Explanation: Muscle fatigue is caused by accumulation lactic acid.

Q.38 Answer is "Tropomyosin"
Explanation: Twisting around the actin chains there are two strands of another protein tropomyosin.

Q.39 Answer is "Origin"
Explanation: It remains fixed during muscle contraction origin.

Q.40 Answer is "A-band of sarcomere"
Explanation: I-band of sarcomere cannot polarize visible light.



Q.41 Answer is "Sarcomere"

Explanation: The length of myofibril from one Z-line to the next is known as sarcomere.

Q.42 Answer is "Muscle fiber"

Explanation: Each muscle consists of muscle bundles, which are further composed of muscle fibers of cells.

Q.43 Answer is "Sarcoplasmic reticulum"

Explanation: The nerve impulse is carried through the T-tubule to the adjacent sarcoplasmic reticulum (SR). the calcium gates of the ST open releasing calcium into the cytosol, thus binding calcium ion to troponin molecules of the thin filament.

Q.44 Answer is "10 – 100 μm"

Explanation: The diameter of skeletal muscle fibres is in ranges of 10 – 100 μm.

Q.45 Answer is "A-band"

Explanation: The thin filaments extends across the I-band and partly in A-band.

Q.46 Answer is "H zone"

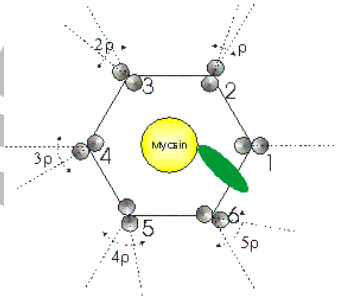
Explanation: Each A band has a lighter stripe in its mid-section called H-zone (H stands for "hele" mean bright). The H-zone is bisected by dark line called M - line. The I bands have mid line called Z-line (Z for zwishen means between).

Q.47 Answer is "Troponin"

Explanation: The protein that is complex of three polypeptide chains is called troponin.

Q.48 Answer is "12"

Explanation:



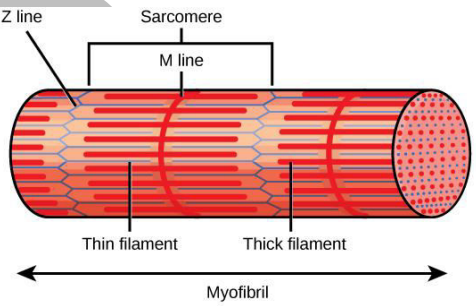
Each myosin filament is surrounded by 12 actin filaments on both ends.

Q.49 Answer is "ATP"

Explanation: After death, the amount of ATP in the body falls. Under these circumstances the bridges cannot be broken and so they remain firmly bound. This results in the body becoming stiff, a condition known as rigor mortis.

Q.50 Answer is "Skeletal"

Explanation: Majority of muscles tissue in your body are skeletal type.



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