BIOLOGY

Worksheet-4

STEP

A PROJECT BY PUNJAB GROUP

Worksheet-4

(Support and Movement)

Q.1 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.2 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.3 Bundles of myofibrils are enclosed by the:
A) Muscle cell membrane
B) Nuclear membrane
C) Sarcolemma
D) Muscle cell membrane or sarcolemma

Q.4 The light band of sarcomere is called:
A) H band C) I band
B) A band D) M band

Q.5 Myofibrils contain:
A) Myofilaments C) Thin filaments
B) Thick filaments D) Muscle fibres

Q.6 It is made up of thick and thin filament:
A) Myofibril C) Muscle bundle
B) Muscle fibre D) Myofilament

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

Q.8 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.9 Thin filaments have a diameter of:
A) 1-2 μm C) 7-8 nm
B) 10-60 μm D) 16 nm

Q.10 Thin filaments are composed chiefly of:
A) Actin
B) Troponin
C) Tropomyosin
D) Actin, tropomyosin and troponin

Q.11 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.12 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.13 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.14 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.15 It has regular stripes:
A) Cardiac muscles
B) Skeletal muscles
C) Voluntary muscles
D) Involuntary muscles

Q.16 It has many nuclei per cell:
A) Smooth muscles
B) Cardiac muscles
C) Skeletal muscles
D) Involuntary muscles

Q.17 The contraction of cardiac muscles is caused by:
A) Spontaneous stimuli
B) Nervous stimuli
C) Stretch stimuli
D) Hormonal stimuli

Q.18 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.19 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.20 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.21 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.22 Twisting around the actin chains there are two strands of another protein:
A) Myosin C) Troponin
B) Tropomyosin D) Creatine

Q.23 It remains fixed during muscle contraction:
A) Origin C) Belly
B) Insertion D) Bone

Q.24 _____ 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.25 Muscle cell is considered as:
A) Muscle fiber
B) Sarcomere
C) Muscle bundle
D) Myofibril

Q.26 Smooth reticulum are similar in structure to:
A) RER
B) Microfilaments
C) Golgi bodies
D) Sarcoplasmic reticulum

Q.27 Pickup the ranges of muscle fibre:
A) 5 – 10 µm C) 10 – 100 µm
B) 1 – 2 µm D) 50 – 100 nm

Q.28 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.29 The _____ have mid-section called H zone:
A) H-zone C) Z-zone
B) M-zone D) A-zone

Q.30 Pick up a complex of three polypeptide chains protein:
A) Tropomyosin C) Myosin
B) Actin D) Troponin

Q.31 Majority of muscles tissue in human body are _____ type:
A) Smooth C) Cardiac
B) Circular D) Skeletal

Q.32 Sarcoplasmic reticulum in muscle cell is like endoplasmic reticulum but devoid of:
A) Sarco-tubules
B) Ca^{+2} ions
C) Repeating pattern
D) Ribosomes

Q.33 The type of muscle present in our:
A) Heart is involuntary and unstriated smooth muscle
B) Intestine is striated and involuntary
C) Thigh is striated and voluntary
D) Upper arm is smooth muscle and fusiform in shape

Q.34 The structure which joins a muscle to a bone is called:
A) Tendon
B) Ligament
C) Belly
D) Sarcolemma

Q.35 The function of calcium ions in muscle contraction is to:
A) Bind to troponin molecule and cause them to move
B) Aid in the transmission of nerve impulse
C) Polarize visible light
D) Bind to tropomyosin molecule and cause them to form cross bridges

Q.36 Term "Hele" means:
A) Dark
B) Hollow
C) Compact
D) Bright

Q.37 Myoglobin is present in:
A) Sarcoplasmic reticulum
B) Nucleus
C) Sarcomere
D) Sarcoplasm

Q.38 T-tubules of muscle fibers are formed by:
A) Invagination of sarcolemma
B) Outgrowth of sarcolemma
C) Degeneration of sarcolemma
D) Thickening of sarcolemma

Q.39 All the muscle fibers triggered by a single neuron contract simultaneously as a single:
A) Associated unit
B) Sensory unit
C) Motor unit
D) Inter unit

Q.40 Sarcomeres are part of:
A) Muscle fibres
B) Myofibrils
C) Myofilaments
D) Myonemes

Q.41 Cartilage is a type of connective tissue consisting of cells called:
A) Osteoblasts C) Chondrocytes
B) Thrombocytes D) Leukocytes

Q.42 It is a tough, flexible matrix made of type II collagen:
A) Bone C) Muscle
B) Cartilage D) Blood

Q.43 It is a rigid form of connective tissue:
A) Cartilage C) Blood
B) Muscle D) Bone

Q.44 Muscle is a specialized tissue of _____ origin:
A) Epidermal C) Mesodermal
B) Ectodermal D) Endodermal

Q.45 The muscles are primarily involved in locomotory actions and changes of body postures:
A) Skeletal C) Smooth
B) Cardiac D) Striped

Q.46 _____ joints are the most freely moving synovial joints:
A) Hing C) Fibrous
B) Ball and socket D) Cartilaginous

Q.47 It is a region of myofibril between two successive Z-lines:
A) Sarcolemma C) Sarcomere
B) H-zone D) I-band

Q.48 The I band have midline called:
A) M-line C) H-zone
B) Z-line D) I-band

Q.49 Each _____ has a series of dark and light bands which are evident along the length of each myofibril:
A) I-band C) Sarcomere
B) A-band D) M-line

Q.50 Bone forming cells are:
A) Chondrocytes C) Osteoclasts
B) Osteoblasts D) Osteocytes

Q.51 It is also called collar bone:
A) Sternum C) Hyoid
B) Clavical D) Mandible

Q.52 _____ are bone dissolving cells:
A) Chondrocytes C) Osteoclasts
B) Osteocytes D) Osteoblasts

Q.53 Which one of the following is the most abundant in human body?
A) Hyaline cartilage
B) Fibrocartilage
C) Elastic cartilage
D) Chondrous cartilage

Q.54 It is also called tail bone:
A) Pubis C) Pelvis
B) Sacrum D) Coccyx

Q.55 Dense parallel bundles of connective tissue that strengthen joints and hold the bones is place called:
A) Tendons C) Sarcomere
B) Ligaments D) Myofibril

Q.56 _____ are those in which the articulating bones are separated by a fluid–containing joint cavity:
A) Synovial joint C) Fibrous joint
B) Cartilaginous joint D) Pivot joint

Q.57 Which one of the following is also called breast bone?
A) Clavicle C) Scapula
B) Sternum D) Humerus

Q.58 Inflammatory or degenerative disease that damages joints called:
Acute arthritis
B) Chronic arthritis
C) Sprain
D) Arthritis

Q.59 Which cartilage is present at the end of long bones?
A) Calcified cartilage
B) Hyaline cartilage
C) Elastic cartilage
D) Fibrous cartilage

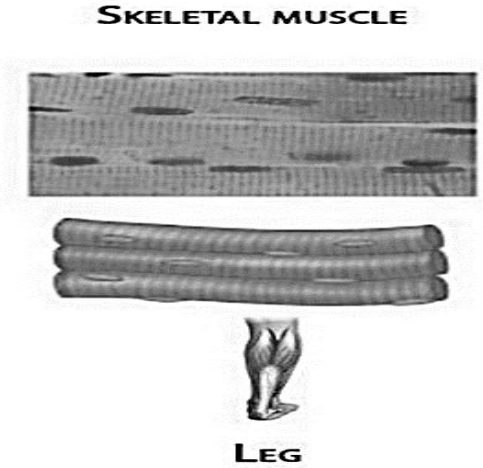
Q.60 All of the following are types of cartilage tissue in human body, EXCEPT:
A) Hyaline cartilage
B) Elastic cartilage
C) Fibrocartilage
D) Osteocytes

Q.61 The cartilage matrix is covered by a dense layer of collagen fibres, called:
A) Perichondrium
B) Pericardium
C) Peritoneum
D) Periosteum

ANSWER KEY (Worksheet-4)					
1	A	22	B	43	D
2	B	23	A	44	C
3	D	24	D	45	A
4	C	25	A	46	B
5	A	26	D	47	C
6	D	27	C	48	B
7	D	28	C	49	C
8	B	29	A	50	B
9	C	30	D	51	B
10	A	31	D	52	C
11	D	32	D	53	A
12	C	33	C	54	D
13	B	34	A	55	B
14	C	35	A	56	A
15	B	36	D	57	B
16	C	37	D	58	D
17	B	38	A	59	B
18	A	39	C	60	D
19	B	40	B	61	A
20	C	41	C		
21	C	42	B		

EXPLANATION

Q.1 **Answer is "Muscle fibre"**
Explanation: A muscle cell or muscle fibre of skeletal muscle have such features.



Q.2 **Answer is "A unique oxygen binding protein myoglobin"**
Explanation: It is called muscle hemoglobin.

Q.3 **Answer is "Muscle cell membrane or sarcolemma"**
Explanation: The plasma membrane of muscle cell is called sarcolemma.

Q.4 **Answer is "I-band"**
Explanation: It consists of thin (actin) filaments only.

Q.5 **Answer is "Myofilaments"**
Explanation: Actin and myosin filaments.

Q.6 **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.7 **Answer is "16nm"**
Explanation: As per measurement.

Q.8 **Answer is "Cross bridges"**
Explanation: Bond between myosin head and thin filament is called cross bridge.

Q.9 **Answer is "7-8 nm"**
Explanation: As per measurement.

Q.10 **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.11 **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.12 **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.13 **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.14 **Answer is "Z-line or A and I junctions"**
Explanation: It is to ensure the transmission of impulse.

Q.15 **Answer is "Skeletal muscles"**
Explanation: Skeletal muscles have regular striations or strips converting the surface into alternating light and dark bands.

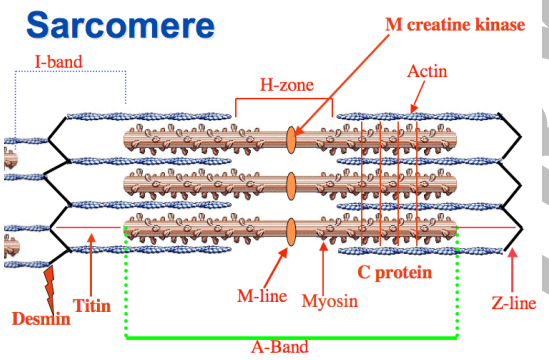
Q.16 **Answer is "Skeletal muscle"**
Explanation: Skeletal muscle cells are multinucleate.

Q.17 **Answer is "Nervous stimuli"**
Explanation: It is autonomic nervous system, which send rythonic stimuli.

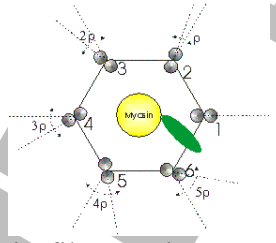
Q.18 **Answer is "To pump blood"**
Explanation: As per function of the heart.

Q.19 **Answer is "To move the skeleton"**
Explanation: As per function of the skeletal muscles.

Q.20 **Answer is "Z- Line"**
Explanation:



Q.21 **Answer is "6"**
Explanation:

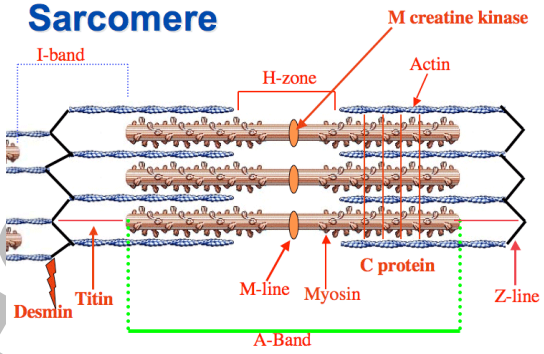


Each myosin filament is surrounded by 6 actin filaments on each end.

Q.22 **Answer is "Tropomyosin"**
Explanation: Twisting around the actin chains there are two strands of another protein tropomyosin.

Q.23 **Answer is "Origin"**
Explanation: It remains fixed during muscle contraction origin.

Q.24 **Answer is "A-band of sarcomere"**
Explanation: I-band of sarcomere cannot polarize visible light.



Q.25 **Answer is "Muscle fiber"**
Explanation: Each muscle consists of muscle bundles, which are further composed of muscle fibers of cells.

Q.26 **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.

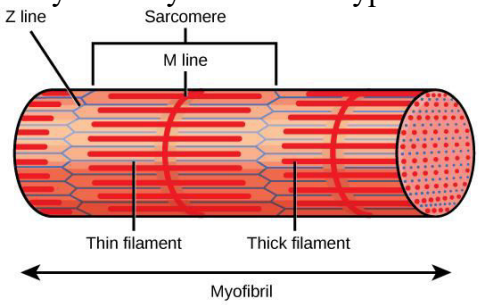
Q.27 **Answer is "10 – 100 μm"**
Explanation: The diameter of skeletal muscle fibres is in ranges of 10 – 100 μm.

Q.28 **Answer is "A-band"**
Explanation: The thin filaments extends across the I-band and partly in A-band.

Q.29 **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.30 **Answer is "Troponin"**
Explanation: The protein that is complex of three polypeptide chains is called troponin.

Q.31 Answer is "Skeletal"
Explanation: Majority of muscles tissue in your body are skeletal type.



Q.32 Answer is "Ribosomes"
Explanation: Sarcoplasmic Reticulum (S.R) is continuous system of sarco-tubules extending throughout the sarcoplasm around each myofibril. It is like endoplasmic reticulum but devoid of ribosomes and exhibits a highly specialized repeating pattern.

Q.33 Answer is "Thigh is striated and voluntary"
Explanation: Cardiac muslces are found in the wall of the heart. It is involuntary and slightly striated. Smooth muscles are found in gastrontestinal tract. These are non-striated and involuntary. Striated (or skeletal) muslces are found int eh limbs and body walls. These muslces are voluntary (under the control of animals will) and show dark and light bands thus are striated.

Q.34 Answer is "Tendon"
Explanation: Skeletal muscle has three parts: **origin** is the end of muscle which remains fixed when muscle contracts, **insertion** is the end of the muscle that moves the bone, and **belly** is thick part between origin and insertion, which contract.**Connective tissue** binds other tissues and helps to maintain body form by holding the various organs together. Connective tissue fibrils have two specialized kinds. **Ligaments** attach bone to bone and are slightly elastic. **Tendons** attach muscles to bones and are non-elastic.

Q.35 Answer is "Bind to troponin molecule and cause them to move"
Explanation: The nerve impulse is carried through the T-tubule to the adjacent sarcoplasmic reticulum (SR). The calcium gates of the SR open releasing calcium into the cytosol, thus binding calcium ion to troponin molecules of the thin filament. The binding sites are exposed and cross bridges with myosin can form, and contraction occurs.

Q.36 Answer is "Bright"
Explanation: Each A band has a lighter stripe in its mid section called H - zone (H stands for "hele" mean bright).

Q.37 Answer is "Sarcoplasm"
Explanation: Skeletal muscles are also called striped or striated muscles because they show alternate light and dark bands, e.g., triceps and biceps. Generally, each end of the entire muscle is attached to bone by a bundle of collagen, non-elastic fibres, known as tendons.

Q.38 Answer is "Invagination of sarcolemma"
Explanation: The sarcolemma of muscle fibre penetrates deep into the cell to form hollow elongated tube, the transverse tubule, T-tubule the lumen of which is continuous with the extracellular fluid. The thousands of T - tubules of each muscle cell are collectively called T-system.

Q.39 Answer is "Motor unit"
Explanation: All or None Response: 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 upon the number of muscle fibers that participate in contraction.

Q.40 Answer is "Myofibrils"
Explanation: The myofibrils consist of smaller contractile units called sarcomere.

Q.41 Answer is "Chondrocytes"

Explanation: Cartilage is a type of connective tissue consisting of cells called chondrocytes and a tough, flexible matrix made of type II collagen. Unlike other connective tissues, cartilage does not contain blood vessels and the chondrocytes are supplied by diffusion. Because of this, it heals very slowly.

Q.42 Answer is "Cartilage"

Explanation: Cartilage is much softer than bone. It is a form of connective tissue. Cartilage is a tough, flexible matrix made of type II collagen.

Q.43 Answer is "Bone"

Explanation: Bone is the most rigid form of connective tissue, which forms the endoskeleton of vertebrates. Bone is living hard (resists compression) and strong (resists bending) structure. The collagen fibers of bone are hardened by deposit of calcium phosphate.

Q.44 Answer is "Mesodermal"

Explanation: Muscle is a specialized tissue of mesodermal origin.

Q.45 Answer is "Skeletal"

Explanation: Skeletal muscle are primarily involved in locomotory actions and changes of body postures. The muscles that are attached to the skeleton and are associated with the movement of bones are called skeletal muscles. The skeletal muscles are consciously controlled and therefore, are called voluntary muscles.

Q.46 Answer is "Ball and Socket"

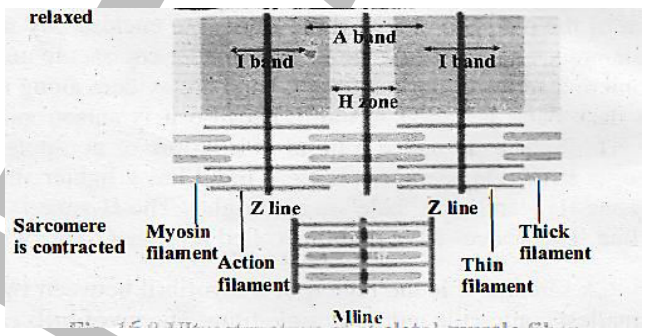
Explanation: In ball and socket joints the spherical or hemispherical head of one bone articulates with the caplike socket of another. These joints are the most freely moving synovial joints. The shoulder and hip joints are examples.

Q.47 Answer is "Sarcomere"

Explanation: A sarcomere is the region of a myofibril between two successive Z – line and is the smallest contractile unit of muscle fibre. The myofibrils contain myofilaments.

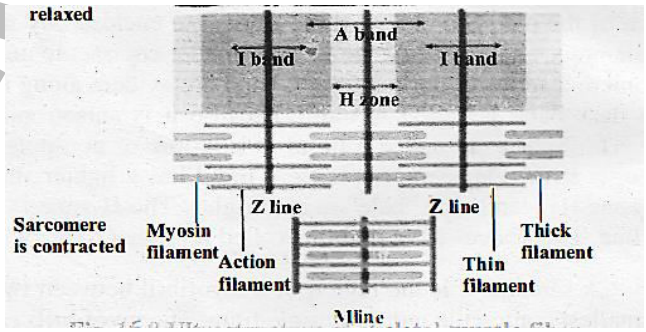
Q.48 Answer is "Z-line"

Explanation: The I band have midline called Z – line (Z for zwishen means between).



Q.49 Answer is "Sarcomere"

Explanation: Each sarcomere has a series of dark (A band) and light bands (I band) which are evident along the length of each myofibril.



Q.50 Answer is "Osteoblasts"

Explanation: Bone forming cell (osteoblast), mature bone cell (osteocyte), and bone dissolving cells (osteoclast). The osteoblasts are mononucleate cells. Osteoblasts produce a matrix which is composed mainly of Type I collegen.

Q.51 Answer is "Clavical"

Explanation: Clavical is also called collar bone.

Q.52 Answer is "Osteoclasts"

Explanation: Osteoclasts are bone dissolving cells (osteoclast). Osteoclasts are large, multinucleated cells that remove bone tissue by removing it mineralized matrix and breaking up the organic bone. This process is known as bone resorption. They are equipped with phagocytic-like mechanisms similar to circulating macrophages.

Q.53 Answer is "Hyaline cartilage"

Explanation: Hyaline cartilage is the most abundant in human body. It is found at the movable joints.

Q.54 Answer is "Coccyx"

Explanation: The end of the vertebral column is the coccyx or tail bone which consists of 4 small fused vertebrae. The coccyx is man's vestige of a tail.

Q.55 Answer is "Ligaments"

Explanation: Dense parallel bundles of connective tissue that strengthen joints and hold the bones is place called Ligaments.

Q.56 Answer is "Synovial joint"

Explanation: Synovial joint are the articulating bones are separated by a fluid–containing joint cavity.

Q.57 Answer is "Sternum"

Explanation: Sternum is also known as breast bone. (Glossary).

Q.58 Answer is "Arthritis"

Explanation: Inflammatory or degenerative disease that damages joints.

Q.59 Answer is "Hyaline cartilage"

Explanation:

Cartilage is an important component of skeleton. It consists of a firm matrix containing collagen and elastin fibres and cells in fluid filled lacunae. Cartilage has many types. Elastic cartilage occurs in the pinna and external auditory canal of the ear, epiglottis, Eustachian tubes and tip of the nose to make these organs flexible. Fibrous cartilage is very strong yet has a degree of flexibility. It is found in the intervertebral discs where it acts as a cushion and in pubic symphysis where it allows parturition without damage to the girdle. Hyaline cartilage occurs in sternal ribs where it allows expansion of chest during inspiration. It also forms the tracheal and bronchial rings and supports larynx and nasal septum and also at the end of long bones.

Q.60 Answer is "Osteocytes"

Explanation:

There are three types of cartilage tissue in human body: hyaline, elastic, and fibrocartilage.

Q.61 Answer is "Perichondrium"

Explanation:

Table 16.1 The comparison between bone and Cartilage

S.No.	Bone	Cartilage
i)	Bone is hard.	Cartilage is soft.
ii)	Cells of bone are called osteocytes.	Cells of cartilage are called chondrocytes.
iii)	Matrix is inflexible.	Matrix is flexible.
iv)	Matrix possesses calcium salts.	Calcium salts are not present.
v)	Bone has rich blood supply.	It does not have blood supply.
vi)	Bone marrow is present.	Bone marrow is absent.
vii)	It is vascular in nature.	It is non-vascular in nature.
viii)	Outer covering is called periosteum.	Outer covering is called perichondrium.
ix)	Provide skeletal support to the body.	Provide flexibility to the body.

STEP

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