UNIT - IV
RABBIT MUSCULO SKELETAL SYSTEM

RABBIT MUSCLE CONTRACTIOIN:

- The tissue useful for animals to move the whole part of their bodies and to maintain particular posture is **- Muscular tissue**
- To transmit the force of the contraction of muscle to generate movement of bone-**Leverage and connective tissues are required**
- In the **first class** lever fulcrum is between resistance and effort
- In the **second class** lever resistance is in between fulcrum and effort.
- In **third class** lever effort is in between resistance and fulcrum.
- Functionally muscle cells are specially organised to convert-chemical energy into mechanical work **- Sliding filament hypothesis**
- In Vertebrates three types of muscles are identified **- Straited muscle, Unstriated muscle, Cardiac muscle.**
- Sheath enclosing muscle fibre is **- Sarcolemma**
- Cytoplasm of muscle is **- Sarcoplasm**
- Mitochondria of muscle is **- Sarcosome**
- Endoplasmic reticulum of muscle is **- Sarco plasmic reticulum.**
- Sarcoplasm contains peripherally arranged **- Nuclei**
- Sarcoplasm contains parallely arranged fibres **- Myofibrils**

STRUCTURE OF MYOFIBRIL

- In myofibril the dark band is **- A band or Anisotropic band**
- In myofibril the light band is **- I band or Isotropic band.**
- Lighter or paler part of A band is **- H- band**
- H band is called **- Hensen's disc**
- The central line of H band is **- M-line**
- I band is bisected at its midpoint by dense narrow line is called - **Z-line or Karause's membrane**
- Part of myofibril between two Z-lines is **- Sarcomere**
- I band consist only **- Thin filaments**
- A - band has both thin & thick filaments
- H band consists of only **- Myosin filaments**
- Each thick myosin filament is made up of **-200 Myosin molecules**
- Each myosin molecule is with **-2heads, 2 necks and one tail**
- A myosin molecule is with six polypeptides **- two heavy chain and four light chain polypeptides**
- The filaments with crossbridges is **- Myosin filaments**
- Thick filaments made up of protein **- Myosin**
- Thin filaments made up of protein **- Actin , Troponin & Tropomyosin**
- Long chain of actin molecules are associated with troponin and tropomyosin **- thin filaments**
- Troponin has three sub units - T_nC,T_nT,T_nI
- The subunit to which calcium attaches during muscle contraction is **-** T_nC
- Tropomyosin attaches to **-** T_nT
- Inhibitory subunit is **-** T_nI
- The domains of myosin filament has **- Head Neck, Tail**
- Head has a pocket for ATP and a slit for binding with actin of thin filament.
- The domain of myosin which join the thin filament at active sites and forms the cross bridges during muscle contractions is **- Head**

TRIAD SYSTEM

- The penetration of plasmamembrane in to muscle fibres form **- T- tubule**
- Terminal cisternae of sarcoplasmic reticulum along with T- tubule forms **- Triad system**
- In striated muscle of mammals plasma membrane invaginates into the muscle fibre at **-A-I junctions forming the T-tubule**
- In the striated muscle of other vertebrates these triad systems are present at **- the 'z' membrane**

MECHANISM OF MUSCLE CONTRACTION

- Muscle contraction is a **- Physico chemical change**
- The changes explained by sliding filament hypothesis **- Physical change**
- Sliding filament hypothesis of muscle contraction explained by **- Jean Hanson & Hugh Huxley (1965)**
- Sliding of actin filaments over myosis filament results in **- Shortening of Sacromere**
- When a nerve impulse reaches the neuromuscular junction sarcolemma of muscle- **gets depolarised**

- Depolarisation reaches through T- tubule to **- Sarcoplasmic reticulum**
- Sarcoplasmic reticulum releases - Ca^{++} ions

CONTRACTION OF MUSCLE

- Calcium ions diffuses into **- Thin filaments.**
- Ca^{++} ions bind to - **Troponin - C of thin filament**
- Tropomyosin from the active site of the thin filament is removed by **- Troponin tropomyosin complex**
- The active sites are exposed when **- Ca^{+2} attaches to T_nC**
- The conformational changes in the myosin filaments is due to **- Increase in concentration of Ca^{+2}**
- The actomyosin complex is formed in the absense of **- ATP**
- When ATP binds to the pocket of myosin head it weakens - actomyosin complex
- Hydrolysed ATP causes conformational changes in **- head of myosin**
- Actin - myosin complex at the active site releases **- inorganic phosphorous**
- The swinging of crossbridge towards the H-zone is called **- Power stroke**
- The power stroke is followed by **- the release of ADP**
- The conformation of myosin, which is with a pocket for ATP and tightly bound to the active site, is restored.

RELAXATION OF MUSCLE

- Ca^{+2} ions detach from thin filaments and diffuse towards **- Sacroplasmic reticulum**
- Troponin permits the tropomyosin to cover the active site of **- thin filament**
- Myosin - actin crossbridges break.
- The swinging movements and the attachment and detachment of the heads of crossbridges from actin filaments is termed as **- Ratchet mechanism**
- Ratchet mechanism is also known as **- Walk along mechanism**
- The band, whose length does not change is **- A-band**
- The band and zone which decreases in size or dissappear are **- I band and H-zone**
- The immediate source of energy for muscle contractions is **- ATP**
- Immediate additional source of energy in the muscle **-Creatine phosphate**
- In the vertebrate muscles the energy rich phosphagen compounds is- **Creatine phosphate.**
- In the invertebrate muscles the energy rich phosphagen compound **- Arginine phosphate**
- The high energy phosphates of muscles that donates high energy phosphate to ADP is **- Phosphagen**
- Above reaction catalised by **- Creatine kinase**
- When C P gets exhausted, the next source of energy for muscle contraction is **- Oxidation of Glucose**
- During rapid activity of a muscle the filter acids respiratory system in unable to supply O_2 needed by it which causes as **- Oxygen debt**
- Pyruvic acid produced by glycolysis is transformed to **- Lactic acid in the absence of O_2**
- Accumulation of lactic acid leads to **- Muscle fatigue**
- 80% of lactic acid utilised in the resynthesis of **- Glycogen**
- Formation of glycogen from lactic acid is called **- CORI & CORI cycle**

AN ELEMENTARY IDEA OF AXIAL SKELETON AND APPENDICULAR SKELETON OF RABBIT

- Endoskeleton of rabbit includes- **Axial skeleton and appendicular skeleton**
- Axial skeleton includes- **bones of skull vertebral column and sternum**
- Appendicular skeleton includes **- bones of girdles and limbs**
- Patella or knee bone is a **- sesamoid bone**
- Patella is formed by ossification of **- certain tendons**
- Study of bones is **- osteology**

I. AXIAL SKELETON

i. Skull :

- The skull of rabbit is **- dicondylic (two occipital condyles are present) and tropibasic (interorbital septum is present).**
- Skull is divisible into five parts. They are **-cranium, sense capsules, upper jaw, lower jaw and hyoid apparatus.**

A.**Cranium:**

- It is a bonybox that **-lodges and protects the brain.**
- The three regions of cranium are **- occipital, parietal and frontal.**
- The occipital region of skull has **- foramen magnum**
- It is surrounded ventrally, dorsally and laterally by **- basioccipital, supraoccipital and exoccipital bones.**
- Spinal cord emerges out through **- foramen magnum.**

- Roof of cranium is formed by a pair of frontals anteriorly and a pair of parietals posteriorly.
- Floor of cranium is formed by **- a presphenoid and a basisphenoid.**
- The **alisphenoids** and **orbitosphenoids** form the **- sides of the cranium.**
- **Cribriform plate** - forms the anterior margin of the cranial cavity.

B. **Sense capsules :**

- Olfactory, optic and auditory are the three pairs of sense capsules that lodge and protect the sense organs
- 1) **Olfactory capsules:** These capsules enclose **- the organs of smell.**
- They are dorsally bound by a pair of **nasals**, laterally by **jaw bones** and ventrally by **vomers**.
- **Mesethmoid** - separates the right and left olfactory capsules internally.
- 2) **Optic capsules:** These capsules enclose the eyes.
- The two optic capsules are separated from each other by **- inter-orbital septum.**
- Each orbit is dorsally bound by a frontal, anteriorly by **- maxillae and lacrimal.**
- Each orbit posteriorly bound by **- squamosal and alisphenoid**
- Interorbital septum is formed of orbitosphenoids and prespenoid
- It is externally bound by **- zygomantic arch**.
- 3) **Auditory capsules :**
  They enclose the **- organs of hearing.**
- Each auditory capsule consists of **- a single bone, the periotic.**
- It has two small apertures namely **- fenestra ovalis and fenestra rotunda.**
- Middle ear bones are - **Malleus, incus and stapes**
- The lower swollen portion of periotic bone is **-Tympanic bulla**
- Modified articular of lower jaw **-Malleus**
- Modified quadrate of upper jaw **- Incus**
- Modified hyomandibular **- Stapes**
- C. **Upper Jaw :** Upper jaw consists of two identical halves called **- rami.**
- Each ramus is formed by **- premaxilla, maxilla and jugal.**
- Other bones associated are **-palatine, pterygoid and squamosal**
- Premaxilla contains **- incisors**
- Maxilla bears **- premolars and molars**
- D. **Lower Jaw :** Lower jaw is also formed by two equal halves called **- rami.**
- Each ramus is formed by a single large bone called **- dentary.**
- E. **Hyoid apparatus:**
  It lies in the floor of **- buccal cavity.**
- It has a median bony plate called **- basihyal.**
- It has **anterior cornua** and **posterior cornua**.

ii. Vertebral column

- The vertebral column of rabbit consists of **- 45 vertebrae**
- They are of **amphiplatyon type.**
  1) Cervical vertebrae - **07**
  2) Thoracic vertebrae - **12 or 13**
  3) Lumbar vertebrae - **06 or 07**
  4) Sacral vertebrae - **03 or 04**
  5) Caudal vertebrae - **about 16**

A. **Cervical vertebrae :** These are characterised by - **thin centrum, fusion of reduced ribs, reduced transverse processes, short neural spine.**

- a) **Atlas :** It is the **- first cervical vertebra**.
- It is ring like with **- reduced centrum.**
- It supports the head.
- Anteriorly centrum has two concavities to accommodate the - **occipital condyles of skull.**
- Upper and lower parts of neural canal accomodates respectively - spinal cord and odontoid process
- b) **Axis :** It is the **second cervical vertebra**.
- It's centrum has - **odontoid process.**
- Prezygapophyses are **absent. Postzygapophyses are present**
- c) The cervical vertebrae from - **third to sixth have two transverse processes each**
- d) Seventh cervical vertebra is modified with - **a longer neural spine**

B. **Thoracic vertebrae:** Thoracic vertebrae are modified for articulation with ribs

- a) First nine thoracic vertebrae have - **long, slender and backwardly directed neural spines.**
- Transverse processes are - **short and horizontal.**
- Centrum has - **Capitular facets and tubercular factets are present on transverse processes**
- b) The remaining thoracic vertebrae have - **short neural spines.**
- Transverse processes lack - **tubercular facets.**

C. **Lumbar vertebrae :**

- These are - **large and stout.**
- Neural spines - **face forwards.**
- **Prezygapophyses** and **postzygapophyses** are present.

- **Transverse processes** are directed forwards and downwards.
- Neural arch of lumbar vertebra has - **a large upwardly directed metapophyses**
- Centrum of first two or three lumbar vertebrae have **hypapophyses on the vertral side**
- D. **Sacral Vertebrae:** All sacral vertebrae are fused to form a single bone called - **sacrum.**
- It supports - **pelvic girdle.**
- First sacral vertebra has large transverse processes
- E. **Caudal vertebrae:** These are present in the tail.
- They gradually decrease in size towards **posterior side.**
- Neural arches **disappear** towards **posterior side**.

iii. Ribs

- Rabbit has **- 12 (or) 13 ribs on each side**
- The upper end of first nine pairs of ribs is forked into - **capitulum and tuberculum**
- The ribs that are connected to sternum directly are **- first 7 pairs**
- The first 7 pairs of ribs are called - **true ribs**
- 8th and 9th pair of ribs are called - **false ribs**
- The remaining ribs which are free ventrally are called **- floating ribs**

iv. Sternum

- It is formed by seven bony pieces called **- sternebrae**
- The first long sternebra is called - **manubrium**
- Sixth sternabra is **very small**
- The last sternebra is called - **xiphisternum**
- Xiphisternum bears xiphoid cartilage

II. Appendicular Skeleton

i. **Pectoral girdle**

- Pectoral girdle is mainly formed by - **scapula and clavicle**
- Scapula is - **thin, flat and triangular bone**
- The apex of scapula has - **a glenoid cavity**
- It forms ball and socket joint with the - **head of humerus**
- Clavicle is - **a slender and curved bone**
- Part attached to acromian process of scapula - **Clavicle**

ii. Pelvic girdle

- Pelvic girdle is formed by two identical halves
- Each half is called **- osinnominatum**
- Each osinnominatum encloses - **obturator foramen**
- Each osinnominatum contains - **ilium, ischium and pubis**
- Each osinnominatum encloses a socket called - **acetabulum**

iii. Forelimb bones

- The forelimb of rabbit is divisible into - **upperarm, forearm and hand**
- Upperarm is supported by a long, stout bone called **- humerus.**
- Its round proximal end is fixed in the **glenoid cavity** and the distal end has pulley like **trochlea**.
- The shaft possess - **Deltoid ridge**
- Fore arm is supported by **- radius and ulna.**
- Radius is **shorter** than the ulna.
- Ulna has **sigmoid notch** and **olecranon** process proximally.
- Wrist contains eight small bones called- **carpals.**
- Proximal row contains **three carplas** and distal row contains **five carpals**.
- Proximal row of carpals are **- Radiale, intermedium, ulnare**
- Palm is supported by five bones called- **metacarpals**
- Fingers are supported by - **phalanges .**
- The digital formula of forelimb of rabbit is **- 2–3–3–3–3.**

iv. Hindlimb Bones

- The hindlimb of rabbit is divisible into - **thigh, shank and foot**
- Thigh is supported by a long and stout bone called- **femur**
- The round proximal end of femur is fixed in acetabulum forming - **a ball and socket joint**
- Shank contains - **tibia and fibula**
- Tibia is **the longest** bone in the body
- Ankle is supported by six small bones called - **tarsals**
- Proximal row contains - **two tarsals**
- Proximal row tarsals are **- Inner small astragalus and outer long calcaneum**
- Middle row contains - **a single tarsal (centrale)**
- Distal row contains - **three tarsals**
- Instep is supported by- **four metatarsals**
- The digital formula of rabbit is - **3-3-3-3**

JOINTS

- Joint is an articulation (or) arthrosis between two bones to facilitate movement
- Joints are classified structurally on anatomical characteristics and functionally on the movement

I. Structural classification:

- Structurally joints are classified into fibrous Joints, cartilaginous joints and synovial joints

i) **Fibrous joints**

- These joints **donot have synovial cavity**
- Articulating bones are held together closely by - **the fibrous connective tissue**

- These are **sutures, syndesmoses** and **gomphoses**
- **Sutures :** Thin layer of dense **fibrous connective tissue** connects the two flat bones.

  Ex : Coronal sutures of skull (between parietal and frontal bones)
- **Syndesmoses :** Between the articulating bones fibrous connective tissue is arranged either as a bundle (ligament) (or) a layer

  Ex : (1)The anterior **tibiofibular ligament** that connect the tibia with fibula

  (2) **Interosseous membrane** between borders of tibia and fibula.
- **Gomphoses :** Cone shaped peg of one bone is articulated with the socket of another bone.

  Ex : Dentoalveolar joint

II.Cartilaginous joints:

- Synovial cavity is **absent**
- It allows a **little** or **no movement**
- Articulating bones are connected by - **either hyaline cartilage (or) fibrous cartilage**
- These are **synchondroses** and **symphyses**

1) Synchondroses :

- **Hyaline cartilage** connects the two articulating bones

  Ex : Connection between the epiphysis and diaphysis during growth

2) **Symphyses :**

- Broad disc of **fibrous cartilage** connects the articulating bones

  Ex : 1) Pubic symphysis

  2) Between the vertebrae by intervertebral discs

III) Synovial Joints

- Components of synovial joints are

  Articular capsule, synovial fluid, accessory ligaments and articular disc
- Capsule around the synovial cavity - **Articular capsule**
- Outer layer of articular capsule is - **fibrous dense irregular connective tissue**
- It connects the **periostea** of two bones
- The tissue that holds the bones together - **Ligament**
- Synovial fluid is secreted by - **Synovial membrane**
- Composition of synovial fluid - **Phagocytic cells, hyaluronic acid, interstitial fluid**
- Fluid that reduces the friction in joint - **Synovial fluid**
- Fluid that supplies the nutrients to articular cartilage - **Synovial fluid**
- Ends of articulating bones are covered by - **Hyaline cartilage**
- Articular discs of some synovial joints - **Menisci**
- Discs that divide the synovial cavity - **Menisci**

i) **Ball and socket joint :**

- It is a **multiaxial diarthrose.**
- Movement is - **angular** and **rotation.**
- This joint allows **free movement in more than one plane**

  EX : a) **The shoulder joint** – Head of humerus fits into the glenoid cavity of the pectoral girdle (shoulder)
- b) **Hip joint** - Between head of **femur** and **acetabulum** of pelvic girdle at hip

ii) **Hinge Joint (Ginglymi) :** It is a **monoaxial diarthrose**.

- This joint allows **angular movement** only
- Ex : **Elbow joint :** a) It is between radius -ulna of fore arm and humerus of upper arm at elbow.
- b) **Knee Joint :** It is between tibia-fibula of shank and femur of thigh at knee.
- c) Joints of phalanges of digits

iii) **Pivot Joint :** It is a **monoaxial diarthrose**.

- Movement is - **rotation.**
- In this type of joint one bone is fixed in its place and has a peg like elevation called pivot.
- The other bone fits over the pivot by a concavity and rotates freely around.

  Ex : In neck, the joint between the atlas and axis.

iv) **Saddle Joint :** It is a **biaxial diarthrose**.

- The movement is **angular motion**.
- This joint is found only in **primate mammals**.

  Ex : Joint between carpal and metacarpal of thumb.

v) **Planar joint** : In this type, articular surfaces of bones are flat (or) slightly curved.

- It is - **nonaxial diarthrose**.
- The motion is **- gliding**.
- This joint allows **restricted movement** in different planes.

  Ex: Joint between carpals, joint between tarsals and between the zygapophyses of vertebrae

vi) **Condyloid Joint :** It is a **biaxial diarthrose**.

- Oval shaped articular surface of one bone fits into the oval shaped depression of the other bone.
- The movement is **angular motion**

  Ex : Radiocarpal and metacarpophalangeal joints

IV. Functional classification of joints

- 1) **Synarthroses :** Immovable joints
  Eg : Sutures, syndesmoses, gomphoses
- 2) **Amphiarthroses :** slightly movable joints
  Eg : Synchondroses and symphyses
- 3) **Diarthroses :** Freely movable joints
  Eg : All synovial joints

RABBIT MUSCLE CONTRACTIOIN

LEVEL - I

1. In muscle contraction, sliding-filament hypothesis was proposed by
   1) Goldacre & Lorsch
   2) Hugh Huxley & Jean Hanson
   3) Albertszent Gyorghi
   4) Cori-Cori
2. The line bisecting the "H" zone is
   1) M line 2) H line 3) Z line 4) A line
3. In a myofibril the filaments with cross bridge is
   1) actin filaments 2) myosin filaments
   3) Z filaments 4) M filaments
4. The connective tissue sheath covering muscle fibre is
   1) perimysium 2) epimysium
   3) endomysium 4) perineurium
5. In a myofibril, the active sites are present on the
   1) actin filaments 2) myosin filaments
   3) Z line 4) M line
6. Swinging movements, attachment, detachments of cross bridges from actin filament is called
   1) Ratchet Mechanism
   2) Counter current Mechanism
   3) Interlocking Mechanism
   4) Donnan equilibrium
7. The junctional place between teledendrites of neuron and sarcolemma of muscle is called.
   1) neuromuscular junction
   2) sarcoplasmic reticulum 3) cross bridge
   4) Krauses membrane
8. The thick primary filament in a myofibril is formed by a protein namely
   1) myoglobin 2) chitin
   3) actin 4) myosin
9. How much percentage of lactic acid which is formed in a muscle is oxidised.
   1) 20% 2) 30% 3) 50% 4) 80%
10. When the myofibril is stimulated the ions released from the sarcoplasmic reticulum is
    1) Mg^{++} 2) Na^{+} 3) K^{+} 4) ca^{++}
11. One of the following is present in "H" zone of a myofibril has
    1) actin 2) myosin
    3) actin & myosin 4) no fibres
12. Which of the following is present in I band of myofibril
    1) Myosin filaments and M Membrane
    2) Myosin filaments and Z Membrane
    3) Thin filaments and Z Membrane
    4) Actin filaments and M Membrane
13. The functional unit of a myofibril in a striated muscle is
    1) Fasciculus 2) Sarcomere
    3) Sarcoplasm 4) Sarcolemma
14. Phosphocreatine is useful for
    1) converting ATP into ADP
    2) converting glycogen into lactic acid
    3) converting ADP into ATP
    4) converting lactic acid into glycogen
15. The structural unit of skeletal muscle is
    1) myofibril 2) muscle fibre
    3) myoglobin 4) myosin
16. The light band of a myofibril is
    1) I band 2) M. Membrane
    3) H disc 4) A band
17. The part of sarcomere that does not change in length during contraction
    1) A-band 2) I-band
    3) H-disc 4) A & I band
18. In actively contracting muscle the substance which is reduced in quantity is
    1) glycogen 2) creatine
    3) ADP 4) lactic acid
19. The membrane found in the middle of I band of myofibril is
    1) Z-Membrane 2) M-Membrane
    3) H-Membrane 4) sarcolemma
20. The connective tissue sheath on a muscle is
    1) perimysium 2) epimysium
    3) endomysium 4) sarcolemma
21. The Cori Cori cycle takes place in
    1) muscle 2) liver
    3) kidney 4) heart
22. The part of sarcomere with only myosin filaments is
    1) A - band 2) H - zone
    3) I - band 4) Z - band
23. The lactic acid generated during muscle contraction is converted to glycogen in (EAMCET2005)
    1) muscle 2) kidney
    3) pancreas 4) liver
24. The muscle band that remains unchanged during contraction and relaxation of the skeletal muscle is (Kerala PMT 2005)
    1) I 2) H
    3) A 4) Z line

25. Striped muscles are (JIPMER 2006)
1) syncytial 2) uninucleate
3) spindle shaped 4) non-nucleated

26. The contractile protein of skeletal muscle involving ATPase activity is (CBSE 2006)
1) Myosin 2) troponin
3) α-Actinin 4) Tropomyosin

27. The event **not related** to "muscle relaxation" is
1) Absorption of Ca^{++} ions into sarcoplasmic reticulum
2) Break down of actomyosin complex
3) Binding of Ca^{++} ions to troponin
4) Delinking of cross bridges from actin

LEVEL - II

Note:

Follow this pattern of options for choosing the correct answer for Assertion/ Reason type and Statement I/ Statement II type of questions

1) A (S I) and R (S II) are correct and R (S II) is the correct explanation of A(S I)
2) A (S I) and R (S II) are correct and R (S II) does not explain A(S I)
3) A (S I) is correct and R (S II) is false
4) A (S I) and R (S II) are false

28. Match the following & Identify correct combination

List – I	List – II
A) Sarcolemma	I) Peripherally arranged
B) Myofibrils	II) Parallely arranged
C) Mitochondria	III) Outer membrane of muscle fibre
D) Nuclei	IV) Sarcoplasmic reticulum
	V) Sarcosomes

	A	B	C	D
1)	II	III	V	IV
2)	III	II	V	IV
3)	III	IV	V	I
4)	III	II	V	I

29. Match the following & identify the correct combination

List – I	List – II
A) T_nC	I) H - Zone
B) $T_n T$	II) Head of myosin
C) ATP	III) Krause's membrane
D) M-line	IV) Calcium attaches
	V) Troponin – Tropomyosin complex

	A	B	C	D
1)	IV	II	III	V
2)	IV	I	V	I
3)	IV	V	II	I
4)	V	IV	III	I

30. In an actively contracted muscle the substance that increases in quantity is
1) glycogen 2) phosphocreatine
3) ATP 4) lactic acid

31. In a myofibril the peripheral part of "A" band is
1) with actin filaments only
2) with myosin filaments only
3) both actin & myosin filaments
4) without filaments

32. The change that takes place in "Cori-Cori" cycle is
1) glycogen is formed from lactic acid in muscles
2) urea formed from ammonia in liver
3) glycogen is formed from lactic acid in liver
4) phosphocreatine formed from creatine in liver

33. Which of the following is present in "H" disc of a myofibril
1) Actin filaments and Z Membrane
2) Actin filaments and M line
3) Myosin filaments and Z Membrane
4) Myosin filaments and M line

34. Active sites on the actin filaments are exposed when the
1) Mg + ions bind with troponin
2) Ca ++ ions bind with tropomyosin
3) Ca ++ ions bind with troponin
4) Mg ++ ions bind with troponin

35. Intracellular vehicular system in a muscle fibre is
1) sarcomere 2) sarcolemna
3) sarcoplasmic reticulum 4) sarcoplasm

36. **Assertion (A):** Prolonged contraction leads to fatigue in striated muscles
Reason (R): Prolonged contraction causes accumulation of lactic acid in a striated muscle

37. **Assertion (A):** In the striated muscles the dark band is "A" band (or) anisotropic band
Reason (R): The "A" band consists of myosin only

38. **Assertion (A):** When creatine phosphate gets exhausted during the muscle contraction, third source of energy is utilised
Reason (R): Muscle has the capacity to transform chemical energy into mechanical energy

39. **Assertion (A):** When the nerve impulse reaches the neuromuscular junction, sarcolemma of that muscle cell gets depolarised

Reason (R): ATP is the immeditate source of energy in muscles

40. **Assertion (A):** The basis of sliding filament hypotheis is Ratchet mechanism
Reason (R): Swinging movements and the attachment and detachment of the heads of cross bridges from actin filaments is called Ratchet mechanism

41. Identify the correct statements from the following pertaining to muscle contraction
I) During muscle contraction in the absence of oxygen pyruvic acid changes to lactic acid in the liver
II) 80% of lactic acid is converted into glycogen in the liver
III) Accumulation of lactic acid in the muscle leads to fatigue
1) I, II are correct 2) II, III are correct
3) I, III are correct 4) I, II, III are correct

42. **Assertion (A) :** 'H' zone of 'A' band is a paler zone in relaxed condition of a sarcomere
Reason (R) : only thin filaments occur in the middle of A-band in relaxed condition of sarcomere

43. Which of the following does not occur due to "oxygen debt" during muscle contraction
1) Deficiency of O_2
2) Accumulation of lactic acid
3) Muscle fatigue
4) Aerobic degradation of glucose

44. The number of 'A' bands and M - lines found in one **sarcomere** of a skeletal muscle fibre of a mammal respectively are
1) 1 and 2 2) 2 and 2
3) 2 and 1 4) 1 and 1

45. Identify the incorrect from the following (EAMCET2008)
A. The accumulation of pyruvic acid in the muscle causes fatigue
B. ATP is resynthesized in the muscle by the phosphorylation of ADP by a phosphagen
C. Cori and Cori cycle occurs in the muscles
D. the phosphagen in the vertebrate muslce is arginine phosphate
1) A and D 2) B and D
3) C and D 4) B and C

46. Which of the following is important for muscle contraction and nerve impulse transmission? (BHU 2005)
1) Ca^{2+} ions 2) Ca^{2+} and Mg^{2+} ions
3) Mg^{2+} ions 4) Fe^{2+} ions

47. During strenuous exercise glucose is converted into (BHU 2005)
1) starch 2) glycogen
3) pyruvic acid 4) lactic acid

RABBIT SKELETAL SYSTEM
LEVEL - I

48. Which of the following bone is formed by the ossification of tendons
1) Palatine 2) Parietal
3) Patella 4) Pterygoid

49. In rabbit foramen Magnum is surrounded by
1) four bones 2) eight bones
3) three bones 4) sixbones

50. In rabbit, the posterior part of floor of cranium is formed by
1) presphenoid 2) Alisphenoid
3) orbitosphenoid 4) basisphenoid

51. The middle earbone formed by the modification of quadrate of upper jaw is
1) malleus 2) stapes
3) incus 4) periotic

52. In rabbit, the bone of upper jaw which bears premolars and molars is
1) maxilla 2) jugal
3) premaxilla 4) palatine

53. Cribriform plate is associated with
1) cranium 2) optic capsule
3) pectoral girdle 4) auditory capsule

54. Obturator foramen is present in
1) cranium 2) pelvic girdle
3) pectoral girdle 4) periotic bone

55. The digital formula of forelimb of rabbit is
1)2–3–3–2–3 2) 3–3–3–3
3) 2–3–3–3–3 4) 2–3–3–3

56. The bone with deltoid ridge is
1) Femur 2) radius-ulna
3) humerus 4) tibia-Fibula

57. Number of carpals in the distal row of wrist in rabbit is
1) 9 2) 3
3)8 4) 5

58. The bone with olecranon process belongs to
1) thigh 2) upper arm
3) shank 4) fore arm

59. The longest bone in the body of rabbit is
1) Femur 2) Radius
3) Tibia 4) Fibula

60. In rabbit, the ankle is supported by
1) 8 carpals 2) 4 metatarsals
3) 6 tarsals 4) 6 metatarsals

61. The digital formula of hind limb of rabbit is
1)3–3–3–3–3 2) 2–3–3–3
3) 3–3–3–3 4) 2–3–3–3–3

62. The anterior tibiofibular ligament that connects the tibia with fibula is an example of
1)sutures 2)synchondroses
3)syndesmoses 4) symphyses

63. Joint between phalanges is
1) planar joint 2) hinge joint
3) ball & socket joint 4) pivot joint

64. The cartilage covering the joint is
1) hyaline cartilage 2) fibrous cartilage
3) elastic cartilage 4) calcified cartilage

65. Joint between atlas and axis is
1) planar joint 2) hinge joint
3) ball & Socket Joint 4) pivot joint

66. Elbow and knee joints are examples of
1) planar joint 2) hinge joint
3) ball & socket Joint 4) pivot joint

67. The type of joint present between writst bones and ankle bones is
1) planar joint 2) hinge joint
3) ball & socket joint 4) pivot joint

68. The type of joint present in the hip region of the human body is
1) planar joint 2) hinge joint
3) ball & socket joint 4) pivot joint

69. The type of joints between vertebrae are
1) gliding joint 2) hinge joint
3) ball & socket Joint 4) pivot joint

70. In rabbit, the joint between thigh & shank is
1) planar joint 2) hinge joint
3) ball & socket joint 4) pivot joint

71. The joint which permits limited movement in different planes is
1) planar joint 2) hinge joint
3) ball & socket joint 4) pivot joint

72. The vertebra with odontoid process is
1) axis 2) atlas 3) urostyle 4) sacrum

73. The joint which allows angular movement in only one plane is
1) hinge joint 2) ball & Socket Joint
3) pivot Joint 4) planar joint

74. Synovial fluid is secreted by
1) synovial membrane 2) hyaline cartilage
3) joint capsule 4) elastic ligaments

75. Match the following articulating bone combinations in the cranium of rabbit.

List – I	List – II
A) Occipital condyles	I) Basioccipital
B) Alisphenoids	II) Pterygoid
C) Basisphenoid	III) Parietals
D) Frontals	IV) Supra-occipital
	V) Atlas

	A	B	C	D
1)	IV	III	II	V
2)	V	II	I	III
3)	I	II	IV	V
4)	V	II	III	I

76. Match the following

List – I	List – II
A) Malleus	I) modified hyomandibular
B) Incus	II) ossified tendon
C) Stapes	III) modified articular of lower jaw
D) Sesamoid bone	IV) modified quadrate
	V) modified articular of upper jaw

	A	B	C	D
1)	V	VI	I	II
2)	V	I	IV	III
3)	III	IV	I	II
4)	III	IV	II	I

77. Match the following bones

List – I	List – II
A) Wrist	I) Metacarpals
B) Ankle	II) Metatarsals
C) Instep	III) Phalanges
D) Palm	IV) Carpals
E) Digits	V) Tarsals
	VI) Claws

	A	B	C	D	E
1)	I	II	III	IV	VI
2)	IV	V	II	I	III
3)	IV	V	II	I	VI
4)	V	IV	I	II	III

78. Sigmoid notch in rabbit's skeleton is in: (CPMT 2006; JIPMER 2006)
1) radius 2) ulna
3) fibula 4) tibia

79. A deltoid ridge characterises (CBSE 2002; DPMT 2004; RPMT 2005)
1) humers 2) femur
3) radius 4) ulna

80. The vertebral column is connected to the pelvic girdle in the (MANIPAL 2005)
1) coccygeal region 2) sacral region
3) lumbar region 4) cervical region

81. Obturator foramen is found in the pelvic girdle of (PCS 2005)
1) amphibian 2) reptiles
3) birds 4) mammals

82. The movement seen in the trichoid (pivot) joint is (EAMCET 2004)
1) decrease in angle
2) rectricted in different planes
3) free in more than one plane
4) rotatory around a central axis

83. The joint where synovial capsule and synovial fluid are lacking is (EAMCET 2005)
1) carpals
2) pubic symphysis in females
3) finger and toes in males
4) femur and pelvis in females

84. This joint allows restricted movement in different planes (EAMCET 2007)
1) Arthrodia 2) Enarthroses
3) Ginglymi 4) Rotatary joint

LEVEL- II

85. Number of thoracic vertebrae without tubercular facets in transverse process are
1) 9 2) 12 3) 3 4) 6

86. Number of unforked ribs in rabbit are
1) 9 pairs 2) 8 pairs
3) 3 pairs 4) 5 pairs

87. Identify the correct statement with reference to ribs of rabbit
1) The first nine pairs of ribs are unforked
2) 8^{th} and 9^{th} pair of ribs are floating ribs
3) Floating ribs are free ventrally
4) The first nine pairs of ribs are connected to sterum directly

88. Number of phalanges in the pollex of rabbit is
1) 2 2) 3
3) 1 4) 4

89. Which of the following is a multiaxial diarthrose
1) Knee joint 2) Shoulder joint
3) Radio carpal joint 4) Saddle joint

90. Identify the incorrect statement with reference to planar joint
1) Articular surfaces of bones are flat
2) The motion is gliding
3) It allows restricted movement in different planes
4) It is a biaxial diarthrose

91. The joint between cranial bones is
1) ball & socket joint 2) hinge joint
3) gliding joint 4) immovable joint

92. The joint in which free movement in several planes is possible is
1) hinge joint 2) ball & socket joint
3) pivot joint 4) planar joint

93. The joint in which rotatory movement around the axis is possible is
1) planar joint 2) hinge joint
3) ball & socket joint 4) pivot joint

94. Match the following

List - I	List - II
A) Thigh	I) Metacarpals
B) Shank	II) Metatarsals
C) Ankle	III) Tarsals
D) Instep	IV) Tibia-fibula
	V) Femur

1) V IV III I 2) V IV III II
3) IV V II III 4) V IV II III

95. Match the following

List - I	List - II
A) Cervical vertebrae	I) 03 or 04
B) Caudal vertebrae	II) 12 or 13
C) Thoracic vertebrae	III) 16
D) Sacral vertebrae	IV) 7
	V) 16

1) V III I II 2) IV III I II
3) V II III I 4) IV III II I

96. Match the following

List - I	List - II
A) Sutures	I) Interosseous membrane
B) Syndesmoses	II) Joint between the parietal and frontal bones
C) Synchondroses	III) Between the anterior sur faces of the hip bones
D) Symphyses	IV) Epiphyseal plate
	V) Dentoalveolar joint

1) I II III IV 2) II I IV III
3) I II V III 4) IV III II I

97. **Assertion (A) :** Synchondroses are cartilaginous joints
Reason (R) : Hyaline cartilage connects the two articulating bones

98. **Assertion(A) :** The skull of rabbit is tropibasic
Reason(R) : In the skull of rabbit, the two optic capsules are seperated by interorbital septum.

99. **Assertion(A) :** In rabbit, the last three to four pairs of ribs are called floating ribs
Reason(R) : The last three to four pairs of ribs are free dorsally

100. **Assertion (A):** Joint between axis and atlas is pivot joint
Reason (R): The odontoid process of axis acts like pivot and helps in the movement of the other bone

101. **Assertion (A):** In ball & socket joint, the head of one bone is ball like and fits into the socket or concavity of the other

Reason(R): Ball and socket joint allows free movement in more than one plane.

102. Arrange the following forelimb bones in a correct sequence from the upper arm to hand
A) Metacarpals B) Humerus
C) Carpals D) Radius and ulna
1) A–C–D–B 2) B–D–C–A
3) B–D–A–C 4) A–C–B–D

103. The joint between the shoulder and upper arm of rabbit, has one of the following salient features
1) Rotatory movement around the central axis
2) Angular movement in one plane
3) Free movement in more than one plane
4) Restricted movement in different planes

104. An acromian process is characteristically found in the (CBSE 2005)
1) Skull of frog
2) Sperm of mammals
3) Pelvic girdle of mammals
4) Pectoral girdle of mammals

105. Neural canal is present in (JIPMER 2006)
1) humerus 2) tibio-fibula
3) cranial bones 4) vertebral column

106. The type of joint **seen** in the / **associated with** the fore limb and **absent** in the hind limb of man is the
1) hinge joint 2. saddle joint
3. planar joint 4. Ball-socket joint

107. Pelvic girdle of mammal
1) is provided with glenoid cavity and accommodates the proximal end of femur
2) is provided with acetabulum and accommodates the proximal end of humerus
3) is provided with a shallow depression and accommodates the condyle of tibio-fibula
4) is provided with acetabulum and accommodates the head of femur

108. Joint between which of the following exhibits similar movement
A. Joint between carpals
B. Joint between humerus and radio - ulna
C. Joint between phalanges
D. Joint between carpal and metacarpal of thumb
1) A and B 2) B and C
3) A and D 4) C and D

RABBIT EXCRETORY SYSTEM

- Separation and elimination of nitrogenous metabolic wastes and excess of water from the body is **- Excretion**
- The nitrogenous waste products include - **ammonia, urea and uric acid besides creatinine etc.**
- Examples for ammonotelic animals **- Hydra, some bony fishes**
- Examples for ureotelic animals - **Cartilaginous fishes, amphibians and mammals**
- Examples for uricotelic animals - **Insects, reptiles and birds**
- Kidneys and sweat glands perform excretory function **- Mammals**
- Kidneys also eliminate excess water and excess salts there by maintaining salt and water balance in the body fluids
- Maintenance of constant internal environment within the body is **- Homeostasis**
- Type of kidneys in rabbit is - **Metanephric kidneys**

EXCRETORY ORGANS OF RABBIT

- Kidneys are located - **on either side of the vertebral column in the abdominal cavity between the dorsal abdominal wall and dorsal peritoneum.**
- They are called retro peritoneal organs because - **they are covered by peritoneum on ventral side only**
- Kidney is covered by **- Fibrous renal capsule**
- Fibrous renal capsule is surrounded by **-Perirenal fat**
- In rabbit right kidney is placed some what more anterior to the left kidney because - **probably due to the presence of stomach on left side**
- In man right kidney is slightly on the lower level due to - **the presence of liver on right side**
- The inner concave surface of kidney has a notch - **hilum**
- The opening of hilum is called **- Hilus**

INTERNAL STRUCTURE OF KIDNEY

- Kidney is demarcated into - **outer cortex and inner medulla**
- The ureter is expanded inside the kidney as a funnel shaped cavity **- Pelvis**
- The free end of pelvis has number of cup like cavities **- Calyces**

- Medulla projects into the calyces as conical processes - **renal pyramids**
- The tips of pyramids are - **renal papillae**
- Cortex spreads among the renal pyramids as - **columns of Bertini**

Microscopic structure of kidney

- The numerous, minute, convoluted tubules of kidney are - **nephrons**
- Two classes of nephrons i.e. **Cortical nephrons** and **Juxtamedullary nephrons** are present in each kidney
- **Cortical nephrons** have renal corpuscle in the superficial renal cortex and have short Henle's loops which extends very little into medulla.
- **Juxtamedullary nephrons** are located near the renal medulla and have very long Henle's loops which extends deep into medulla.
- Nephron is formed by - **Malphigian body (Renal corpuscle) and a convoluted tubule**
- Malphigian body consists of two parts - **Bowman's capsule and a glomerulus**
- Bowman's capsule is a thin walled, double layered cup like structure formed by - **the invagination of the tubule, consists of simple squamous epithelial cells called podocytes**
- The branch of renal artery that enters the cavity of Bowman's capsule and splits into fine branches are - **Afferent arterioles**
- These branches unite with one another and come out of the Bowman's capsule as - **Efferent arteriole**
- The network of capillaries formed by afferent and efferent arterioles in the Bowman's capsule is - **Glomerulus**
- The diameter of efferent arteriole is - **comparatively less than that of afferent arteriole**
- Arteriole that begins and ends in the form of capillaries in kidney is -**Efferent anteriole**
- In human kidney - **more than one million nephrons are present**
- The structural and functional units of kidney are - **nephrons**
- The blood in glomerular capillaries and the fluid in the lumen of Bowman's capsule are separated by a very thin barrier i.e., - **squamous epithelium of Bowman's capsule and endothelium of blood capillaries of glomerulus**
- The walls of capillaries of glomerulus are formed by - **a single layer of endothelium**
- A narrow delicate tubule arises from posterior of Bowman's capsule is - **Neck**

RENAL TUBULE

- The three parts of convoluted tubule are - **proximal convoluted tubule, loop of Henle and distal convoluted tubule**
- The inner lining of proximal convoluted tubule has simple - **cuboidal epithelium with brush border**
- PCT lies in - **Cortex**
- U-shaped loop of Henle formed - **deep in the medulla**
- The walls of descending limb and the lower end of the ascending limb - **are very thin**
- They are formed by - **squamous epithelium without brush broders**
- At the end of ascending limb - **squamous epithelium becomes cuboidal epithelium**
- The ascending limb of loop of Henle enters the cortex and becomes - **the distal convoluted tubule**
- Distal convoluted tubule is lined by two types of cuboidal epithelial cells, principal cells and inter calated cells
- The lumen of this tubule is wide and lined by - **cuboidal epithelium without brush border**
- The terminal part of the distal convoluted tubule is - **collecting tubule (or) connecting segment**
- At the place of contact of DCT with afferent arteriole, the crowded cells of tubule together called **macula densa.**
- Along the side of macula densa, the wall of afferent arteriole contains the modified smooth muscle fibres called **Juxta glomerular (JG) cells.**
- Macula densa together with JG cells form **Juxtaglomerular apparatus**.
- The capillary net close to the proximal and distal convoluted tubules is - **Peritubular net**
- The capillary net present close to the loop of Henle is - **Vasa recta**
- The collecting tubule opens into - **a straight collecting duct**
- Collecting ducts merge to form - **duct of Bellini**
- Duct of Bellini opens into the pelvis at - **tip of renal papilla**

- The thin walled, pear shaped, white transparent sac, situated in the pelvis, ventral to rectum is **- Urinary bladder**
- Urino genital canal in males is **- Urethra**
- Urino genital canal in females is **- vestibule**

FORMATION OF URINE

- Formation of urine has three stages **- Glomoerular filtration, Selective reabsorption and Tubular secretion**

GLOMERULAR FILTRATION

- The endothelial cells of the glomerular capillaries together with podocytes of the Bowman's cup form the **filtration membrane**.
- The hydrostatic pressure of the blood while flowing in glomerulus is **- 70mm Hg (GHP)**
- GHP is opposed by - **Blood colloidal osmotic pressure (BCOP) - 35 mm Hg and - Capsular hydrostatic pressure (CHP) - 25mm Hg**
- Net filtration pressure (NFP) **- 10mm Hg**
- The process of filtration through glomerular capillaries in Bowmans capsule is **- Glomerular filtration**
- The filtrate is known is - **Primary urine (or) renal fluid**
- Renal fluid contains metabolic wastes like - **Urea, Uric acid, creatinine, toxins**
- Other substances in renal fluid are - **Water, aminoacids, glucose, salts of Na, K, Ca, Mg**

SELECTIVE REABSORPTION IN PCT

- PCT is hightly permeable to - **Water and solutes**
- In PCT 65% of filtrated load of sodium and water and slightly lower percentage of filtrated chlorine are reabsorbed
- Absorption of water in PCT - **by Osmosis**
- Water reabsorption in PCT - **Obligatory water reabsorption**
- Na^+, glucose, aminoacids $Cl^-, K^+, Mg^{+2}, Ca^{+2}$ are reabosrbed.
- In PCT organic acids and bases like bile salts, oxalates, hippuric acid and urates are secreted into **- renal fluid**
- H^+ ions are also secreted into **- Lumen**
- The renal fluid is isotonic to **- Cortical fluid and blood**

SELECTIVE REABSORPTION IN DESCENDING LIMB

- Descending limb is highly permeable to water and moderately permeable to **-** Na^+ **and urea**
- The amount of water reabsorbed obligatory into interstitial fluid in descending limb - 15% (by osmosis)
- Na^+ and urea passively diffuse into the lumen
- Glomerular filtrate osmolarity gradually increases in Descending limb
- In descending limb primary urine is - **hypertonic to blood and isotonic to medullary fluid**
- Concentration of primary urine reaches maximum at **- hairpin turn of loop**

IN ASCENDING LIMB

- The ascending limb has - **thick and thin segments**
- Segment which is impermeable to water and less permeable to ions **- thin segment**
- Segment which is impermeable to water but more permeable to $-Na^+, Cl^-, Mg^{+2}, K^+, HCO_3^-, Ca^{+2}$ is **-thick segment**
- About 25% of filter load of these ions is - **actively reabsorbed in the thick region**
- The renal fluid is progressively diluted as it passes through - **the ascending limb**
- The nature of renal fluid in the ascending limb compared to the medullary fluid and blood is - **hypotonic**

IN DISTAL CONVOLUTED TUBULE

- The distal convoluted tubule is permeable to **- water and ions**
- The cells which reabsorb sodium and secrete potassium **- Principal cells**
- The cells which secrete H^+ ions and reabsorb potassium and HCO_3^- **- Intercalated cells**
- In DCT reabsorption of water takes place by - **both principal cells and Intercated cells**
- The % of water is reabsorbed in DCT - 9%
- Reabsorption of water takes place under the influence of **- Anti diuretic hormone**
- Water reabsorption aided by ADH is called **- Facultative water reabsorption**
- The nature of filtrate to the cortical fluid and blood is **- Isotonic**

IN THE COLLECTING DUCT

- Water is absorbed in the cortical and medullary collecting ducts under the influence of **- ADH hormone**
- In collecting duct about 10% filtered water and sodium are reabsorbed.
- Ions secreted into collecting ducts are - H^+ ions
- In medullary collecting duct some amount of urea is reabsorbed by **- passive transport**
- Urea reabsorbed at medullary collecting duct is secreted into - **Descending limb and thin part of ascending limb**
- At the end of collecting duct, concentration of glomerular filtrate is **- high**
- The filtrate at the end of collecting duct is called **- urine**
- Urine is **- hypertonic to blood**
- Urine is **- isotonic to the medullary fluid**

TUBULAR SECRETION

- The diffusion of materials (which could not be filtered in glomerulus) from capillary net into the lumen through interstitial fluid is called - **Tubular secretion or augmentation**
- During augmentation components secreted into the lumen of the tubule are - H^+ **ion,** K^+ **ion, ammonia, hippuric acid etc.**

FORMATION OF HYPERTONIC URINE

- In the medullary fluid osmolarity increases from - **Outer medulla to the inner medulla**
- **Concentration gradient of the interstitial fluid of medulla is maintaining**
  * Active transport of ions from the ascending limb through symporter
  * Facultative reabsorbtion of water through collecting duct
  * Passive transport of urea from collecting duct
- The second contribution to the osmotic gradient of the interstial fluid in the medulla is - **Counter current mechanism**
- The fluid flowing in one limb of loop of Henle is opposite to the fluid **- flowing in the other limb**
- The flow of blood in vasa recta and the flow of renal fluid in loop of Henle are in opposite directions. It is called **- counterflow**
- The operation in the loop of Henle as a **counter current multiplier** produces the ascending gradient of hyperosmolarity in the medullary interstitial fluid.
- Under normal conditions, vasa recta carries only the solutes and water absorbed from the loop of Henle - **without altering the concentration of the medullary interstitial fluid.**
- The operation of vasa recta as a **counter current exchange** maintains the hyperosmotic gradient in the medullary interstitium.
- Osmotic gradient in the medulla is useful in producing **- the concentrated urine**
- High threshold substances - **glucose, amino acids vitamins, some salts (efficiently reabsorbed)**
- The substances reabsorbed in very little amounts - **Low thresold substances, uric acid, urea**
- The substances which are not reabsorbed and are actual excretory products- **Athresold substances**
- Athresold substances **- creatinine**
- **HORMONAL REGULATION OF URINE FORMATION**
- **Angiotensin II** and **aldosterone** hormones regulate solute reabsorption.
- Water reabsorption is regulated by **ADH**
- **Atrial natriuritic peptide** inhibits the absorption of water and solutes.
- JG cells secrete **renin** enzyme when ever the blood pressure in afferent arteriole is decreased.
- Renin stimulates the conversion of angiotensin I, synthesised by the liver into **angiotensin II**, which is an active hormone.
- It decreases the glomerular filtration rate and enhances the reabsorption of Na^+, Cl^- and water in PCT and stimulates the secretion of aldosterone.
- Aldosterone stimulates principal cells to absorb Na^+, Cl^- and secretion of H^+
- ADH regulates the facultative reabsorption of water by increasing the permeability of principal cells.
- An increase in blood volume promotes the release of **atrial natriuritic peptide (ANP)** from heart.
- ANP decreases the absorption of water and Na^+ from PCT.

COMPOSITION OF URINE

- Pale yellow colour of the urine is due to - **urochrome**
- Breakdown of haemoglobin results in the formation of **- urochrome**
- pH of urine is **- 6**
- Composition of healthy individual urine is - **96% water, 2% urea, 2% other dissolved solids (Uric acid, creatinine, inorganic salts)**
- Urine in little amounts also consists of - **ammonia, urobilin, haemato porphyrin**

MICTURITION

- The urine formed in the kidneys reaches the urinary bladder through **- Ureters**

- The passage of urine is prevented by - **the sphincter at the base of the bladder.**
- When the bladder dilates, stretch receptors in its wall are stimulated and send impulses to brain, which cause - **the desire of urination**
- During urination, urinary bladder - **contracts**
- The process of discharge of urine is called - **Micturition**

EXCRETORY SYSTEM:

LEVEL - I

109. Duct of Bellini opens at the end of
1) renal cortex 2) renal calyces
3) renal papilla 4) renal pelvis

110. In the nephron of rabbit the sodium ions are diffused into medullary fluid from the
1) ascending limb 2) descending limb
3) distal convoluted tubule
4) proximal convoluted tubule

111. The part of the nephron which is impermeable to water is
1) descending Limb of Henle's Loop
2) ascending Limb of Henle's Loop
3) collecting duct
4) distal convoluted tubule

112. The excretory organs in rabbit are
A) Kidneys B) Sweat glands
C) Liver D) Lungs
1) All 2) All except C
3) A & B only 4) A & C only

113. An example for retroperitoneal organ
1) Kidney 2) Lung 3) Liver 4) Heart

114. The outer surface of the kidney of rabbit is
1) concave 2) irregular 3) flat 4) convex

115. The type of kidney in rabbit
1) pronephric 2) metanephric
3) mesonephric 4) postnephric

116. In the nephron of rabbit the percentage of water reabsorbed from the distal convoluted tubule is
1) 16% 2) 8.8% 3) 64% 4) 9%

117. The capillary net work close to the Henle's loop of nephron is
1) retetestis 2) glomerulus
3) vasa recta 4) vas efferentia

118. The maintainance of chemical equilibrium in the body is called
1) Homeostasis 2) Osmosis
3) Epistasis 4) Cladogenesis

119. Renal papilla opens into the renal pelvis through
1) ureters 2) collecting ducts
3) Bellini ducts
4) common pancreatic duct

120 Glomerular filtration occurs in
1) proximal convoluted tubule
2) Henle's loop
3) Distal convoluted tublule
4) Bowman's capsule

121. All the collecting ducts of nephron merge to form
1) vestibule 2) ducts of Bellini
3) ureter 4) column of Bertin

122 In the kidney of rabbit the part present in the Medulla is
1) proximal convoluted tubule
2) Henle's loop
3) distal convoluted tubule
4) Malpighian capsule

123. The ureotelic vertebrates which excrete hypertonic urine is
1) Amphibians 2) Reptiles
3) Aves 4) Mammals

124. In the nephron of kidney of rabbit the blood vessel that divides into peritubular net work
1) afferent renal arteriole
2) efferent renal arteriole
3) renal portalvein
4) renal vein

125. The substances which are not at all reabsorbed from the nephron of rabbit are
1) glucose and amino acids
2) sodium and potassium
3) creatinine
4) urea & uric acid

126. In the kidney of rabbit, the calyces open into
1) cortex 2) columns of Bertin
3) eenal pelvis 4) ureters

127. The excretory system of rabbit is orginated from
1) ectoderm 2) endoderm
3) mesoderm 4) ecto endoderm

128. In the kidney of rabbit the extensions of cortex that projects into medulla are called
1) renal pyramids 2) ducts of Bellini
3) columns of Bertini 4) calyces

129. The high threshold substance is
1) uric acid 2) glucose only
3) aminoacids only 4) glucose and aminoacids

130. The percentage of filtrated load of sodium and water reabsorbed from proximal convoluted tubule is
1) 16% 2) 8.8%
3) 65% 4) 10.4%

131. Based on their principal nitrogenes wastes *Amoeba* and *Hydra* are in the group described as
1) ammonotelic 2) ureotelic
3) urecotelic 4) atelic

132. The fibrous layer ensheathing the kidney of rabbit is
1) Tunica albuginea 2) Renal capusule
3) Glisons capsule 4) Bowmans capusule

133. The blood vessels not related to kidney of rabbit is
1) renal arteries
2) renalveins
3) renal portal veins
4) afferent renal arteriole

134. In the nephron of rabbit the percentage of water reabsorbed from the descending limb of Henle's loop
1) 15% 2) 8.8%
3) 64% 4) 10.4%

135. In the nephron of rabbit the blood vessel that collects blood from peritubular capillary net work
1) Afferent renal arteriole
2) Efferent renal arteriole
3) Renal veins
4) Renal portal vein

136. In the kidney the tips of renal pyramids are called
1) renal papillae 2) calyces
3) renal pelvis 4) renal capusle

137. Cold blooded uricotelic vertebrates are
1) Insects 2) Birds
3) Reptiles 4) Amphbians

138. The blood vessel that collects blood from glomerulus
1) Afferent renal arteriole
2) Efferent renal arteriole
3) Renal veins 4) Renale portal vein

139. The percentage of water reabsorbed from the ascending timb of Henle's Loop of nephron in Rabbit is
1) 16% 2) 8.8%
3) 64% 4) zero

140. In the kidney of rabbit the conical structures present in the medulla are
1) Bertini columns 2) ducts of Bellini
3) renal pyramids 4) renal pelvis

141. The percentage of water in the urine of rabbit is
1) 0.8% 2) 1.5%
3) 96% 4) 64%

142. In the nephron of mammal, the part that is impermeable to water is
1) proximal convoluted tubule
2) distal convoluted tubule
3) descending limb of Henle's loop
4) ascending limb of Henle's loop

143. The ureotelic, viviparous animal is
1) *Echidna* 2) *Vipera*
3) *Rana* 4) *Scoliodon*

144. The number of nephrons present in the kidney of man approximately
1) 1 lakh 2) 1 Million
3) 2 Lakhs 4) 50 Thousands

145. The intercalated cells in distal convoluted tubule can reabsorb
1) H^+ *ions* 2) Na^+ *ions*
3) K^+ *ions* only 4) K^+ *ions & Water*

146. The capillary net work present in the Bowman's capsule
1) Vasa recta
2) Glomerulus
3) Peritubular capillary network
4) Renal artrery

147. Hypertonic urine is excreted by
1) Anamniotic Animals
2) Amniotic Animals
3) Fresh water bony fishes
4) Amphibians

148. In mammals the adaptation to excrete concentrated urine is
1) ultrafiltration
2) stretch refelxes
3) tubular secretion
4) counter current mechanism

149. The epithelia lining the Bowman's capsule is
1) Squamous 2) Cuboidal
3) Transistional 4) Columnar

150. Uricotelic invertebrates
1) *Amoeba* and *Hydra* 2) Insects
3) Reptiles 4) Fishes

151. The structural and functional unit of kidney is
1) Nephron 2) Columns of Bertini
3) Kidney 4) ureter

152. The percentage of filtered water and sodium reabsorbed from collecting duct
1) 16% 2) 8.8% 3) 64% 4) 10%

153. In the kidney of rabbit, the notch present on the inner margin is called
1) pelvis 2) Hilum
3) Pyramid 4) Columns of Bertini

154. The cavity present inside the kidney is called
1) Hilus 2) Cortex
3) Medulla 4) Pelvis

155. An example for ureotelic animal
1) Sharks 2) Amphibians
3) Mammals 4) All of the above

156. The nephrons whose renal corpuscles are located near renal medulla are
1) cortical nephrons
2) juxta medullary nephrons
3) all teh nephrons of kidney
4) without Bowman's cup

157. Macula densa is a group of cells present in
1) PCT 2) DCT
3) loop of Henle 4) collecting duct

158. The enzyme secreted by Juxtaglomerular cells is
1) Renin 2) Angiotensin I
3) Aldosterone
4) Atrial natriuritic peptide

159. Atrial natriuritic peptide is secreted by
1) Adrenal cortex 2) Liver
3) Heart 4) Kidneys

160. Which of the following is secreted, when the blood pressure in afferent arteriole is decreased
1) Angiotensin I 2) Renin
3) Aldosterone
4) Atrial natriuritic peptide

161. Which of the following inhibits the absorption of water and solutes from PCT.
1) ANP 2) ADH
3) Renin 4) Angiotensin II

162. At which part of nephron present in medulla the renal fluid concentration is hypotonic to medullary interstitial fluid.
1) PCT 2) DCT
3) Ascending limb of Henle's loop
4) Descending limb of Henle's loop

163. In rabbit **'Podocytes'** are
1) simple squamous epithelial cells
2) cubodial epithelial cells
3) columnar epithelial cells
4) ciliated columnar epithelial cells

164. The reabsorption of which of the following in the renal tubule is influenced by **ADH**
1) Na^+ 2) Cl^- 3) Hippuric acid 4) Water

165. Which of the following cells of nephron are cuboidal epithelial cells
1) podocytes and intercalated cells
2) principal cells and intercalated cells
3) cells of glomeruli and lining of Bowman's capsule
4) principal cells and podocytes

166. The region of nephron, in which the amount of renal filtrate reabsorption is the highest
1) Facultative water reabsorption region of DCT
2) Facultative water reabsorption region of Collecting duct
3) Obligatory water reabsorption in nephron
4) Obligatory water reabsorption of Henle's loop

167. In the process of urine formation in rabbit, the **sodium ions and urea** passively diffuse from the interstitial fluid into the lumen of
1) proximal convoluted tubule
2) descending limb of loop of henle
3) thick part of ascending limb
4) distal convoluted tubule

168. In the kidneys of rabbit, columns of Bertini are
1) tips of renal pyramids 2) Cortex present between renal pyramids
3) projections of medulla into calyces
4) renal papillae projecting into pelvis

169. Expanded part of ureter inside the kidney is
1) calyx 2) hilus
3) pelvis 4) renal capsule

170. The percentage of water reabsorbed from renal fluid in the distal convoluted tubule of the nephron is
1) 65% 2) 15%
3) 10% 4) 9%

171. In the kidney of rabbit, the collecting ducts of nephron merge in to the renal medulla to form
1) columns of Bertini 2) duct of Bellini
3) bidder's canal 4) inguinal canal

172. Which of the following are found both in the cortex and medulla
1) columns of Bertini 2) ducts of Bellini
3) collecting ducts 4) renal papillae

173. The region of kidney of rabbit in which reabsorption of urea from the renal fluid into medullary tissue fluid occurs
1) PCT 2) DCT
3) Collecting duct 4) Descending limb

174. In which part of nephron of rabbit, the reabsorption of water is not possible
1) Proximal convulated tubule
2) Descending limb of loop of Henle
3) Distal convoluted tubule
4) Ascending limb of loop of Henle

175. Na^+ ions are actively **reabsorbed** from the loop of Henle in the kidney of rabbit, in the region of the
1) collecting duct
2) ascending limb of loop of Henle
3) descending limb of loop of Henle
4) hair pin bend of loop of Henle

176. Low threshold substances of glomerular filtrate are
1) glucose and aminoacids
2) vitamins & uric acid
3) creatinine & sulphates
4) urea & uric acid

LEVEL - II

Note:

Follow this pattern of options for choosing the correct answer for Assertion/ Reason type and Statement I/ Statement II type of questions

1) A (S I) and R (S II) are correct and R (S II) is the correct explanation of A(S I)
2) A (S I) and R (S II) are correct and R (S II) does not explain A(S I)
3) A (S I) is correct and R (S II) is false
4) A (S I) and R (S II) are false

177. **Assertion:** In the ascending limb of Henle's loop the concentration of the renal fluid decreases

Reason: The ascending limb of Henle's loop is permeable to water

178. Study the following

S.No.	Animal	Excretory material	Nature of the urine
I	Amphibians	urea	Hypotonic
II	Reptiles	uric Acid	Hypertonic
III	Aves	urea	Hypotonic
IV	Mammals	Ammonia	Hypertonic

Select the correct statements
1) 1 & II 2) I & III
3) I & IV 4) II & III

179. Which of the following lead to micturition
1) Stretch receptors in the wall of the urinary bladder are stimulated
2) Motor impulses from brain reaches the urinary bladder
3) The sphincter at the base of the bladder relaxes
4) All of the above

180. Juxta glomerular apparatus consists of
1) Juxtaglomerular cells
2) Juxtaglomerular nephrons
3) Macula densa
4) Macula densa and Juxta glomerular cells

181. Which of the following produces ascending gradient of hypersmolarity in the medullary tissue fluid.
1) Operation of vasa recta as a counter current exchange
2) Operation in the loop of Henle as a counter current multiplier
3) Operation of vasa recta as a counter current multiplier
4) Operation of loop of Henle as a counter current exchange

182. The urine formed at the end of collecting duct is
1) Isotonic to both blood & medullary interstitial fluid
2) Hypertonic to blood and isotonic to medullary interstitial fluid
3) Hypertonic to medullary interstitial fluid and hypotonic to blood.
4) Hypotonic to both blood & medullary interstitial fluid.

183. In rabbit, the renal fluid is called urine, when it reaches
1) the end of the ascending limb
2) the end of the descending limb
3) the end of the collecting duct
4) the end of the distal convoluted tubule

184. In rabbit the pale yellow color of the urine is due to the presence of
1) a substance formed due to breakdown of urea
2) a substance formed due to breakdown of ammonia
3) a substance formed due to breakdown of uric acid
4) a substance formed due to breakdown of its respiratory pigment

185. Which of the following an **incorrect** statement regarding the kidneys of rabbit ?
1) Left kidney is slightly on the lower level than the right kidney
2) Kidneys are covered by dorsal peritoneum on their ventral side
3) Right kidney is more anterior to the left kidney due to presence of stomach on the left side
4) Left kidney is posterior to right due to the presence of stomach on the left side

186. Arrange the following concentrations of the renal fluid compared to that of blood starting from the Bowman's capsule, PCT, descending limb, ascending limb, DCT and collecting duct respectively.
A) Hypotonic B) Hypertonic C) Isotonic
1) A-C-B-A-C-B 2) A-C-A-B-C-B
3) C-C-A-C-B 4) A-B-C-A-B-C

187. In the process of urine formation in rabbit, at the end of collecting duct, urine is ***hypertonic*** and ***isotonic*** to _____ * _____ respectively.
1) blood and medullary fluid
2) blood and cortical fluid

3) blood only
4) medullary fluid only

188. In rabbit the concentration of glomerular fitrate that enters the duct of Bellini is
1) hypotonic to blood and medullary fluid
2) hypertonic to medullary fluid and hypotonic to blood
3) isotonic to the renal fluid of the ascending limb of loop of Henle
4) isotonic to medullary fluid and hypertonic to blood

189. **Assertion (A)** : In rabbit the renal fluid in ascending limb of Henle's loop is hypotonic to the medullary fluid.
Reason (R) : Salts are secreted in to the ascending limb from the blood of Henle's loop in rabbit.

190. Renal fluid present in the part of renal tubule which is impermeable to water but less permeable to ions is
1) hypertonic to the medullary fluid
2) hypotonic to the medullary fluid
3) hypertonic to the cortical fluid
4) hypertonic to blood and, isotonic to the cortical fluid

191. In rabbit, the renal fluid in the part of a renal tubule in which 9% of water is reabsorbed under the influence of ADH is
1) hypotonic to the blood and isotonic to the medullary fluid
2) hypertonic to the blood and isotonic to the medullary fluid
3) isotonic to the cortical fluid
4) hypotonic to both the blood and medullary fluid

192. The common process occurring in the parts of nephron of rabbit which are subjected to the influence of ADH
1) reabsorption of urea by passive transport
2) secretion of H^+ ions and HCO^-_3
3) passive diffusion of Na^+ into lumen of nephron
4) reabsorption of water and Na^+

193. **Assertion (A) :** The process of pressure filtration through glomerular capillaries of Bowman's capsule is glomerular filtration
Reason (R) : The primary urine in the Bowman's cup is hypotonic to the cortical fluid

194. Match the following

List – I	**List – II**
A) Renal papillae	I) Malpighian body
B) Renal corpuscle	II) Tips of renal pyramid
C) Renal medulla	III) Juxtamedullary nephron
D) Renal capsule	IV) Bowmans capsule
	V) Fibrous covering of kidney

	A	**B**	**C**	**D**
1)	VI	II	III	I
2)	III	I	II	V
3)	II	III	I	IV
4)	II	I	III	V

195. Match the following

List – I	**List – II**
A) Podocytes	I) Proximal convoluted tubule
B) Endothelium	II) Distal convoluted tubule
C) Brush bordered cuboidal cells	III) Bowman's capsule
D) Principal and intercalated cells	IV) Glomerulus
	V) Ascending limb of loop of Henla

	A	**B**	**C**	**D**
1)	IV	III	I	V
2)	IV	III	I	II
3)	III	IV	V	I
4)	III	IV	I	II

196. Match the following

List –	**IList – II**
A) Macula densa	I) Contact of DCT with afferent arteriole
B) Peritubular net	II) loop of Henle
C) Vasa recta	III) PCT & DCT
D) Urethra	IV) Ureter
E) Vestibule	V) Urinogenital canal in male
	VI) Urinagenital canal in female

	A	**B**	**C**	**D**	**E**
1)	III	II	I	IV	V
2)	II	III	I	IV	VI
3)	I	II	III	V	VI
4)	I	III	II	V	VI

197. Match the following

List – I	**List – II**
Part of Nephron	**H_2O Reabsorption**
A) PCT	I) 9 %
B) Descending limb	II) 10 %

C) Ascending limb — III) Nil
D) DCT — IV) 65 %
E) Collecting duct — V) 15 %
VI) 25%

	A	B	C	D	E
1)	VI	II	I	V	IV
2)	II	I	III	VI	II
3)	IV	II	V	III	I
4)	IV	V	III	I	II

198. Match the following

List – I	List – II
A) Aldosterone	I) Conversion of angiostenin - I
B) Atrial natriuritic peptide	II) Decreases the glomerular filtration rate.
C) Renin	III) regulation of solute reabsorption
D) Angiostenin - II	IV) inhibition of water absorption
	V) enhances the water absorption

	A	B	C	D
1)	V	IV	I	III
2)	V	IV	I	II
3)	III	IV	II	V
4)	III	IV	I	II

199. Read the following and choose the correct combination pertaining to the region of kidney where they are located

	PCT	Loop of Henle	DCT
1)	Cortex	Medulla	Medulla
2)	Medulla	Cortex	Medulla
3)	Cortex	Medulla	Cortex
4)	Cortex	Cortex	Medulla

200. Read the following and choose the correct combinations

	Component	In plasma %	In urine %
1)	Protein	7 – 8.5	1.5
2)	Sodium	0.32	0.6
3)	Potassium	0.02	-
4)	Glucose	-	0.1

201. Read the following and choose the **incorrect** combination(s)
I. Perirenal fat is around fibroud renal capsule
II. Fibrous renal capsule is around the kidney
III. Retroperitoenium is around each nephron of the kidney
IV. Hilus of kidney opens outside with the help of hilum
1) I and II only — 2) II only
3) III and IV only — 4) III only

202. Read the following and choose the correct combination(s)
I. Juxtaglomerular cells are a type of epithelial cells
II. Podocytes are a type of smooth muscle fibres
III. Intercalated cells are a type of epithelial cells
IV. Principal cells are a type of nerve cells
1) I and II only — 2) II only
3) III and IV only — 4) III only

203. Read the following and choose the correct combination(s)
A. Creatine is the component never reabsorbs in all along the length of nephron
B. Hippuric acid is the secretory component but not the reabsorbing component in all along the length of nephron
C. Glucose is found in primary urine but not in the micturiting urine
1) A and B only — 2) B and C only
3) A and C only — 4) A, B and C

204. Match the following and choose the correct answer

List-I	List-II
A. Uricotelic homeotherms	I. Amphibians
B. Uricotelic poikilotherms	II. Bony fishes
C. Ureotelic homeotherms	III. Reptiles
D. Ureotelic poikilotherms	IV. Birds
	V. Mammals

	A	B	C	D
1)	II	I	III	IV
2)	IV	III	V	I
3)	IV	III	V	II
4)	I	III	IV	II

205. Match the following and choose the correct answer

List-I	List-II
A. Juxtaglomerular cells	I. Modified smooth muscle fibres

B. Vasa recta — II. Squamous cells of Bowman's capsule
C. Peritubular net — III. Capillaries close to loop of Henle
D. Podocytes — IV. Capillaries close to convoluted tubules
V. Modified nerve fibres

	A	B	C	D
1)	V	III	IV	II
2)	V	IV	III	II
3)	I	IV	III	II
4)	I	III	IV	II

206. Match the following and choose the correct answer

List-I	List-II
A. Athreshold substance	I. Vitamin
B. Low threshold substance	II. Blood corpuscle
C. A product of digested high threshold substance	III. Urea
D. Directly absorbable high threshold substance	IV. Creatinine
	V. Glucose

	A	B	C	D
1)	II	I	III	IV
2)	IV	III	V	I
3)	IV	III	V	II
4)	I	III	IV	II

207. Match the following and choose the correct answer

List-I	List-II
A. Ultrafiltraton	I. Ascending limb of loop of Henle
B. Obligatory reabsorption of water	II. Descending limb of vasa recta
C. Facultative reabsorption of water	III. PCT
D. No reabsorption of water	IV. Malpighian body
	V. DCT

	A	B	C	D
1)	II	I	III	IV
2)	IV	III	V	I
3)	IV	III	V	II
4)	I	III	IV	II

208. Match the following and choose the correct answer

List-I	List-II
A. Cortical nephrons	I. Structures of collecting system
B. Juxtamedullary nephrons	II. Smooth muscle fibres of afferent renal arteriole
C. Macula densa	III. Renal corpuscles in medulla
D. Juxtaglomerular cells	IV. Renal corpuscles in cortex
	V. Crowded cells of DCT

	A	B	C	D
1)	II	I	III	IV
2)	IV	III	V	I
3)	IV	III	V	II
4)	I	III	IV	II

209. Match the following and choose the correct answer

List-I	List-II
A. Angiotensin	I. Heart
B. Aldosterone	II. Juxtaglomerular cells
C. ADH	III. Adrenal cortex
D. Atrial natriuritic peptide	IV. Liver
	V. Pituitary gland

	A	B	C	D
1)	II	I	III	IV
2)	IV	III	V	I
3)	IV	III	V	II
4)	I	III	IV	II

210. **Statement (I) :** Urine is pale yellow in colour
Statement (II) : The break down of haemoglobin leads to the formation of yellow coloured urochrome present as excretory product in the urine

211. **Statement (I) :** The blood pressure in the glomerulus that opposes the blood pressure in afferent arteriole is always less
Statement (II) : The diameter of afferent arteriole is greater than that of efferent arteriole

212. Read the following and arrange them in a sequence (Anterior to posterior in a nephron)
A. DCT B. PCT
C. Ascending limb of loop of Henle
D. Malpighian body
E. Descending limb of loop of Henle
1) D-B-E-C-A 2) D-B-C-E-A
3) D-B-E-A-C 4) D-E-B-C-A

213. Read the following and arrange them in an ascending order based on the amount of water that reabsorbed
A. PCT B. Collecting duct
C. Distal convoluted tubule
D. Descending limb of loop of Henle
1) A-B-D-C 2) A-C-B-D
3) C-B-A-D 4) C-B-D-A

214. Renal fluid present in the part of nephron where H^+ ions are not secreted into the lumen of the renal tubule is
1) isotonic to the blood and hypertonic to the medullary fluid
2) isotonic to the medullary fluid
3) hypertonic to both blood and medullary fluid
4) hypotonic to the blood and hypertonic to the medullary fluid

215. Which of the following factors does not contribute towards maintainance of osmotic gradient in the interstitial fluid of medulla during urine formation in rabbit
1) passive transport of urea from collecting duct
2) active transport of ions from ascending limb of loop of Henle
3) blood colloidal osmotic pressure
4) counter current mechanism

216. Renal fluid in the descending limb of loop of Henle is
1) hypertonic to blood and medullary fluid
2) hypotonic to blood and medullary fluid
3) hypertonic to medullary fluid and isotonic to blood
4) hypertonic to blood and isotonic to medullary fluid

217. Which of the following of the blood are filtered but not reabsorbed in the nephron of rabbit
1) Urea, Creatinin
2) Blood corpuscles, Creatinin
3) Complex proteins, Creatinin
4) Creatinine

218. In a healthy rabbit, usually in which of the following, relatively high glucose content can be recorded
1) Hair pin bend of loop of Henle
2) Collecting tubule
3) Distal convoluted tubule
4) Bowman's cup

219. Sodium ions 'passively diffuse' into the lumen of the nephron from the interstitial fluid in the
1) descending limb of Henle's loop
2) ascending limb of Henle's loop

220. Select the false statement
1) proximal convoluted tubule of rabbit's nephron is the site of maximum water reabsorption
2) ADH action is restricted to descending and ascending limbs of Henle's loop
3) Angiotensin I is synthesized in kidney
4) Increased blood volume promotes the release of atrial natriuritic peptide

I. MALE REPRODUCTIVE SYSTEM:

LEVEL - I

221. The location of testis in rabbit is
1) ventro anterior region in the abdomen
2) ventro posterior region in the abdomen
3) scrotal sac 4) infront of penis

222. In male rabbit, the thin, long muscular tube that begins from testis is:
1) rete testis 2) epididymis
3) vas efferentia 4) vasa deferentia

223. In rabbit, the vaginal acidity is neutralised by the secretions of this gland
1) bulbourethral glands 2) perineal glands
3) rectal glands 4) prostate glands

224. The function of epididymis is
1) storage of sperms
2) nourishment of sperms
3) activating the sperms
4) storage & nourishment of sperms

225. Cauda epididymis is connected to scrotal sac through
1) gubernaculum 2) rete testis
3) vas deferens 4) vasa efferentia

226. In a young rabbit, the testis descends into scrotal sacs through
1) inguinal canal 2) uterus masculinus
3) perineal canal 4) anal canal

227. In rabbit, the epithelium lining the seminiferous tubules is
1) glandular epithelium
2) germinal epithelium
3) pseudostratified epithelium
4) stratified squamous epithelium

228. In rabbit, the outer covering of the testis is
1) zona pellucida
2) carona radiata
3) tunica albuginea
4) tunica vasculosa

229. The function of Sertoli cells
1) Nourishment of sperms
2) supplying O_2 to sperms
3) Excretion
4) Spermatogenesis

230. Inhibin is the protein secreted by
1) Leydig cells 2) Sertoli cells
3) Granulosa cells 4) Follicular cells

231. The enzymes present in acrosome of sperm are
A) Hyaluronidase B) Inhibin
C) Acrosin
D) Corona penetrting enzyme

1) All 2) All except C
3) All except B 4) A & C only

232. Which of the following are digested by acrosin enzyme
1) Prostaglandins 2) Glycoproteins
3) Lipoproteins 4) Cholesterol

233. The dorsal diverticulum of urethra in male rabbit is :
1) uterus 2) uterus masculinus
3) prepuse 4) vas deferens

234. The thicknened and elastic part by which epididymis is attached to the scrotal sac in the male rabbit is
1) Spermatic cord 2) Tunica albuginea
3) Gubernaculum 4) Tunica vaginalis

235. Which of the following allows sliding movement of testis in rabbit
1) Spermatic cord 2) Tunica albuginea
3) Theca 4) Coelomic fluid

236. In male reproductive system of rabbit, the tunica albuginea of the testis is surrounded by double layer of mesothelium called
1) Tunica vaginalis 2) Tunica interna
3) Tunica externa 4) Tunica media

237. In rabbit, the part of the male reproductive system that stores sperms temporarily and nourishes them is present
1) between the seminiferous tubules and vasa efferentia
2) on the outer surface of the testis inbetween vasa efferentia and rete testis
3) between the rete testis and epididymis
4) on the inner surface of the testis between vasa efferentia and vas deferens

238. Which of following projects into the testis to form septa
1) Tunica interna 2) Zona pellucida
3) Tunica albuginea 4) Zona radiata

239. The secretions of an unpaired gland that is present around the base of uterus masculinus of rabbit helps in the
1) storage of sperms
2) secretes citric acid to generate ATP
3) nourishing the developing sperms
4) neutralising vaginal acidity and urinary residue in urethra

240. In male rabbit, the secretions of the following neutralize the urinary residue
1) Perineal glands 2) Prostate glands
3) Bulbo-urethral glands 4) Bartholin's glands

LEVEL - II

Note:
Follow this pattern of options for choosing the correct answer for Assertion/ Reason type and Statement I/ Statement II type of questions

1) A (S I) and R (S II) are correct and R (S II) is the correct explanation of A(S I)
2) A (S I) and R (S II) are correct and R (S II) does not explain A(S I)
3) A (S I) is correct and R (S II) is false
4) A (S I) and R (S II) are false

241. The following are the statements pertaining to prostate gland
(i) it opens into uterus masculinus
(ii) It forms bulk of seminal fluid
(iii) It is present in both male & female rabbit
1) All are correct 2) All are incorrect
3) i & iii are correct 4) ii & iii are incorrect

242. **Assertion:** (A) In adult rabbit, the testes are situated in scrotal sacs
Reason: (R) In rabbit, the testis descend into testis sac through inguinal canal a few days after birth

243. **Assertion:** (A) The secretions of Cowper's gland protect the sperms from acidity
Reason: (R) The secretion of Cowper's gland neutralises the urinary residue and vaginal acidity.

244. Which of the following chemicals are present in seminal fluid secreted by seminal vesicle?
1) Glucose & fructose
2) Fructose & citric acid
3) Fructose & prostaglandins
4) Glucose & prostaglandins

245. Read the following parts of male reproductive system of rabbit and identify the route of passage of sperms in rabbit
A) Rete testis
B) Seminiferous tubules
C) Vas deferens D) Vasa efferentia
1) B-A-D-C 2) B-A-C-D
3) A-B-C-D 4) D-A-B-C

II. FEMALE REPRODUCTIVE SYSTEM:

LEVEL - I

246. In female rabbit, the hormone secreted by corpus luteum is
1) progesterone 2) aldosterone
3) androgens 4) inhibin

247. Duplex type of uterus is seen in
1) female rabbit 2) human female
3) females of human or rabbit
4) all the female mammals

248. In rabbit, if ovum is not fertilized the corpus luteum becomes
1) corona radiata 2) zona pellucida
3) corpus albicans 4) discuss proligerous

249. In female mammal, the homologus organ to penis is
1) vagina 2) clitoris
3) vestibule 4) vulva

250. The hormone which influences secondary sexual characters in female rabbit is
1) progesterone 2) oestrogen
3) relaxin 4) androgen

251. The anterior part of oviduct is
1) vagina 2) vestibule
3) uterus 4) oviducal funnel

252. In female rabbit, the vestibule opens out through a slit like aperture called
1) ostium 2) vulva
3) clitoris 4) hilus

253. In mammals, the penetration of sperm into ovum is facilitated by
1) testestrone 2) fertilizin
3) progesterone 4) hyaluronidase

254. In female rabbit, the number of mammary glands is
1) 1 pair 2) 2 pairs
3) 3 pairs 4) 4 pairs

255. The breeding period of domestic rabbit is
1) January to June 2) June to October
3) August to October
4) at any time in the year

256. In rabbit, the time required for ovulation after copulation
1) 5 hrs 2) 8-10 hrs
3) 1-2 hrs 4) 24-36 hrs

257. In rabbit, the fertilization takes place in
1) uterus 2) fallopian tube
3) vagina 4) vestibule

258. In rabbit, the special tissue present between uterus and embryo is
1) umbilicus 2) corpus luteum
3) placenta 4) endometrium

259. The gestation period in rabbit is
1) 25 Days 2) 31 Days
3) 21 Days 4) 60 Days

260. The follicle with primary oocyte surrounded by a layer of cuboidal cells is
1) primordial follicle 2) primary follicle
3) secondary follicle 4) graafian follicle

261. In rabbit, the stage of the female sex cell when it is in the secondary follicle
1) oogonium 2) primary oocyte
3) secondary oocyte 4) ovum

262. In rabbit, the hormone **not** secreted by corpus luteum is
1) estrogen 2) progesterone
3) relaxin 4) oxytocin

263. The cells encircling the primary oocyte of a secondary follicle form
1) corona radiata 2) zona pellucida
3) discus proligerus
4) membrana granulosa

264. The layer present outer to the inner layer of the secondary oocyte is called
1) membrana granulosa
2) discus proligerus
3) zona pellucida
4) corona radiata

265. In rabbit, the uterus is attached to the dorsal abdominal wall by a thin peritoneum, called
1) mesorchium 2) mesosalpinx
3) mesovarium 4) mesometrium

266. In rabbit, the tissue present in clitoris of female and the two upper columns of penis of male are
1) corpora cavernosa & corpus spongiosum
2) corpora cavernosa in both
3) corpus spongiosum in both
4) corpus spongiosum and corpora cavernosa

267. In rabbit, the glands which lubricate the vaginal passage are present
1) in the wall of urethra
2) in the wall of uterus
3) in the wall of vagina
4) in the wall of vestibule

268. In rabbit, the hormone produced by the inner part of theca and granulosa cells of secondary follicle is responsible for the
1) development of secondary sexual characters
2) development of corpus luteum
3) maintenance of pregnancy
4) stretching of pelvic ligaments

269. The highly vascular and highly distensible part of oviduct of female rabbit in which blastocyst implanted is
1) fallopian tube 2) pviducal funnel
3) uterus 4) abdominal cavity

270. Meiosis –I in the primary oocyte of a female rabbit is completed
1. soon after 'ovulation'
2. soon after the entry of a male gamete into the ovum
3. during the breeding season
4. after the formation of Graafian follicle in the ovary

LEVEL - II

Note:

Follow this pattern of options for choosing the correct answer for Assertion/ Reason type and Statement I/ Statement II type of questions

1) A (S I) and R (S II) are correct and R (S II) is the correct explanation of A(S I)
2) A (S I) and R (S II) are correct and R (S II) does not explain A(S I)
3) A (S I) is correct and R (S II) is false
4) A (S I) and R (S II) are false

271. **Assertion:** In rabbit, the mature ovarian follicle is called Graafian follicle
Reason: It is covered by corona radiata

272. Which of the following layers are present on either side of antrum in a matured Graafian follicle
1) Membrana granulosa, Theca
2) Membrana granulosa, Corona radiata
3) Discus proligerus, Corona radiata
4) Membrana granulosa, Discus proligerus

273. Which of the following is not correctly matched
1) Uterus - Mesometrium
2) Clitoris - Corpora cavernosa
3) Ovary - Mesovarium
4) Graafian follicle - Corpus spongiosum

274. In the absence of pregnancy, corpus luteum
1) stimulates the accessory glands
2) is maintained in the same condition
3) becomes active and acts as a temporary endocrine gland
4) degenerates after some time

III. FERTILIZATION AND DEVELOPMENT:

LEVEL - I

275. In rabbit, the outer layer of blastocyst is formed by
1) polygonal cells 2) cells fo Rauber
3) embryonal Knob 4) trophoblast

276. Hyaluronidase useful for the penetration of the sperm into the secondary oocyte is secreted by
1) corona radiata of the secondary oocyte
2) acrosome of the sperm
3) zona pellucida of the secondary oocyte
4) middle piece fo the sperm

277. Four cells stage in the zygote of rabbit is formed as a result of
1) 2nd meridional cleavage divisions
2) 3rd horizontal cleavage divisions
3) 4th irregular cleavage divisions
4) Ist meridional cleavage divisions

278. The trophoblast of morula gives rise to
1) inner cell mass
2) embryonic disc
3) extra embryonic trophectoderm
4) hypoblast

279. The longitudinal furrow forms along the middle of the primitive streak is called
1) primitive pit 2) primitive knot
3) primitive fold 4) primitive groove

280. During embryonic development of rabbit, the non-functional extra embryonic membrane is
1) chorion 2) allantois
3) yolksac 4) amnion

281. Which one of the following is derived from mesoderm
1) Dermis 2) Skeleton
3) Muscles 4) All of the above

282. The cells present on either sides of primitive streak move and form
1) mesoderm 2) ectoderm
3) hypoblast 4) neural plate

283. Identify the **wrong match** regarding the foetal membrane of rabbit from the following
1) Chorion-Respiration
2) Allantois-excretion
3) Yolksac-Nutrtion
4) Amnion-Protection

284. During the embryonic development in rabbit, the rearrangement and reorganisation of cells occurs to produce germ layers is called
1) fertilization 2) gastrulation
3) blastulation 4) implantation

285. The process of birth is called
1) micturition 2) parturition
3) premunition 4) ovulation

286. The decidua present between embryo and lumen of uterus is
1) decidua capsularis 2) decidua parietalis
3) decidua basalis 4) decidua cavernosa

287. In rabbit, the placenta is formed by
1) chorio allantoic membrane and yolk sac.
2) amnion, chorion and yolk sac.
3) chorio allantoic membrane and endometrium
4) allantois and endometrium

288. In the developmental stages of rabbit, the neural folds raise from the neural plate due to
1) sinking of neuro-ectrodermal cells of blastocyst
2) sinking of neuro-ectodernal cells of gastrula
3) sinking of neuro-ectodermal cells of discoblastula stage
4) sinking of neuro-ectodermal cells of blastula stage

289. In the embryonic development of rabbit, the cells of the trophoblast come in contact with the uterine epithelium after the immediate disapearence of
1) outer membrane of secondary oocyte
2) inner membrane of secondary oocyte
3) outer membrane of secondary follicle
4) inner membrane of secondary follicle

290. The germinal layer and the part of alimentary canal involved in the formation of allantois are respectively
1) ectoderm, hindgut
2) endoderm, midgut
3) endoderm, hindgut
4) ectoderm, midgut

291. Which of the following processes are responsible for the development of extraembryonic endoderm and mesoderm respectively in the development of rabbit ?
1) delamination and involution
2) involution and delamination
3) ingression and involution
4) involution and ingression

292. The lining of the uterus in which the mammalian embryo implants itself is called the
1) trophoblast 2) endometrium
3) cells or Rauber 4) trophectoderm

293. During the development of rabbit, the first polar body is released in the formation of
1) secondary oocyte 2) primary oocyte
3) membrane oocyte 4) primary follicle

294. When does "zona pellucida" disappear, during embryonic development of rabbit ?
1) Before fertilization
2) Before the cells of trophoblast come in direct contact with uterine endometrium
3) Immediately after fertilization
4) During gastrulation

295. Embryonic inner cell mass of blastocyst contains
1) unipotent cells 2) pleuripotent cells
3) totipotent cells 4) multipotent cells

LEVEL - II

Note:

Follow this pattern of options for choosing the correct answer for Assertion/ Reason type and Statement I/ Statement II type of questions

1) A (S I) and R (S II) are correct and R (S II) is the correct explanation of A(S I)
2) A (S I) and R (S II) are correct and R (S II) does not explain A(S I)
3) A (S I) is correct and R (S II) is false
4) A (S I) and R (S II) are false

296. Study the following statements about fertilization of rabbit
I) During ovulation, the ovum is present in the form of primary oocyte
II) With the penetration of the sperm secondary ooctye undergoes second maturation division
III) For the penetration of the sperm into secondary oocyte by hyaluronidase present in the acrosome of the sperm plays an important role
The **incorrect** statement is
1) Only I 2) I & II are incorrect
3) I, II,& III are incorrect 4) Only II is incorrect

297. Read the following statements about development of rabbit
i) The mesoderm present in the embryonic disc is embryonic mesoderm
ii) Mesodermal layer beyond the embryonal disc is extraembryonic mesoderm
iii) Inner wall of amniotic folds forms-amnion
The correct combination is
1) All are true 2) I & II are true
3) I & III are true 4) II & III are true

298. **Assertion:** (A) Fertilization takes place in fallopian tube of mammals
Reason: (R) Fallopian tube is attached to the abdominal wall by mesosalpinx

299. **Assertion:** (A) Blastocyst stage is peculiar to the embryonic development of mammals
Reason: (R) Blastocyst is similar to blastula to other animals

300. **Assertion:** (A) Placenta is useful for the exchange of materials between the foetus and mother
Reason: (R) Young one is still attached to the uterus mother by an umbilical cord at the time of birth

301. **Assertion:** (A) Allantois is regarded as the embryonic urinary bladder
Reason: (R) Allantois stores the waste materials of the embryo

302. **Assertion:** (A) The placenta of rabbit is of deciduous type.
Reason: (R) The placenta of rabbit is formed by the fusion of allontois with chorion.

303. Study the following
A. Testosterone influences the male secondary sexual characters
B. Gestation period in rabbit is approximately 14 days.
C. Prostrate gland secrete a vaginal lubricant
D. Placenta secretes oestrogen
The correct answer is
1) A and D 2) B and C
3) C and D 4) A and B

RABBIT - FUNCTIONAL ANATOMY II
LEVEL - III

Note:

Follow this pattern of options for choosing the correct answer for Assertion/ Reason type and Statement I/ Statement II type of questions

1) A (S I) and R (S II) are correct and R (S II) is the correct explanation of A(S I)
2) A (S I) and R (S II) are correct and R (S II) does not explain A(S I)
3) A (S I) is correct and R (S II) is false
4) A (S I) and R (S II) are false

304. Which of the following is present in I band of myofibril
1) Myosin filaments and M Membrane
2) Myosin filaments and Z Membrane
3) Thin filaments and Z Membrane
4) Actin filaments and M Membrane

305. Which of the following are absent in "H" disc of a myofibril
1) Actin filaments and Z membrane
2) Actin filaments and myosin filaments
3) Myosin filaments and Z membrane
4) Myosin filaments and M line

306. The lightier region of dark band of Sarcomere in a myofibril
1) I band 2) H disc 3) A band 4) M Membrane

307. **Assertion(A):** Pyruvic acid produced by glycolysis transformed into lactic acid in the absence of O_2
Reason (R): During rapid activity of muscle, respiratory system is unable to supply sufficient O_2 needed by it leading to anaerobic degradation of glucose

308. **Assertion (A):** During muscle relaxation thin filaments swing back from Krause's membrane
Reason (R): Activated myosin ATPase makes the myosin head extended to establish a link with actin during the process of relaxation

309. **Assertion (A):** During muscle contraction, active sites of actin filament are exposed
Reason (R): The calcium ions bound to troponin and pushes the tropomyosin exposing the active sites so that binds the thin filament react with myosin heads.

310. Study the following related to striated muscle and choose the answer

Muscle contraction	Muscle relaxation	Structure of myofibril
i) Actomyosin complex is formed	Actomyosin complex breaks	Contain alternate dark & light bands
ii) Actomyosin complex breaks	Actomyosin complex is formed	Contain alternate dark and light bands
iii) Actomysin complex breaks	Actomysin complex breaks	Contain alternate dark and light bands

1) I & II are incorrect 2) II & III are correct
3) I & III are correct 4) Ony I is correct

311. Study the following

Power Stroke	Recovery Stroke	Ratchet Mechanism
i) Formation of of cross bridges	Breakage of Actomyosin complex	Swinging movements Actomyosin Complex
ii) Formation of of cross bridges	Formation of Actomyosin complex	Swinging movement Actomyosin complex
iii) Separation of of cross bridges	Breakage of Actomyosin complex	Swinging movements Actomyosin complex

Select the correct statements

1) I & II are incorrect 2) II & III are correct
3) I & III are correct 4) Ony I is correct

312. Calcium is essential for muscle contraction. The direct or indirect role of calcium in muscle contraction is
1) promoting the spread of depolarisation to sarcoplasmic reticulum
2) activation of myosin ATPase which results in the release of energy from ADP
3) to expose the active sites on the myosin filaments so as to facilitate formation of actomyosin
4) to bring conformational changes in muscle filaments to allow direct interaction between certain components of myosin and active sites of actin.

313. Read the following statements :
i) H-Zone is darker than 'I' band but lighter than sides of 'A' band
ii) 'I' band is lighter than 'A' band and H-zone
iii) 'A' band is darker than 'H' zone but lighter than 'I' band
iv) 'A' band consisits of only myosin filaments
1) I, III are correct 2) II, III are correct
3) I, II are correct 4) III, IV are correct

314. Arrange the following events of muscle contraction from the starting to the end in correct order and choose the correct option
A) release of Ca^{++} ions into sarcoplasm
B) formation of actomyosin complex
C) depolarisation of sarcolemma
D) swinging of crossbridges of myosin towards the H zone
1) A→C→B→D 2) C→A→B→D
3) B→C→A→D 4) C→B→A→D

315. Choose the **incorrect** statement
1) During muscle contraction the muscle is contracted as a whole
2) During muscle contraction the muscle fibres are contracted
3) During muscle contraction the myofibrils are contracted
4) During muscle contraction thick and thin filaments are contracted

316. **Statement-I :** Hensen's disc in the middle of anisotropic band of myofibril is paler in appearance
Statement-II : Hensen's disc is without myosin filaments

317. Identify the correct sequence in the muscle contraction
A) power stroke
B) nerve impulse at the neuromuscular junction
C) release of Ca^{++} ions
D) Actin – myosin complex
E) release of inorgainc phosphorous
1) C → B → A → D → E
2) D → C → B → A → E
3) A → B → C → D → E
4) B → C → D → E → A

318. Match the following

List – I	List – II
A) Capitular process	I) Cervical vertebra
B) Tubercular facet	II) Sacrum
C) Metapophysis	III) lumbar vertebra
D) Thin centrum	IV) Hyoid apparatus
E) Vertebrarterial foramen	V) Transverse process of thoracic vertebra
	VI) Centrum of thoracic vertebra

	A	B	C	D	E
1)	VI	V	III	I	I
2)	V	VI	II	I	III
3)	IV	V	VI	I	II
4)	VI	V	II	I	III

319. Following are the statements about myofibril
I. Tropomyosin covers the active sites of actin in the absence of Ca^{+2}
II. Calcium attaches to TnC during muscle contraction
III. Tropinin – tropomyosin complex is formed due to the binding of tropomyosin to T_nT
IV. Actomyosin and troponin – tropomyosin complexes are formed during muscle contraction
1) All except I, II are true
2) All except III, IV are true
3) All except III are true 4) All are true

320. Following are the statements about muscle contraction
I. Myosin head binds to the active site in the absence ATP
II. Actin – myosin complex at the active site releases inorganic phosphorus
III. Active sites are exposed on thin filaments due to the binding of Ca^{++} to T_nC shifts the troponin – tropomyosin complex
Which of the above are true
1) All are true 2) All except I
3) All except III 4) Only I and III

321. Following are the statements related to muscle contraction and choose the correct answer
I. ATP is the immediate source of energy
II. CP is an immediate backup source
III. The oxidation of glucose and fatty acids are the next source of reserve energy
IV. ATP & CP are resynthesized by utilizing the energy liberated during the oxidation of glucose and fatty acids
1) All are true
2) All except II are true
3) All except III are true
4) All except IV are true

322. Observe the statements related to myofibrils
I. Each myosin has 3 domains – head, neck and tail
II. A myosin molecule is with 4 polypeptides 2 heavy chain and 2 light chain polypeptides only
III. Neck of each heavy chain is with the light chains
IV. Two heavy chains wrap around each other in tail region
The correct statements
1) I, II and III 2) I, III and IV
3) II, III and IV 4) I, II and IV

323. **Assertion (A) :** During power stroke in muscle contraction the thin filaments are pulled over the myosin filaments
Reason (R) : Actomyosin complex swings cross bridges towards the H-zone during power stroke

324. If we observe the portion of myofibril from one Krause's membrane to another succeeding Krause's membrane in which of the following correct sequence the various parts are seen
A. Half of light band
B. Darker peripheral portion of A-band
C. One full I-band D. Hensen's disc
1) A → C → A 2) A → B → D → B
3) C → B → D → B → C
4) A → B → D → B → A

325. Study the following features of vertebrae
A) Thin centrum
B)Well developed transverse processes
C) Short neural spine
D) Large and stout
Which of the above are true to 'Cervical vertebrae' ?
1) A and C 2) B and C
3) A and D 4) A and B

326. Which of the following bone is not found in osinnominatum
1) Ilium 2) Pubis
3) Clavicle 4) Ischium

327. Which of the following is a amphiarthroses
1) Syndesmoses 2) Synchondroses
3) Gomphoses 4) Ginglymi

328. Synovial capsule is absent in this joint
1) Sutureless joint of skull bones 2) Hinge joint
3) Gliding joint 4) pivot joint

329. Study the following

Joint -	found at-	type of movement allowed
I) Ginglymoid	Elbow Joint-	Extension flexion joint -
II) Saddle Joint	Between wrist bones-	Movement in different limited planes
III) Planar joint-	between carpal meta carpal of thumb	Movement in all planes
IV) Ball & socket	Hip joint-	Free in more than one plane movement-

Which of the above two are correct
1. I & II 2. I & III
3. I & IV 4. II & III

330. Match the following

List - I	List - II
A) Planar joint	I) Radiocarpal joint
B) Condyloid joint	II) Joint between tarsals
C) Gomphoses	III) Knee joint
D) Ginglymi	IV) Dentoalveolar joint
	V) Hip joint

A B C D	A B C D
1) I II III IV	2) II I IV III
3) II I III IV	4) II I IV V

331. Study the following

Types of Joints	Character	Bones forming the joint
i) Hinge Joint	Allows angualr movement	Humerus, Radio-ulna
ii) Saddle Joint	Only in primates	Carpal, metacar pal of thumb
iii) Planar Joint	Allows restricted movement in different planes	Skull-Axis
iv) Pivotal Joint	Bone fits over pivot by concavity and rotates	Atlas / Axis

1) I & II are incorrect 2) II & III are correct
3) I & IV are correct 4) I, II, IV are correct

332. Study the following

Part of the skull	Bone (s)	Location
I) Cranium	Frontals	Roof of cranium
II) Olfactory capsule	Vomers	Ventral side of capsule
III) Auditory capsule	Stapes	Internal ear
IV) Cranium	Alisphenoids and orbitosphenoids	Floor of cranium

The correct combination is
1) I and IV 2) II and III
3) I and II 4) III and IV

333. Study the following

Types of joints	Bones forming the joint	Type of movement
I) Pivot joint	Atlas / Axis	rotation
II) Planar joint	Tarsals	Free movement in more than one plane
III) Condyloid joint	Metacarpophalangeal joint	Angular
IV) Saddle joint	Carpal and Metacarpal of thumb	Both angular and rotation

The correct combination is
1) I and III 2) II and IV
3) II and III 4) I and II

334. A type of joint present between radius-ulna of forearm and humerus of upper arm is also present between
1) Tarsals of ankle 2) Phalanges of digits
3) Zygopophyses of vertebrae
4) Carpal and metacarpal of thumb

335. Read the following statements about types of joints and select the **incorrect** statement
1) Ball & socket joint allows free movement in more than one plane
2) Amphiarthroid joint allows restricted movement in different planes
3) Due to saddle joint the thumb enjoys greater freedom of movement than the other fingers.
4) Hinge joint allows angular movement in only one plane

336. Match the following

List - I	List - II
A) Mesethmoid	I) Inter-orbital septum
B) orbitosphenoid & presphenoid	II) Olfactory capsule
C) fenestra-ovalis	III) Vertical plate in the cranial cavity
D) fenestra rotunda	IV) Posterior aperture of auditory capsule
E) cribriform plate	V) Anterior aperture of auditory capsule
	VI) Floor of the cranium

	A	B	C	D	E
1)	II	I	IV	III	VI
2)	III	I	V	IV	VI
3)	II	I	V	IV	III
4)	III	II	V	IV	I

337. Match the following

List - I	List - II
A) Palatine processes of pre-maxillae	I) Anterior part of hard palate
B) Squamosal	II) Middle part of hard palate
C) palatine processes of maxillae	III) Lateral side of cranium
D) Jugal	IV) Zygomatic arch
	V) Hyoid apparatus

	A	B	C	D
1)	II	V	I	IV
2)	I	III	II	IV
3)	VII	IV	I	V
4)	I	II	III	IV

338. Match the following

List - I	List - II
A) Trochlea	I) Tibia
B) Sigmoid notch	II) Humerus
C) Longest bone	III) Ulna
D) Thin and weak bone	IV) Radius
	V) Fibula

	A	B	C	D
1)	I	IV	II	V
2)	II	IV	V	III
3)	III	II	V	I
4)	II	III	I	V

339. Match the following

List - I	List - II
A) Shoulder joint	I) Non-axial diarthrose
B) Pivot joint	II) Mono-axial diarthrose
C) Saddle joint	III) Multi-axial diarthrose
D) Planar joint	IV) Biaxial diarthrose
	V) Amphiorthrose

	A	B	C	D
1)	III	V	IV	II
2)	IV	II	V	I
3)	V	IV	II	III
4)	III	II	IV	I

340. In frog, the vertebra with an anterior convex surface (i.e., double convexities) is (JIPMER 2004)
1) Atlas 2) Urostyle
3) 8th vertebra 4) 9th vertebra

341. Structure responsible for formation of sigmoid notch is (CPMT 2005)
1) olecranon process of humerus
2) olecranon process of femur
3) olecranon process of radio-ulna
4) olecranon process of tibio-fibula

342. Thoracic cage in rabbit is made up of (CPMT 2006)
1) ribs, diaphragm and sterum
2) ribs, verterbral column and sternum
3) ribs, vertebral column and diaphragm
4) vertebral column, diaphragm and sternum

343. Lumbar vertebrae are found in (CPMT 2005)
1) hip region 2) thorax
3) neck region 4) abdominal region

344. Total number of bones found in right forelimb of rabbit is
1) 24 2) 26
3) 30 4) 60

345. **Assertion (A):** Inflammation of a skeletal joint may immobilize the movements of the joint.
Reason (R): Uric acid crystals in the joint cavity and ossificaiton of articular cartilage lead to this (AIIMS 2006)

346. Observe the statements pertaining to sense capsules of rabbit
I. Dorsal part of olfactory capsules formed by vomers and ventral part by nasals
II. Inter orbital septum formed by orbitosphenoid and presphenoid
III. Ear ossicles extend between fenestra ovalis and tympanum
IV. Each orbit is bordered anteriorly by squamosal and posteriorly by maxillae
The correct statements are
1) I, II and III 2) II, III and IV
3) II and III 4) III and IV

347. Observe the statements regarding skull of rabbit
I. Olfactory capsules are internally seperated by vertical partition called mesethmoid

II. Ear ossicles are lodged by lower swollen portion of periotic bone
III. Alisphenoid meet the pterygoids anteriorly
IV. Occipital and parietal regions are seperated on lateral sides by pterygoids
The correct statements are
1) II, II and IV 2) I, II and III
3) II, III & IV 4) I, III & IV

348. Observe statements related to jaw bones of rabbit
I. Palatine is a thin bone behind the maxilla
II. Dorsally nasal process of premaxillae are connected to nasals
III. Jugal of upper jaw forms the part of zygomantic arch
IV. Jaws are derived from hyoid arch.
The correct statements are
1) I, II & IV 2) II, III and IV
3) I, II and III 4) I, III and IV

349. Match the following bones of skull of rabbit with corresponding regions

List - I	List - II
A) Alisphenoids & orbitosphenoids	(i) Posterior part floor of cranium
B) Pre sphenoid	(ii) Roof of cranium
C) Basiphenoid	(iii) Sides of cranium
D) Frontals and parietals	(iv) Anterior part of floor of cranium

1) A-II, B-IV, C-III, D-I
2) A-III, B-I, C-IV, D-II
3) A-III, B-IV, C-I, D-II
4) A-IV, B-II, C-I, D-III

350. Match the following bones of skull of rabbit with corresponding regions

List - I	List - II
(A) Mesethmoid	(i) Posterior border of orbit
(B) Cribriform Plate	(ii) Partition of olfactory capsule
(C) Basioccipital	(iii) Closes anterior margin of cranial cavity
(D) Squamosal and alisphenoid	(iv) Ventral part of posterior side of cranium

1) A-II, B-III, C-IV, D-I
2) A-III, B-IV, C-II, D-I
3) A-IV, B-I, C-III, D-II
4) A-II, B-IV, C-III, D-I

351. Match the following bones of skull of rabbit with corresponding regions

LIST-1	LIST-II
(A) Supra occipital	(i) Articulated with basioccipital
(B) Basisphenoid	(ii) Floor of cranium
(C) Occipital condyle	(iii) Posterior side of cranium
(D) Presphenoid	(iv) Borders foramen magnum dorsally

1) A-III, B-I, C-IV, D-II
2) A-IV, B-I, C-III, D-II
3) A-IV, B-I, C-II, D-III
4) A-I, B-III, C-IV, D-II

352. Match the following

Vertebrae	Character
A) 3rd - 6th cervical vertebrae	I) With capitular facet without tubercular facet
B) 2nd cevical vertebrae	II) Supports pelvic girdle
C) 10th to 12th or 13th thoracic vertebrae	III)Each vertebrae with transverse processes
D) Sacral vertebrae	IV) Odontoid process present

1) A-IV, B- I, C-II, D-I
2) A-III, B-IV, C-1, D-II
3) A-III, B-II, C-I, D-IV
4) A-II, B-IV, C-I, D-III

353. Match the following bones of skull of rabbit with corresponding regions

Character	Vertebrae
(A) Transverse process directed forwards and downwards	(i) First nine thoracic
(B) Neural arch disappear towards posterior side	(ii) Lumbar
(C) Transverse process short and horizontal	(iii) Sacral
(D) Connected to pelvic girdle	(iv) Caudal

1) A-III, B-I, C-IV, D-II
2) A-II, B-IV, C-I, D-III
3) A-IV, B-II, C-III, D-I
4) A-II, B-III, C-IV, D-I

354. Arrange the following structures from posterior to anterior direction.
(A) Manubrium (B) Xiphisternum
(C) Clavicle (D) Xiphoid cartilage
1) B→A→C→D 2) D→B→A→C
3) D→A→B→C 4) C→D→A→D

355. Study the statements related to girdles of rabbit
I. Clavicle is articulated with acromian process of pelvic girdle
II. Obturator foramen is enclosed by osinnominatum
III. Apex of scapula faces downwards and forwards and base facing upwards
IV. Two halves of pectoral girdle are joined by symphases
The true statements are
1) I, II and IV 2) II and III
3) II, III and IV 4) III and IV

356. Observe statements related to hind limbs and select the correct statements
I. Syndesmoses found near proximal part of bones of thigh
II. Instep of rabbit is supported by 4 metatarsals
III. Proximal part of bones of shank forms hinge joint with femur
IV. Number of tarsals are 6, arranged in three rows
1) I, II and III 2) I and III
3) II, III and IV 4) II & IV

357. Arrange the following joints of various parts of forelimbs of rabbit upto the thumb in a proper sequence
(A) Condyloid joint (B) Hinge joint (C) Ball and socket joint (D) Planar joint (E) Saddle joint
1) B→D→A→E→C 2) C→B→D→E→A
3) C→B→D→A→E 4) B→E→A→C→D

358. Match the following

List - I	List - II
A) Monaxial diarthrose	I) Hip joint
(B) Multi axial diarthrose	II) Condyloid joint
C) Non axial diarthrose	III) ginglymi
D) Biaxial diarthrose	IV) Planar joint

1) A-I, B-II, C-III, D-IV
2) A-III, B-IV, C-I, D-II
3) A-III, B-I, C-IV, D-II
4) A-IV, B-I, C-II, D-III

359. Match the following

List - I	List - II
A) Planar joint	(i) Joint that allows only angular movement
B) Hinge joint	(ii) Joint allows free movement
C) Condyloid joint	(iii) Articular surfaces of bones are flat or slightly curved in the joint
D) Ball and socket joint	(iv) Oval shaped bone fits into oval depression of another bone
	(v) One bone rotates on peg like elevation of other bone

1) A-III, B-I, C-IV, D-II
2) A-IV, B-II, C-I, D-III
3) A-IV, B-III, C-V, D-II
4) A-III, B-II, C-IV, D-V

360. Observe the character related to synovial joint and select the true combinations
I) synovial fluid contains phagocytic cells, hyaluronic acid and interstitial fluid
II) Articular capsule is made up of outer synovial membrane and inner dense fibrous layer
III) Some synovial joints contain menisci
1) I, II and III 2) II & III
3) I & II 4) I & III

361. Arrange the following in an ascending order based on their number
A) True ribs
B) Sternebrae
C) Tarsals of one hind limb
D) Caudal vertebrac
E) Bones of lower jaw
1) C - E - B - D - A 2) E - C - B - D - A
3) C - E - B - A - D 4) E - C - B- A - D

362. In the fore limb of rabbit various types of joints such as ball - socket joint (E), planar joint (A), ginglymus joint (G) are present. Identify the correct sequence of the types of joints in the fore limb from shoulder to the tip of finger
1) G → G → A → E
2) E → A → E → E
3) E → G → A → G
4) E → A → E → G

363. Identify the correct combination with regards to inorganic ions essential for muscle contraction

Released form	Released into	Bind with
1) Sarcoplasmic reticulum	Sarcoplasm	Cross bridges of myosin
2) Cisternae	Sarcoplasmic reticulum	Troponin
3) Sarcoplasmic reticulum	Sarcoplasm	Troponin
4) Cisternae	Sarcoplasm	Myosin

364. Choose the correct combination with reference to rabbit

Part	Bones	Character
I) Palm	five metacarpals	long slender bones
II) Sacrum	3 or 4 vertebrae	fused bones with hypapophyses

III) Lower jaw	two dentary bones	each dentary with 1 incisor, 3 premolars and 3 molars
IV) auditory capsule	single periotic bone	with fenestra ovalis and fenestra rotunda

1) I, IV 2) II, IV
3) II, III, IV 4) I, III, IV

365. Identity the correct combinations from the following with regard to vertebrae of rabbit

Type	Number	Character
I. Cervical	7	Possesses vertebraatrial articulation with ribs
II. Thoracic	7 to 9	Modified for articulation with ribs
III. Lumbar	6 to 7	Neural arch possesses metapophyses
IV. Sacral	4 to 6	Fused to form sacrum & supports the pelvic girdle

1) I & II 2) II & III 3) I & III 4) I & IV

366. Identify the correct combination (s)

Limb bones	Character	Function
I. Humerus	Trochlea	Supports upper arm
II. Ulna	Sigmoid notch	Articulates with trochlea
III.Metacarpals	Long, slender bones	Support instep
IV. Metatarsals	Long, slender bones	Support palm

1) I & II 2) II & III 3) III & IV 4) I & IV

367. Identify the correct combination

Joints	Structural classification	Example
A. Sutures	Fibrous joint	Coronal
B. Syndesmoses	Cartilaginous joint	Interosseous membrane between tibia and fibula
C. Gomphoses	Fibrous joint	Dentoalveolar joint
D. Symphyses	Cartilaginous joint	Vertebrae by intervertebral discs

1) All except B 2) All except D
3) All except A 4) All are correct

368. Identify the correct combinations with regard to joints

Name	Type	Exmple
I. Ball & socket	Multiaxial diarthrose	Between head of humerus & glenoid cavity
II. Ginglymi	Monaxial diarthrose	Between femur & tibio-fibula
III. Pivot	Multixial diarthose	Between axis & atlas
IV. Planar joint	Monaxial diarthrose	Joint between carpals

1) I & II 2) III & IV
3) II & III 4) I & II

369. **Statement I** : A maximum osmolarity of glomerular filtrate is reached at the hairpin turn of the loop of Henle of a nephron
Statement II : When the renal fluid flows through the descending limb of loop of Henle, the water is reabsorbed and some soluties enter into the lumen of the descending limb

370. **Assertion (A)** : In rabbit, the thick segment of the ascending limb of loop of Henle is impermeable to water and more permeable to ions
Reason (R) : 25% filtered load of Na^+, K^+Cl^-, Mg^+ and Ca^{++} ions are actively secreted in to the lumen of ascending limb of loop of Henle from the medullary fluid

371. Match the following

Part of nephron	Nature of renal fluid
A) Bowman's capsule	i) Isotonic to cortical fluid
B) Descending limb	ii) Hypotonic to the medullary fluid
C) Ascending limb	iii) Isotonic to the medullary fluid
D) Distal convoluted tubule	iv) Hypotonic to the cortical fluid
	v) Hypertonic to the cortical fluid

	A	B	C	D
1)	iv	iii	ii	v
2)	iv	iii	iii	i
3)	iii	iv	ii	i
4)	iii	iv	i	ii

372. Read the following and choose the correct combinations

Part of renal tubule	Type of epithelium	Type of reabsorption of water
I. Proximal convoluted	Simple cuboidal	Obligatory

II. Descending limb	Simple squamous	Facultative
III. Ascending limb	Simple squamous	Obligatory
IV. Distal convoluted	Simple cuboidal	Facultative

1) I and II 2) II and III
3) I and IV 4) II and IV

373. Read the following and choose the correct combinations

Cells of distal convoluted tubule	**Reabsorb**	**Secrete**
I. Principal cells	Na^+ ions	K^+ ions
II. Intercalated cells	H^+ ions	Na^+ ions
III. Principal cells	K^+ ions	Na^+ ions
IV. Intercalated cells	K^+ ions	H^+ ions

1) I and II 2) II and III 3) I and IV 4) II and IV

374. Read the following and choose the correct combination(s)

Structure	**Hormone that released**	**Process that stimulates the secretion of hormone**
I. Juxtaglomerular	Renin	Decrease in B.P in afferent arteriole
II. Pituitary gland	ADH	Dehydration condition in the body
III. Heart	Angiotensin	
IV. Liver	Aldosterone	Increase in blood olumeIncrease in the B.P

1) I and II 2) II only 3) IV only 4) II and IV

375. Read the following and choose the correct combinations pertaining to vasa recta

Limb	**Reabsorbs**	**Osmolarity of blood**
I. Ascending	Na^+, Cl^-, urea	Increases
II. Descending	Na^+, Cl^-, urea	Increases
III. Ascending	Water	Decreases
IV. Descending	Water	Decreases

1) I only 2) II and III
3) I and IV 4) II only

376. Read the following and choose the correct combinations
I. Blood pressure in afferent arteriole is 70 mm Hg.
II. Opposing pressure is created by capsular hydrostatic pressure
III. Net filtration pressure is greater than that of opposing pressure created in glomerulus
IV. Net filtration pressure is 10 mm Hg
1) I and II only 2) II and III only
3) I and IV only 4) II and IV only

377. Read the following and choose the correct combination(s)
I. The parts of renal tubule where obligatory reabsorption of water take place are PCT and descending limb of loop of Henle
II. The parts of renal tubule where facultative reabsorption of water take place are DCT and collecting ducts
III. The part of loop of Henle where no reabsorption of water is made up of two types of epithelia
IV. If the reabsorption of water take place in a part of loop of Henle, generally it is obligatory reabsorption
1) I, II and III only 2) I and III only
3) I, III and IV only 4) I, II, III and IV

378. Read the following and choose the **incorrect** combination(s)
A. Renal fluid of PCT and DCT is isotonic to both the cortical fluid and the blood
B. Renal fluid of descending limb is hypertonic to cortical fluid and hypotonic to the renal fluid of ascending limb
C. Renal fluid in collecting duct is hypertonic to the blood but isotonic to interstitial fluid
D. Renal fluid in the lumen of Bowman's capsule is with high threshold substances also
1) A and B 2) B and C
3) B and D 4) B only

379. **Statement (I) :** Osmolarity of blood increases towards the tip in the descending limb of vasa recta
Statement (II) : Na^+, Cl^+ and urea like solutes are reabsorbed into the blood of descending limb of vasa recta

380. **Statement (I) :** Increased concentration of ADH in the medium results the decrease in the volume of blood
Statement (II) : ADH stimulates the facultative reabsorption of water in the proximal convoluted tubule of renal tubule

381. **Statement (I) :** Decrease in the blood pressure in afferent arteriole decreases the rate of glomerular filtrate
Statement (II) : Decrease in blood pressure results the release of renin from juxtaglomerular cells and causes the conversion of inactive angiotensin I into angiotensin II

382. Identify the correct statement pertaining to renal fluid in the process of formation of urine in the nephron of Rabbit
1) It is isotonic to both blood and cortical fluid in 'PCT' and 'DCT'
2) in the ascending limb of loop of Henle it is hypertonic to the medullary fluid
3) In the descending limb of loop of Henle it is hypotonic to the medullary fluid and hypertonic to blood
4) In the collecting duct it is isotonic to blood and hypertonic to the medullary and cortical fluids

383. Choose the **incorrect** statement among the following
1) Counter current mechanism helps in producing concentrated primary urine by the time it reaches the distal convoluted tubule
2) Osmolarity of blood decreases in vasa recta while flowing from the medullary region towards the cortex
3) Urobilin is one of the waste substances in urine
4) Glucose is high threshold substance

384. **Assertion (A) :** Though some substances like glucose, aminoacids, vitamins etc., are filtered through glomerulus and enter into renal fluid, under normal condition they do not appear in the urine.
Reason (R) : Glucose, aminoacids and vitamins are high threshold substances

385. Choose the correct combination

Part of nephron	**change**	**Concentration of renal fluid**
A) Descending limb	absorption of water and urea into the interstitial fluid	isotonic to medullary fluid
B) DCT	secretion of potassium by the principal cells and reabsorption of Na^+ by the intercalated cells	isotonic to cortical fluid
C) Medullary collecting duct	reabsorption of urea, water and Na^+	hypertonic to blood
D) Thick segment of ascending limb	reabsorption of Na^+, Cl^-, Ca^{2+}, Mg^{2+},HCO_3^- ions	hypotonic to medullary fluid

1) A, C, D 2) B, C, D
3) A, B 4) C, D

386. Identify the correct combinations

Part of nephron	**Internal lining**	**Nature of renal fluid**
I. PCT	Simple cuboidal epithelium with brush border	Isotonic to cortical fluid and hypotonic to blood
II. Descending limb	Simple squamous epithelium	Isotonic to medullary interstitial fluid
III.Ascending limb	Proximal part by simple squamous and distal part by simple cuboidal epithelia	Hypertonic to medullary interstitial fluid
IV.DCT	Simple cuboidal epithelium	Isotonic to cortical fluid and blood

1) I & II 2) II & III
3) III & IV 4) II & IV

387. Identify the correct combinations

Hormone	Secreted / synthesized by	Function
I. Atrial natriuritic peptide	Heart	Inhibition of absorption of water and solutes
II.Angiotensin II	Kidney	Decreases glomerular fitration rate
III.Renin	JG cells	Conversion of angiotensin II into angiotensin I
IV.Aldosterone	Zona glomerulosa of adernal cortex	Regulates solute reabsorption

1) I & II 2) II & III
3) I & IV 4) All are correct

388. Identify the correct combination

Name of the substance	Type of the substance	Place of reabsorption in the renal tubule
I. Amino acids	High threshold substance	PCT
II. Urea	Low threshold substance	Medullary part of collecting Duct
III.Vitamins	High threshold substance	DCT
IV.Creatinine	Athreshold substance	Collecting duct

1) I & III 2) I & II
3) II & III 4) All are correct

389. The correct sequence of male reproductive structures of rabbit through which sperms pass out is :

I. Rete testes II. Vasa efferentia
III. Epididymis IV. Vasa deferentia

1) I II III IV
2) III I IV II
3) II IV III I
4) IV I III II

390. Match the following

List – I	List – II
A) Sertoli cells	I) Secrete citric acid
B) Leydig cells	II) Prostaglandins
C) Seminal vesicle	III) Secrete inhibin
D) Prostate glands	IV) Oestrogen
	V) Testosterone

	A	B	C	D
1)	V	IV	I	II
2)	IV	V	III	II
3)	III	IV	II	I
4)	III	V	II	I

391. Match the following :

Set - I	Set - II
(a) Inguinal canal	1. Net work of seminiferous tubles
(b) Rate testis	2. Secondary sexual characters
(c) Leydig cells	3. For descending of testis
(d) Prepuee	4. Paired columns of penis
(e) Corpora cavernosa	5. Terminal skin of penis

The **correct** match is

1) a-1 b-2 c-3 d-5 e-4
2) a-3 b-1 c-4 d-2 e-5
3) a-3 b-1 c-2 d-5 c-4
4) a-2 b-4 c-3 d-5 c-1

392. The following are the parts of the female reproductive system of rabbit

A) Vulva B) Vestibule
C) Fallopian tube D) Uterus
E) Vagina

Arrange the above parts from inside to out side in a sequence

1) C-A-E-D-B 2) C-E-A-B-D
3) C-D-B-E-A 4) C-D-E-B-A

393. Match the following & choose the correct option

Column A	Column B
A) Clitoris	I) Mesometrium
B) Fallopian tube	II)Corpora cavernosa
C) Uterus	III) Prepuce
D) Penis	IV) Mesosalpinx
	V) Mesovarium

	A	B	C	D
1)	III	IV	I	II
2)	II	IV	III	I
3)	II	IV	I	III
4)	V	III	IV	II

394. Arrange the following from the outer to the inner side in a Graaffian follicle of rabbit

A) Discus proligerus B) Zona pellucida
C) Corona radiata D) Secondary oocyte
E) Membrana granulosa

1) E→A→B→C→D
2) E→A→C→B→D
3) A→E→B→D→C
4) B→A→C→E→D

395. Arrange the following regions of the ovary in a correct sequence from the outer to the inner side

A) Germinal epithelium
B) A zone containing relatively large blood and lymph vessels
C) Connective tissue sheath surrounding the cortex
D) A zone containing ova in various stages of development

1) A-C-B-D 2) C-A-D-B
3) C-A-B-D 4) A-C-D-B

396. Match the following in respect of rabbit

List - I	List - II
A) Ovulation	i) 20-30 hrs after copulation
B) Fertilization	ii) Fallopian tube
C) Amphimixis	iii) Holoblastic
D) Cleavage	iv) 8-10 hrs after copulation
	v) Meroblastic

	A	B	C	D
1)	IV	I	II	III
2)	IV	II	I	III
3)	II	I	IV	III
4)	I	IV	III	II

397. Identify the correct sequence of the following layers from outside to inside concerned with testis

A) Germinal epithelium B) Tunica albuginea
C) Parietal layer D) Visceral layer

1) B → C → D → A
2) A → B → D → C
3) C → B → D → A
4) C → D → B → A

398. Match the following

List – I	List – II
A) Mesovarium	I) Cauda epididymis
B) Mesosalpinx	II) Caput epididymis
C) Mesometrium	III) Fallopian tube
D) Spermatic cord	IV) Ovary
E) Gubernaculum	V) Vas deferens
	VI) Uterus

	A	B	C	D	E
1)	IV	VI	III	II	I
2)	VI	IV	III	II	V
3)	IV	V	III	VI	II
4)	IV	III	VI	II	I

399. Match the following

List – I	List – II
A) Cortex	I) Connective tissue layer around the cortex
B) Medulla	II) Zone containing large blood & lymph vessels
C) Tunica albuginea	III) Zone containing ova at various stages of development
D) Germinal epithelium	IV) Membrana granulosa
	V) Covering epithelium of ovary

	A	B	C	D
1)	III	II	IV	V
2)	IV	III	V	I
3)	III	II	I	V
4)	II	IV	III	V

400. Match the following

List – I	List – II
A) Primary oocyte	I) Inner theca & granulosa cells
B) Secondary oocyte	II) Zona radiata
C) Oestrogens	III) Prophase I of meiosis I
D) Progesterone	IV) Metaphase I of Meiosis II
	V) Corpus luteum

	A	B	C	D
1)	II	IIII	I	V
2)	III	IV	I	V
3)	II	III	V	I
4)	IV	III	I	V

401. Match the following

List – I	List – II
A) Fallopian tube	I) Blastocyst
B) Implantation	II) Morula
C) Clitoris	III) Corpus spongiosum
D) Urethra	IV) Corpus albicans
	V) Corpora cavernosa

	A	B	C	D
1)	II	I	III	IV
2)	I	II	IV	V
3)	V	IV	II	I
4)	II	I	V	III

402. Match the following

List-I	List-II
A) Rete testis	i) Uterine wall
B) Implantation	ii) Release of ovum
C) Amphimixis	iii) Release of sperms
D) Ovulation	iv) Union of male and female pronuclei
	v) Fallopian tube

	A	B	C	D
1)	iii	i	v	**i**
2)	iii	ii	iv	v
3)	ii	iii	v	i
4)	iii	i	iv	**i**

403. Match the following and choose the correct combination

List-I	List-II
A) Hensen's node	i) Delamination
B) Primitive pit	ii) Anterior swelling of primitive streak
C) Rauber cells	iii) Anterior shallow de pression of primitive streak
D) Hypoblast	iv) Trophoblast cells above formative cells

Select the correct combination

	A	B	C	D
1)	I	IV	III	II
2)	III	II	IV	I
3)	IV	I	III	II
4)	II	III	IV	I

404. Match the following and choose the correct combination

List-I	List-II
A) Parturition	i) Expulsion of urine
B) Micturition	ii) Ovary
C) Implantation	iii) Process of Birth
D) Ovulation	iv) Attachment of embryo to uterine wall
E) Graafian follicle	v) Liberation of oocyte from ovary

Select the correct combination

	A	B	C	D	E
1)	I	IV	III	II	V
2)	III	II	IV	V	I
3)	IV	I	III	II	V
4)	III	I	IV	V	II

405. The following are the various stages in the development of rabbit

A) Blastocyst B) Fertilization
C) Zygote D) Morula
E) Cleavage

Arrange them in ascending order

1) B-C-E-D-A 2) C-B-D-E-A
3) E-B-C-D-A 4) D-B-C-A-E

406. Match the following

Set-I	Set-II
A.Mesomere	I.Vertebrae
B. Scleratome	II. Skeletal muscles
C. Hypomere	III. Connective tissues
D. Dermatome	IV. Coelom
	V. Excretory organs

	A	B	C	D
1)	**V**	**II**	**IV**	**III**
2)	**V**	**I**	**III**	**IV**
3)	**V**	**I**	**IV**	**III**
4)	**IV**	**II**	**III**	**I**

407. Match the following lists :

List - I Str ucture	List-II Disappearance
A) Zona pellucida	i) after the formation of embyronic disc
B) Corona radiata	ii) after involution of mesoderm
C) Cells of Rauber	iii) after formation of formative cells
D) "Primitive streak shirks"	iv) just before implanation
	v)Soon after fertilization

The correct match is

	A	B	C	D
1)	iv	v	i	**ii**
2)	iv	v	**ii**	i
3)	v	iv	i	**ii**
4)	v	iv	**ii**	i

408. Arrange the following events that occur during the development of rabbit in the proper sequence

A) Disappearance of Rauber cells
B) Formation of discoblastula
C) Delamination
D) Formation of primitive streak
E) Formation of Yolk Sac

1) A, B, E, C, D 2) A, B, C, E, D
3) B, A, C, D, E 4) B, A, C, E, D

409. Match the following

List – I	List – II
A) Decidua basalis	I) Polyhedral cells
B) Decidua capsularis	II) Uterine endometrium other than the site of implantation
C) Decidua parietalis	III) Region between embryo and uterine myometrium
D) Formative cells	IV) Region between embryo and lumen of uterus
	V) Hypoblast

	A	B	C	D
1)	I	III	IV	V
2)	IV	II	III	I
3)	III	II	IV	V
4)	III	IV	II	I

410. Match the following

List – I	List – II
A) Amnion	I) Exchange of materials between mother and embryo
B) Yolk sac	II) Non functional extra embryonic membrane
C) Allantois	III) Stores the waste material of the embryo
D) Placenta	IV) Prevents malformation in the embryo

	A	B	C	D
1)	II	IV	III	I
2)	IV	III	II	I
3)	II	III	II	IV
4)	IV	II	III	I

411. Various regions in the ovary of rabbit are arranged in the following correct sequence from the **peripheral** (outer) region to the **center** (inner)

1) Medulla (M) $\rightarrow$ Cortex (C) $\rightarrow$ Germinal epithelium (GE) $\rightarrow$ Tunica albuginea (TA)
2) M $\rightarrow$ C $\rightarrow$ TA $\rightarrow$ GE
3) GE $\rightarrow$ TA $\rightarrow$ M $\rightarrow$ C
4) GE $\rightarrow$ TA $\rightarrow$ C $\rightarrow$ M

412. Identify the true statements from the following

I. Secretion of Bartholin's glands lubricates the vaginal passage

II. Secretion of Cowper's glands of male rabbit neutralises the vaginal acidity
III. Tunica vaginalis is not found around the testis
IV. Urethra / vestibule passes through the clitoris of female rabbit also, just like that of penis of male rabbit

1) I and IV 2) III and IV
3) I and III 4) I and II

413. Following are the layers present around the secondary oocyte of rabbit. Arrange them in sequence towards exterior from its surface

A) corona radiata B) discus proligerus
C) membrana granulosa D) zona pellucida
E) theca

1) C - A - B - D - E 2) B - D - A - C - E
3) D - A - B - C - E 4) D - B - A - C - E

414. The prospective female gamete in the Graafian follicle of rabbit

I) is haploid in chromosomal number
II) is in the processof reduction of chromosomal number to haploid condition
III) has already given rise to the first polar body
IV) has stopped midway through the metaphase II

1) I, III and IV 2) II and III only
3) III and IV only 4) IV only

415. Study the following aspects of reproductive system of rabbit

Component	Location	Function
I) Epididymis	Inner surface of the testis	Storage and nourishment of sperms
II) Prostate gland	Around the base of uterus masculinus	Secretion activates sperms
III) Fallopian tube	Behind the oviducal funnel	Secretion of oestrogens
IV) Bartholin glands	Wall of vestibule	Neutralisation of vaginal acidity

Choose the correct combination

1) I & II 2) II & III
3) I & IV 4) I & II

416. Study the following table and choose the correct answer

Type of tissue	Location	Function
I. Sertoli cells	Part of testis	Nourishment of sperms
II. Tunica vaginalis	Part of Vagina	Protection of Vagina
III. Cells of leydig	Part of testis	Production of hormones
IV. Corona radiata	Part of ovary	Production of hyaluronidase

Which of the above two combinations are correct

1) I and II are correct
2) II and III are correct
3) I and IV are correct
4) I and III are correct

417. Choose the correct combination with reference to rabbit

I. Amniotic fold	- somatopleure	- extra embryonic ectoderm and somatic mesoderm
II. Allantois	- splanchnopleure	- extra embryonic ectoderm and splanchnic mesoderm
III. Myotome	- epimere	- mesoderm between neural tube and gut
IV. Yolk sac	- hypomere	- hypoblast

1) I, II, III 2) I, III
3) II, IV 4) I only

418. Identify the correct combination

Accessory gland	Secretion	Function
I. Seminal vesicle	Prostaglndins	Stimulate the contraction of smooth muscle in female
II. Seminal vesicle	Fructose	Useful in the production of ATP
III. Prostate glands	Citric acid	Helps to generate ATP int he Kreb's cycle
IV. Corpus lueum	Progesterone	Maintenance of uterus during pregnancy

1) I & II only 2) II & III only
3) III & IV only 4) All are correct

419. Identify the correct combinations

Nature of cells	Their secretion	Function
I. Leydig cells	Testosterone	Controls male secondary sexual characters
II. Sertoli cells	Inhibin	Inhibits the secretion of FSH
III. Inner part of theca and	Oestrogen	Controls female secondary

granulosa Cells — sexual characters

1) I & II only 2) II & III only
3) III only 4) All are correct

420. Identify the correct combination with regard to embyanic development of rabbit

	Event stage	Location	Change the occurs
I.	Fertilization	Fallopian tube	Leads to diploidy
II.	Implantation	Fallopian tube	Decidua
III.	Discoblastula	Uterine wall	Delamination
IV.	Gastrulation	Uterine wall	Primitive streak formation

1) All except II correct 2) All except I correct
3) All except III correct 4) All except IV correct

421. Identify the correct combination with regard to rab bit

	Extraembryonic membrae	Formed from	Function
I.	Amnion	Splanchnopleure	Protects from desiccation
II.	Yolk sac	Mid gut	Nutritive
III.	Allantois	Hing gut	Storing the waste materials
IV.	Placenta	Chorio allanotic membrane	Exchange of materials between mother & foetus

1) I & II 2) II & III
3) I & III 4) III & IV

KEY

RABBIT MUSCLE CONTRACTIOIN

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

RABBIT SKELETAL SYSTEM

48) 3 49) 1 50) 4 51) 3 52) 1 53) 1 54) 2
55) 3 56) 3 57) 4 58) 4 59) 3 60) 3 61) 3
62) 3 63) 2 64) 1 65) 4 66) 2 67) 1 68) 3
69) 1 70) 2 71) 1 72) 1 73) 1 74) 1 75) 2
76) 3 77) 2 78) 2 79) 1 80) 2 81) 4 82) 4
83) 2 84)1 85) 3 86) 3 87) 3 88) 1 89) 2
90) 4 91) 4 92) 2 93) 4 94) 2 95) 4 96) 2
97) 1 98) 1 99) 3 100) 1 101) 1 102) 2 103) 3
104) 4 105) 4 106) 2 107) 4 108) 2

EXCRETORY SYSTEM:

109) 3 110) 1 111) 2 112) 1 113) 1 114) 4 115) 2
116) 4 117) 3 118) 1 119) 3 120) 4 121) 2 122) 2
123) 4 124) 2 125) 3 126) 3 127) 3 128) 3 129) 4
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207) 2 208) 3 209) 2 210) 1 211) 1 212) 1 213) 4
214) 2 215) 3 216) 4 217) 4 218) 4 219) 1 220) 3

I. MALE REPRODUCTIVE SYSTEM:

221) 3 222) 4 223) 1 224) 4 225) 1 226) 1 227) 2
228) 3 229) 1 230) 2 231) 3 232) 2 233) 2 234) 3
235) 4 236) 1 237) 4 238) 3 239) 2 240) 3 241) 2
242) 3 243) 1 244) 3 245) 1

II. FEMALE REPRODUCTIVE SYSTEM:

246) 1 247) 1 248) 3 249) 2 250) 2 251) 4 252) 2

253) 4 254) 4 255) 4 256) 2 257) 2 258) 3 259) 2
260) 2 261) 2 262) 4 263) 3 264) 4 265) 4 266) 2
267) 4 268) 1 269) 3 270) 3 271) 3 272) 4 273) 4
274)4

III. FERTILIZATION AND DEVELOPMENT:

275) 4 276) 2 277) 1 278) 3 279) 4 280) 3 281) 4
282) 1 283) 3 284) 2 285) 2 286) 1 287) 3 288) 2
289) 2 290) 3 291) 1 292) 2 293) 1 294) 2 295) 2
296) 1 297) 1 298) 2 299) 3 300) 2 301) 1 302) 2
303) 1

LEVEL - III

304) 3 305) 1 306) 2 307) 1 308) 1 309) 1 310) 4
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409) 4 410) 4 411) 4 412) 4 413) 3 414) 1 415)1
416) 4 417) 4 418) 4 419)4 420)1 421)4