Study Notes

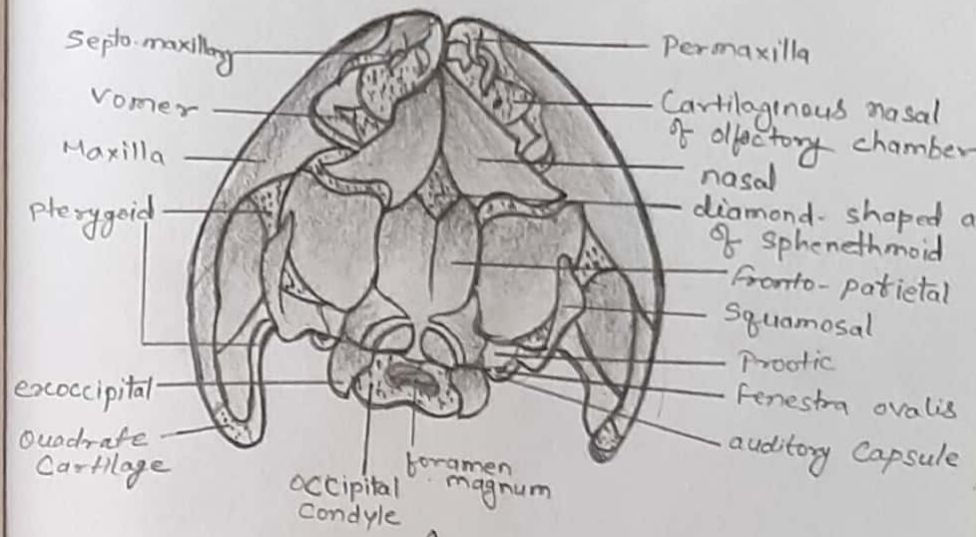
STUDY OF BONES

Study of bones of frog :-

SKULL OF FROG

1) **Dorsal view** ⇒ Various structures seen are Septo-maxillary, external na... vomer maxilla, orbital fossa, pterygoid, quadratojugal, quadrate Cartilage, exoccip... occipital condyle, foramen magnum, audit... Capsule, fenestra ovalis, prootic, squamosal, front... parietal, diamond-shaped area sphenethmoid, nasa... Cartilaginous nasal or olfactory chamber and premaxilli...

2) **Ventral view** ⇒ Various structures seen are prema... Cartilaginous nasal capsule, vomer, Sphenethmoid, fronto parietal, parasphenoid, Squamos... Columella, quadratojugal, auditory Capsule, fenestra ovalis, occipital condyle, foramen for ... and X nerves, exoccipital quadrate Cartilag... prootic, pterygoid, foramen for V and VII ... foramen for VI nerve, foramen for II ne... orbital fossa, maxilla, palatine, foramen for I... nerve and internal nares.



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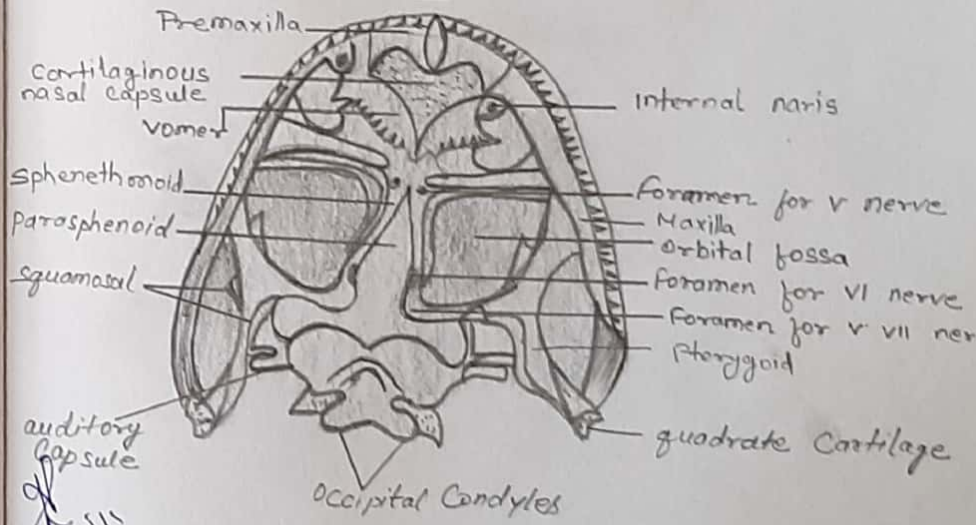


B

Skull of Frog

Vertebrae of frog :-

Comments :-

1) Atlas (Dorsal View) ⇒ It is a ring-shaped bone with a Centrum on one face only. Anteriorly Centrum Contains two large Concave fa for articulation with occipital Condyles. Pre-zygapophyes absent, neural Spine reduced, pos Zygapophyes present and neural arch present.

2) Atlas vertebra (ventral view) ⇒ It shows neural Canal, Post. zygapophysis Centrum and anterior facet for occipital Condyle.

3) Typical vertebra - 2nd to 7th (Lateral view) ⇒ It is a typical vertel It is also nearly a ring-shaped bone. Centrum proce with anterior Concave face and posterior Convex faces. Neural spine is blunt and transverse processes are long and tapering on their side of Centrum. Pre-zygapophyes are inwardly and upwar directed, while post-zygapophyes are downwardly and outwardly directed.

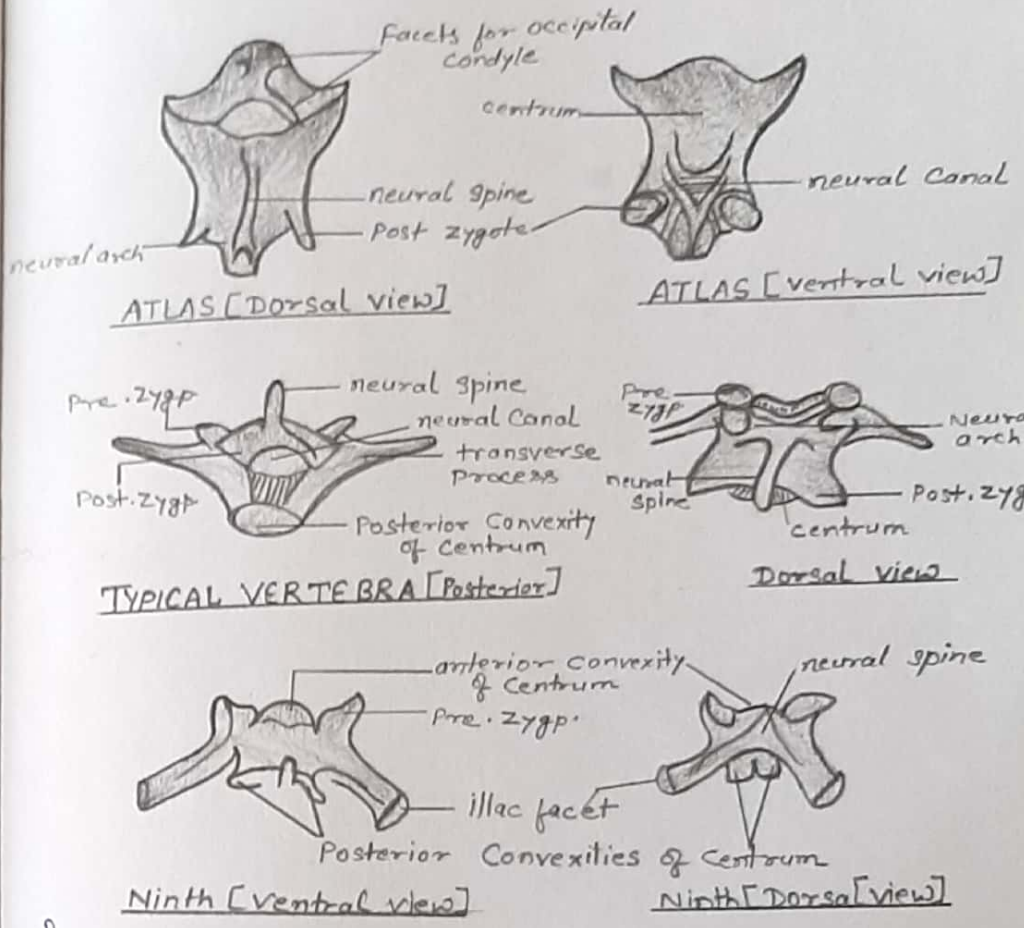


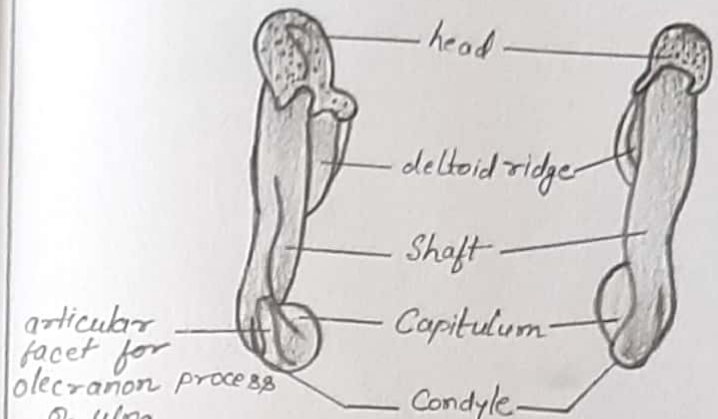
Fig: Vertebrae of frog

Fore Limbs :-

Comments :-

1) **Humerus** ⇒ It is a short, cylindrical and slightly curved bone of upper arm.
Proximal end fits into glenoid cavity of pectoral girdle. It is swollen forming head, which is covered by Calcified Cartilage.
Below head is a deltoid ridge for muscle attachment. Distal end has a prominent trochlea, Capitulum and a Condylar ridge for articulation with radio-ulna.

2) **Radio-ulna** ⇒ It is the Compound bone of forearm formed by fusion of radius and ulna.
Proximal end Contains a Concavity for articulation with Capitulum of humerus and an olecranon process.
A groove divides radius and ulna distally; each terminating into a facet to articulate with Carpal bones.



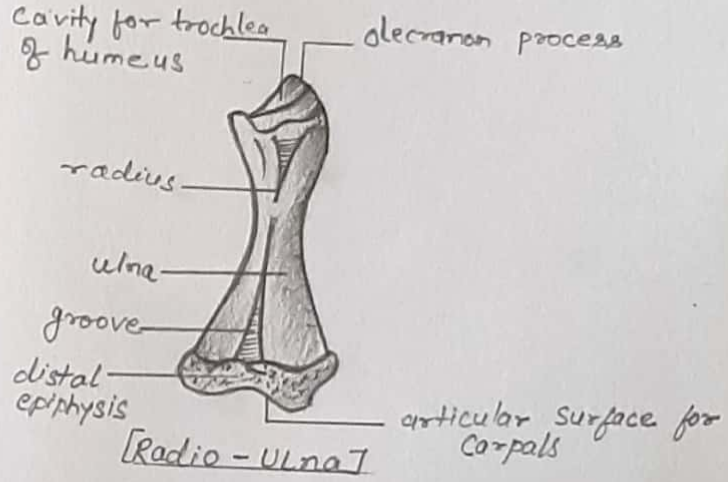


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Fig : Forelimb bones of frog

Hind Limbs :-

Hind Limb Constitute the femur, tibio-fibula, astragalus Calcaneum and bones of foot.

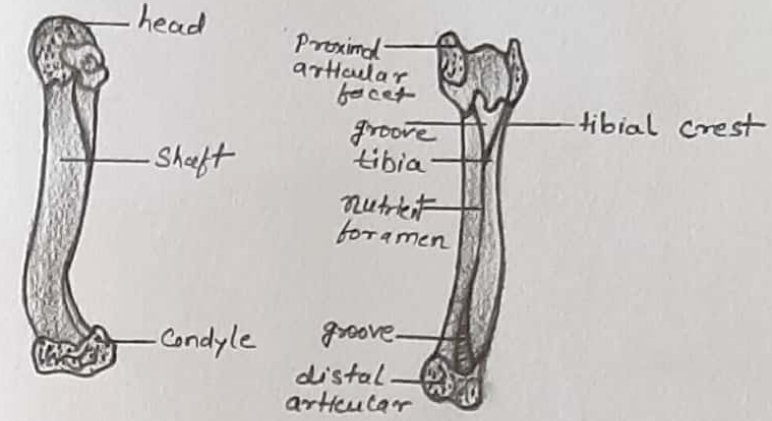
Comments :

(1) **Femur** ⇒ • It is thigh bone having expanded ends, Covered with Calcified Cartilages.
• Proximal end of head articulates with acetabulum while distal end with tibio-fibula.

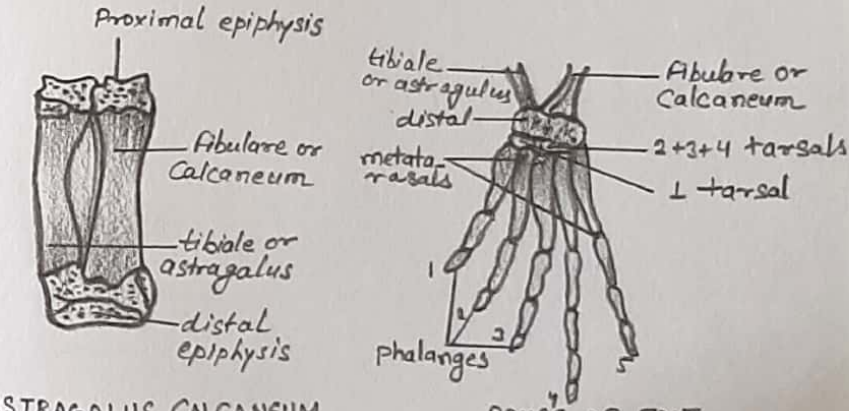
(2.) **Tibio-fibula** ⇒ These are shank bones and are elongated.
Tibia is inner and fibula is outer, both fused together to form a Compound bone. Proximally tibia Contains a tibial Crest. At proximal end tibio-fibula articulates with femur, and at distal end with astragalus-Calcaneum.

(3.) **Astragalus-Calcaneum** ⇒ There are proximal ankle bones united at both ends and Covered by proximal and distal epiphyes of Calcified Cartilage.

(4.) **Bones of foot** ⇒ Foot Contains 5 longs, slender bones known as metatarsals, having five true toes. First, second, third, fourth and fifth digits Contain 2, 2, 3, 4 and 3 Phalanges respectively.



FEMUR TIBIO-FIBULA



ASTRAGALUS CALCANEUM BONES OF FOOT

Fig: Hind limb bones of frog

Pectoral girdle :-

Comments :-

- Pectoral girdle is found embedded in the body wall thoracic region. It is Composed of two identical ha which are permanentaly attached with sternum.
- Each half is Composed of Scapular and Coracoid reg
- Scapular region Consists of Suprascapula and Scapul Suprascapula is a broad, flat and Contains a cup like glenoid Cavity of humerus.
- Coracoid region is made up of two bones, namely Clavicle and Coracoid, and two Cartilages viz... epicoracoid and precorcoid.
- Pectoral girdle protects viscera and gives support limbs. other structures seen regarding sternum are episternum, Omesternum xiphisternum and Mesosternum.

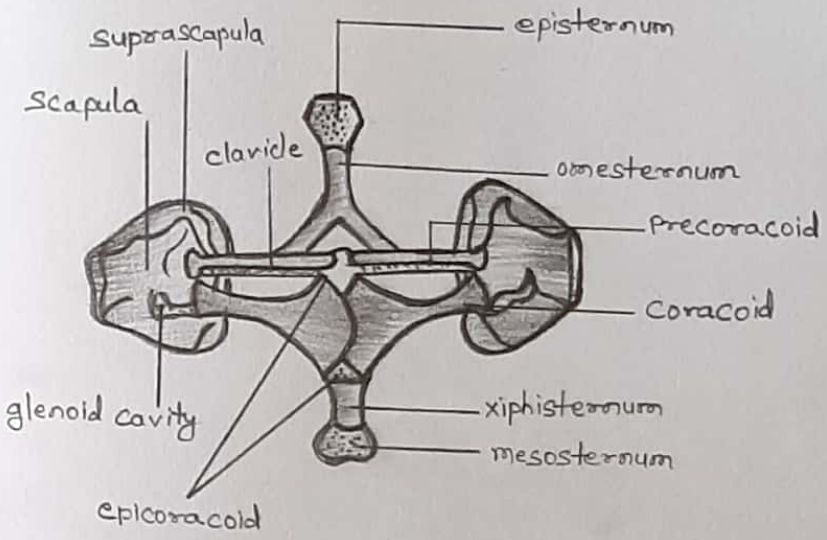


Fig : Pectoral Girdle

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Pelvic Girdles :-

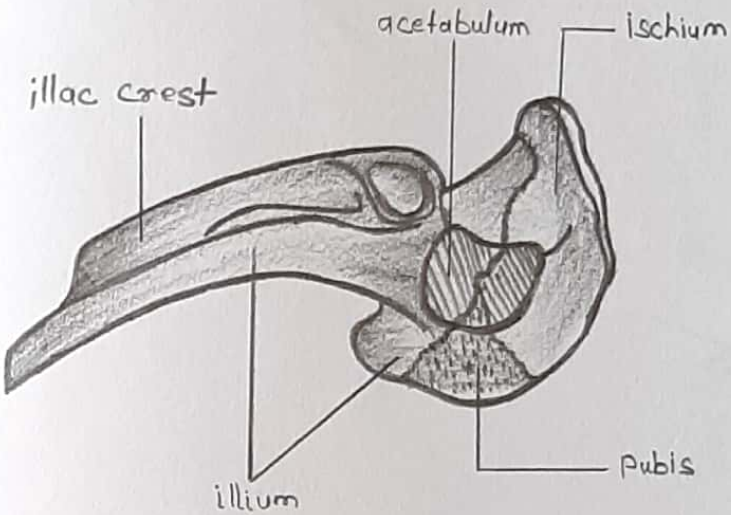
Comments :-

- Two pelvic girdle from a V-shaped structure. Each half of girdle or innominatum is composed of ilium, ischium and pubis which unite posteriorly with a verticle disc bearing a cup-shaped cavity, called acetabulum, on either side.

- **Ilium** :- It is a long bone meeting with transverse process of ninth vertebra. Dorsally it contains a distinct iliac crest. Two ilia meet posteriorly at an iliac symphysis.

- **Pubis** :- It is a reduced calcified cartilage forming major part of acetabulum. The pubic cartilages of both sides are completely fused.

- **Ischium** :- Two ischia give rise to one-third of and completely fuse together at an ischiatic symphysis.



LEFT HALF OF PELVIC GIRDLE OF FROG

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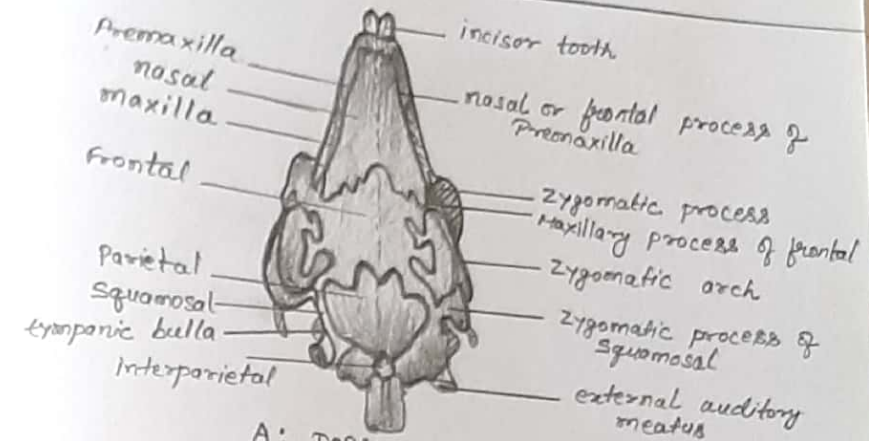
Study of bones of Rabbit :-

SKULL OF RABBIT

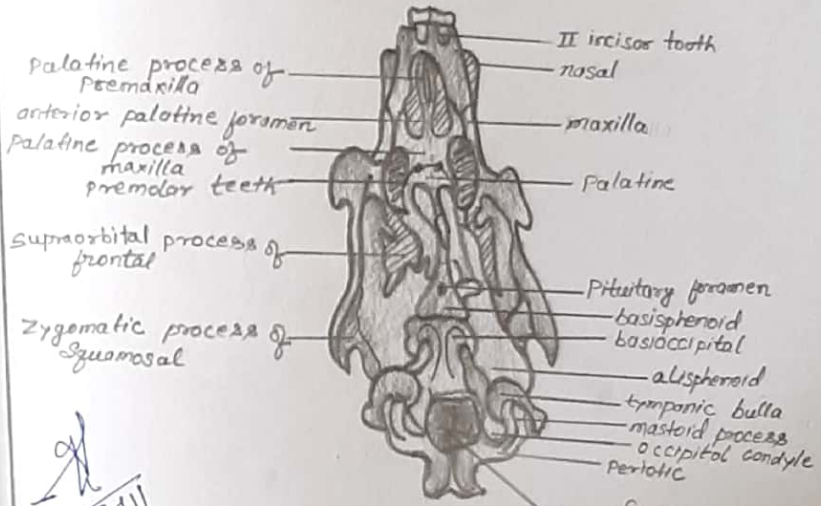
1) **Dorsal view** ⇒ Skull bones seens in dorsal view are as nares, Pre-maxilla, nasal, maxilla, frontal, Parietal, Squamosal, tympanic bulla, interparietal, Supraoccip external auditory meatus, zygomatic process of Squamosal Supra-orbital process of frontal, zygomatic arch, zygomatic process of maxilla.

2) **Ventral view** ⇒ Skull bones seens in ventral view are incisor teeth, Palatine process of pre-max anterior palatine foramen, palatine process of maxilla, premolar teeth, zygomatic process of frontal, Supraoccip foramen magnum periotic, occipital condyle, exoccipital mastoid process, tympanic bulla, Pre-maxilla, nasal an II incisor tooth.

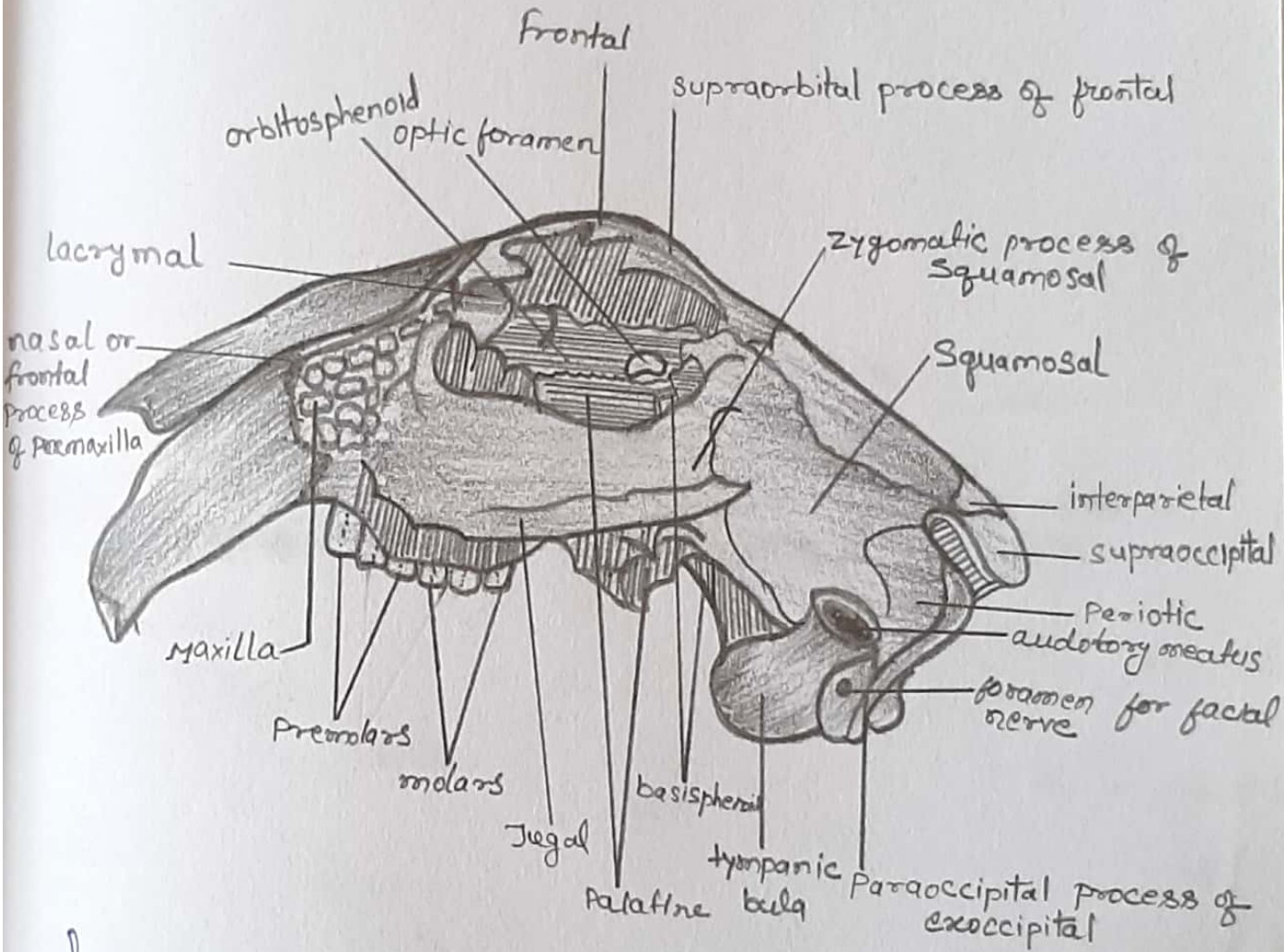
3) **Lateral view** ⇒ Skull bones seens in lateral view consists premaxilla, I-incisor, II-incisor, zygomatic process of maxilla, premolars, molars, jugal, palatine, pterygoid, basisphenoid. foramen for facial nerve, exter auditory meatus, periotic, Supraoccipital, interparietal, optic foramen, orbitosphenoid, lacrymal, maxillary proces of frontal, nasal or frontal process of premaxilla.



A: DORSAL VIEW



B: VENTRAL VIEW



C: LATERAL VIEW

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Vertebrae of Rabbit :-

Comments :-

1) **Atlas** ⇒ • It is first cervical and signet-ring like. Centrum, zygapophyses absent and neural spine rudimentary.
• On the sides are present flattened Cervical rib, the so-called transverse processes.

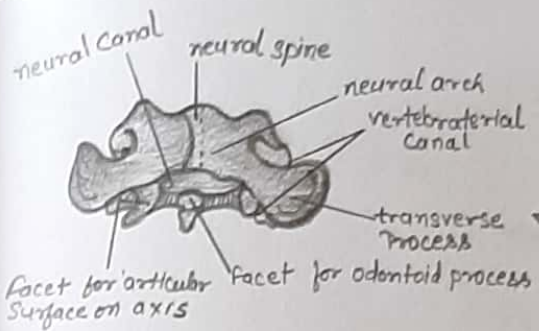
2) **Axis** ⇒ • It is second cervical.
• Neural spine is flattened, antero-posteriorly elevated and ridge-like.
• Cervical ribs or so-called transverse processes are small.

3) **Typical Cervical** ⇒ Rest of the cervicals are typical having small neural spine, large neural arch, flattened centrum, Pre-zygapophyses.

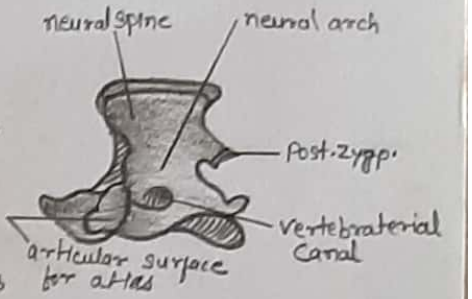
4) **Sacrum(L)** ⇒ • Sacral vertebrae are fused to form a compact bone supporting pelvis.

5) **Sacrum(D)** ⇒ • Structures seen as neural spine, Post-zygaphy intervertebral foramen.

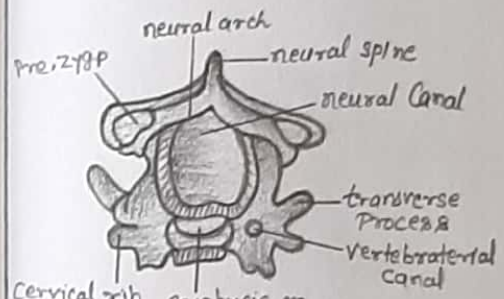
6) **Caudal** ⇒ Structures seen, are neural spines, vertebral, Post zygapophysis, and pre-zygapophysis.



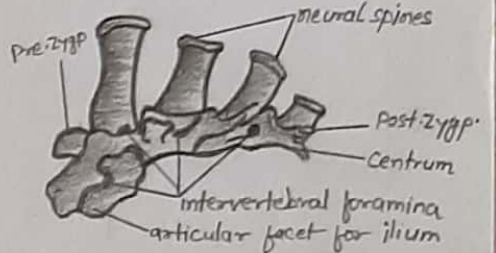
ATLAS [DORSAL VIEW]



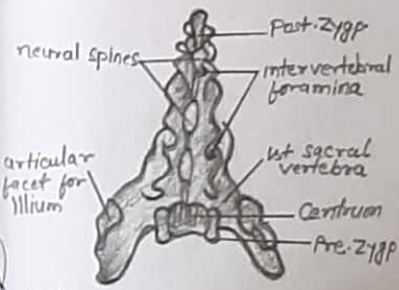
AXIS [LATERAL VIEW]



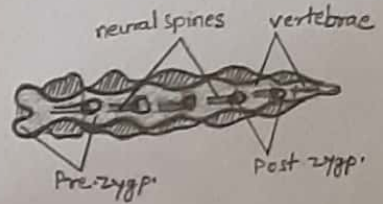
TYPICAL SERVICAL



SACRUM [LATERAL VIEW]



SACRUM [DORSAL VIEW]



CAUDAL [DORSAL VIEW]

Forelimb :-

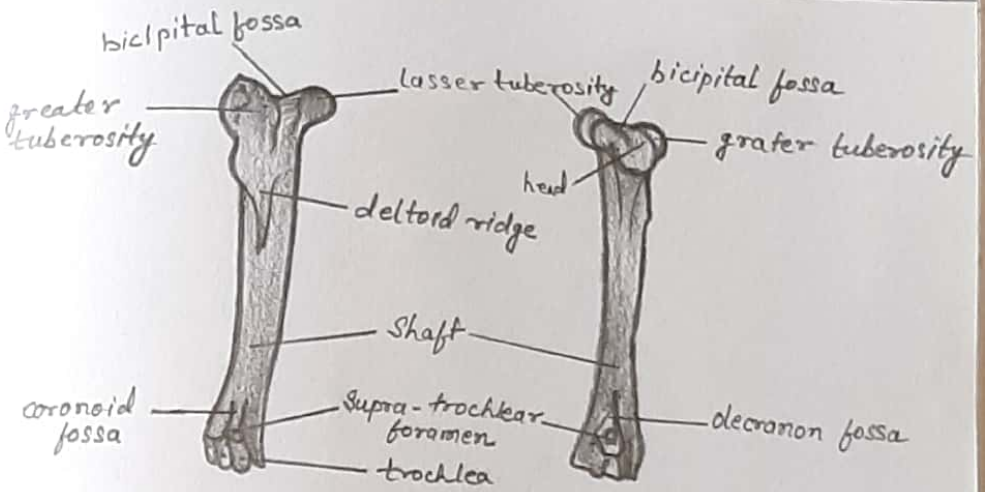
Forelimb Comprises of humerus, radius, ulna and bones of forefoot or hand.

Comments :-

Humerus : • It is a rod-shaped bone.
• Head articulates with glenoid cavity.

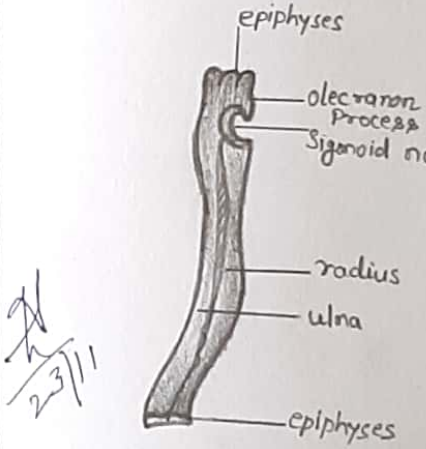
Radius and ulna : Radius and ulna are separate but united firmly at both ends.
Radius is smaller and curved.
At the proximal end of ulna is an olecranon process which articulates with olecranon fossa of Humerus.
At the base of olecranon process is a sigmoid notch.

Bones of forefoot or hand : wrist Contains nine small bones in two rows, namely radiale, intermedium and ulnare in proximal row and Single Centrale, trapezium, trapezoid, magnum, and uniform in distal row. A Sesamoid bone or pisiform is found on ventral Side of Carpus. Manu has five digit with 2,3,3,3 and 3 phalanges, respectively.

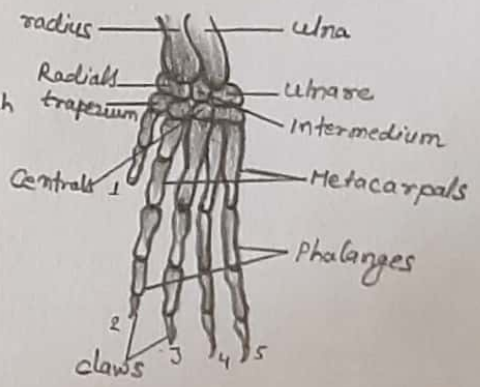


HUMERUS (Anterior view)

HUMERUS (Posterior view)



RADIUS-ULNA



BONES OF HAND

Hind limb :-

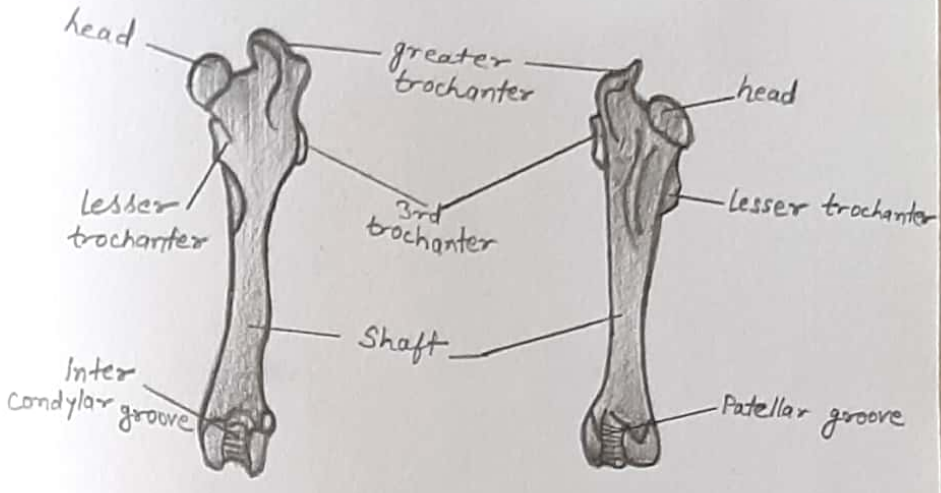
Hind limb is formed by femur, tibio-fibula and bones of hindfoot.

Comments :-

1) Right femur ⇒ • It is thigh bone. Proximal head articulates with acetabulum.
• lesser, greater and third trochanters present for muscle attachment.
• Distally it has pulley-shaped structure, having two lateral condyles which enclose and intercondylar groove.

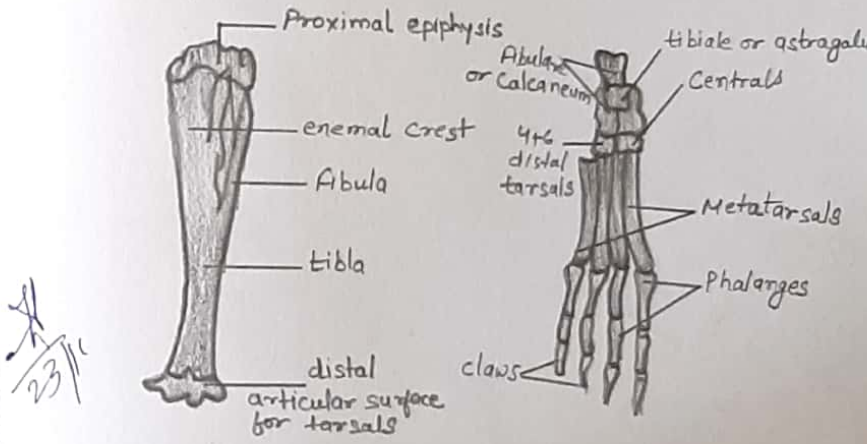
2) Right Femur (Front) ⇒ • It shows head, greater trochanter, lesser trochanter, shaft, Patellar groove and Condyles.

3) Bones of hind foot ⇒ It contains tarsal bones in two rows.
• Tibiale and intermedium of the proximal row are fused to form astragalus on pre-axial side while fibulare or Calcaneum is the larger tarsal bone produced into a spur on post-axial side.
• Distal row contains three bones – mesocuneiform, ectocuneiform and cuboid.



RIGHT FEMUR [BACK VIEW]

RIGHT FEMUR [Front view]



LEFT TIBIO-FIBULA

BONES OF HIND FOOT

DISARTICULATED SKULL BONES OF FROG

The disarticulated skull bones comprises of occipital region, fronto-parietals, sphenethmoid, parasphenoid, columella, nasals, septo-maxillaries, vomers, premaxillae, quadratojugals, quadrates, palatines, squamosal and pterygoids.

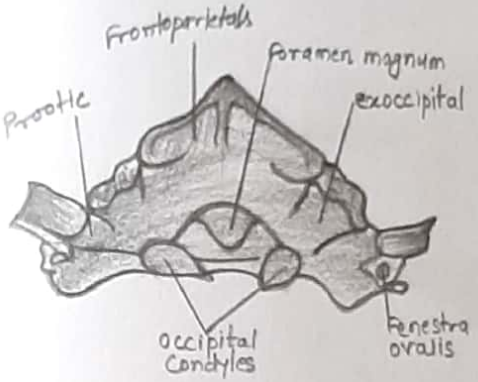
Comments :

Occipital region – It is the posteriormost part of skull. It is formed by frontoparietals on dorsal side, parasphenoid on ventral side and a pair of bony exoccipitals sides, which enclose a large opening called foramen magnum.

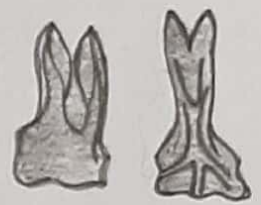
Frontoparietals : These form a pair of long and broad membranous bones, which are united in mid-dorsal line and cover entire brain box.

Parasphenoid – Parasphenoid is like a dagger, in the form of an inverted 'T' covering entire floor of cranium.

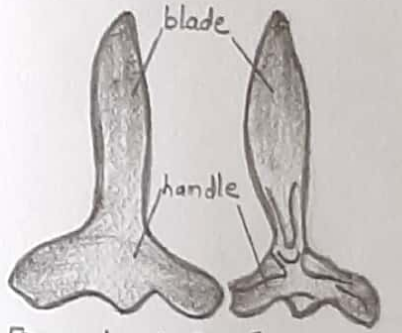
Nasals – These form a pair of large triangular, flat and membranous bones, which serve as roof olfactory capsules.



OCCIPITAL SEGMENT



FRONTOPARIETALS



PARASPHENOID

NASAL

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DISARTICULATED SKULL BONES OF RABBIT

The disarticulated skull bones of Rabbit include occi region, squamosal, parietal, interparietal basisphenoid and alisphenoids, presphenoid and orbitosphenoid, frontal, nasal, vomer, turbinals, periotic and tympanic bulla.

Comments :

Occipital segment – It enclose a large foramen magnum is made up of supraoccipital, exoccipital basioccipital cartilaginous bones.

Squamosal – It is a more or less rectangular membran bones found ventral to parietal.

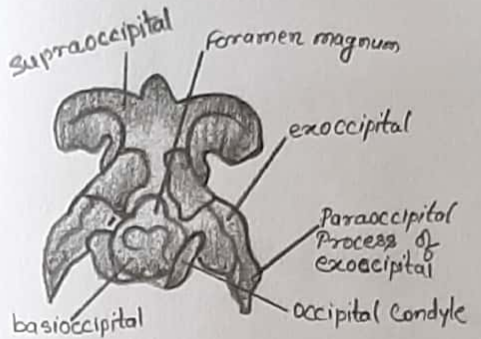
Parietal – It forms major part of posterior cranial roo

Frontals – They are two in number forming the roof o sides of frontal cranium.

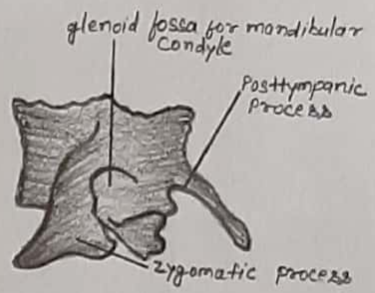
Nasals – They are narrow membrane bones forming of the olfactory chambers.

Vomers – They are blade-like and slender bones, situat ventrally to olfactory capsules.

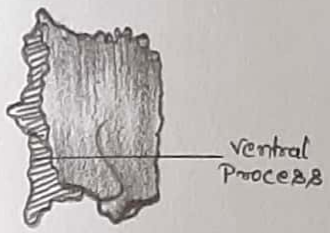
Jugal – It is a laterally compressed bone forming maj part of the zygomatic arch.



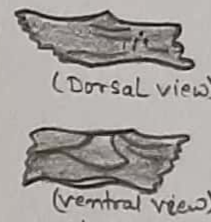
OCCIPITAL SEGMENT



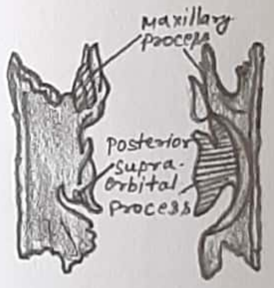
SQUAMOSAL



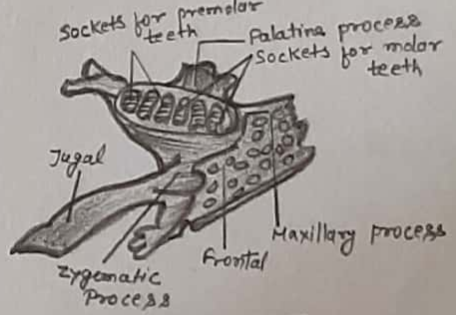
PARIETAL



NASAL



FRONTAL



MAXILLA & JUGAL

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