

THE TOAD

Q1

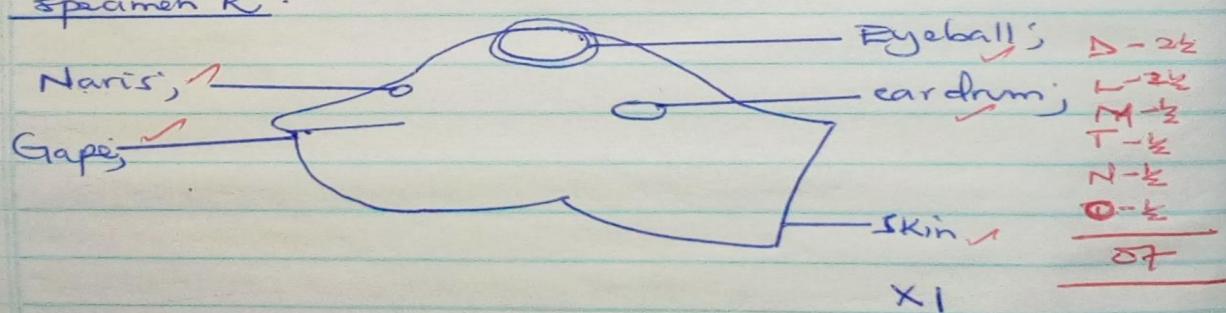
1a You are provided with specimen R (toad) which is freshly killed.

a) Classify the specimen as far as you can;
soln.

Kingdom — Animalia; ✓
 Phylum — Chordata; ✓
 Class — Amphibia; ✓ $\frac{3}{4}$
 Order — Anura; ✓
 Family — Bufonidae; ✓
 Genus — Bufo; ✓
 species — B. regularis; ✓

b) Observe the structural features on the head from the left hand side. Draw and label the features concerned with sensitivity and feeding. (7 marks)

A drawing showing the structural features for sensitivity and feeding located on the left hand side of the head of specimen R.



c) Examining the head of specimen; describe the shape of the head and its significance; (3 marks)
soln.

- It is triangular with apex anterior; and base posterior joined to the trunk directly; to reduce air resistance during locomotion;
- It is dorsal-ventrally flattened to offer a stream-lined shape to the animal; for reducing air resistance during locomotion.

ii) Is your specimen a toad or a frog, give a reason. (2marks) 02
soltm.

It is a ~~toad~~; it has a rough/dry; skin. 07

iii) State the significance of the structure and position of the eyes. (2marks) 02
soltm.

Are large; spherical; and dorsal laterally positioned on the head; for a wide field of view;

- Has slightly movable ~~upper eye lid~~; and lower transparent; nictitating membrane; for protecting the eye ball; 02

IV) Examine the dorsal and ventral skin surface of the abdominal region of the specimen. Outline the structural differences between the dorsal and ventral skin surfaces;

Dorsal skin surface;	Ventral skin surface;
Few glands; x	Numerous glands; x
Dark colouration; x	pale colouration; x
larger swellings/glands; x	small swellings/glands; x
Tightly held onto the body wall; x	Loosely held onto the body wall; x 04

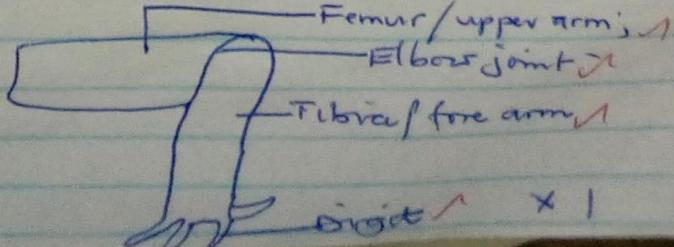
V) State the relevancy of the structural difference in iv), above; (2marks) 02
soltm.

Dorsal surface is more exposed to danger; than the ventral surface, therefore the dorsal surface is more highly protected than the ventral surface; 02

VI) Observe the limbs of the specimen. Draw and label;

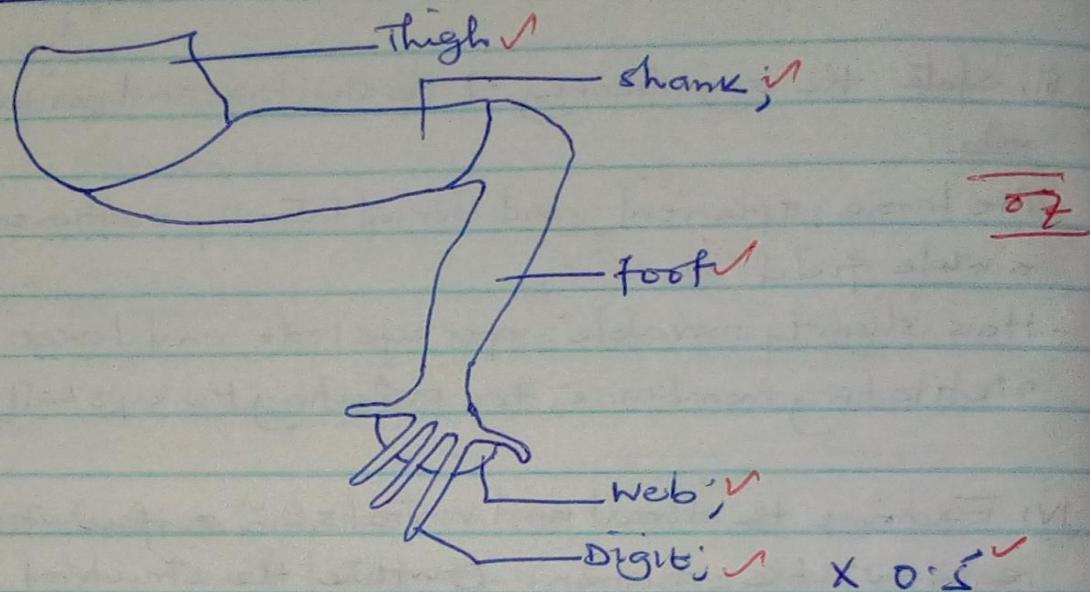
a) the structure of the left fore limb;

A drawing ^{showing} of the structure of the left fore limb of specimen R.



3

b) left hind limb.
 A drawing showing the structure of the left hind limb of specimen R.



Similarities between the fore and hind limb:

Both have digits; ✓

Are jointed; ✓

Have poisonous glands; ✓

Have phalanges in digits; ✓

Digits are variable in length; ✓

About

Differences:

Fore limb;

Has four digits; ✓

Shorter; ✓

Digits not webbed ✓

Less muscular; ✓

Has two main regions; ie upper arm & fore arm;

L-shaped ✓

Hind limb;

Five digits;

Longer;

Webbed digits;

More muscular;

Three main regions; ie thigh, shank and foot;

Z-shaped;

✓

07

Note

The habitat of a toad is Land/terrestrial; and Fresh water;^{or}
aquatic habitat;

- vii) How is a toad adapted to living a terrestrial life? ^(11 marks)
- Nostrils; for air breathing on land; ✓
 - Streamlined body; for easy burrowing; ✓
 - Dark colouration dorsally; and lighter colouration ventrally for camouflaging; ✓
 - Muscularised hind limbs; to provide strong propulsive force for leaping; ✓
 - Possess large bumps (tubercles) on the fore and hind feet for digging burrows in the ground; ✓
 - Short and stout fore limbs; for absorbing shock on landing; ✓

Adaptations of the toad to live a ^{showing} aquatic environment

06 max

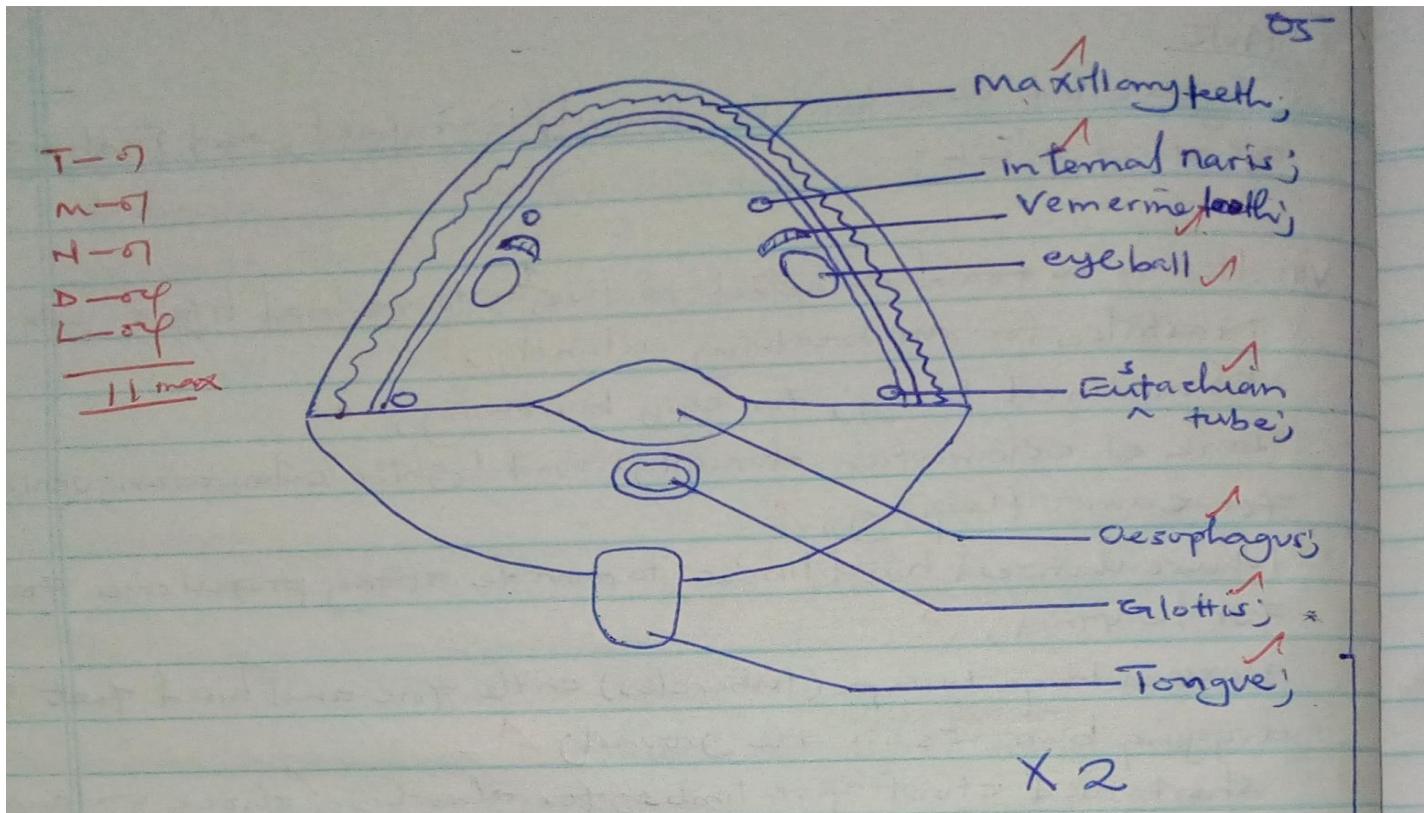
- Streamlined body; for easy swimming; ✓
- Webbed hind digits; for easy swimming; ✓
- Transparent nictitating membrane for protecting the eye against mechanical damage when submerged; ✓
- Nostrils at the tip of the snout for breathing in water; ✓
- Muscularised hind limbs for providing strong propulsive force for swimming; ✓
- Flat ear drum/tympanic membrane to allow for streamlined shape for easy swimming; ✓

07 max

- viii) Open up the buccal cavity of the specimen to expose the inner structures. Draw and label the interior of the buccal cavity when the tongue is pulled at the front; ^(11 marks) _(central side uppermost)

soln.

A drawing ^{of} _{at} interior structures of the buccal cavity of specimen R with the tongue pinned at the front.

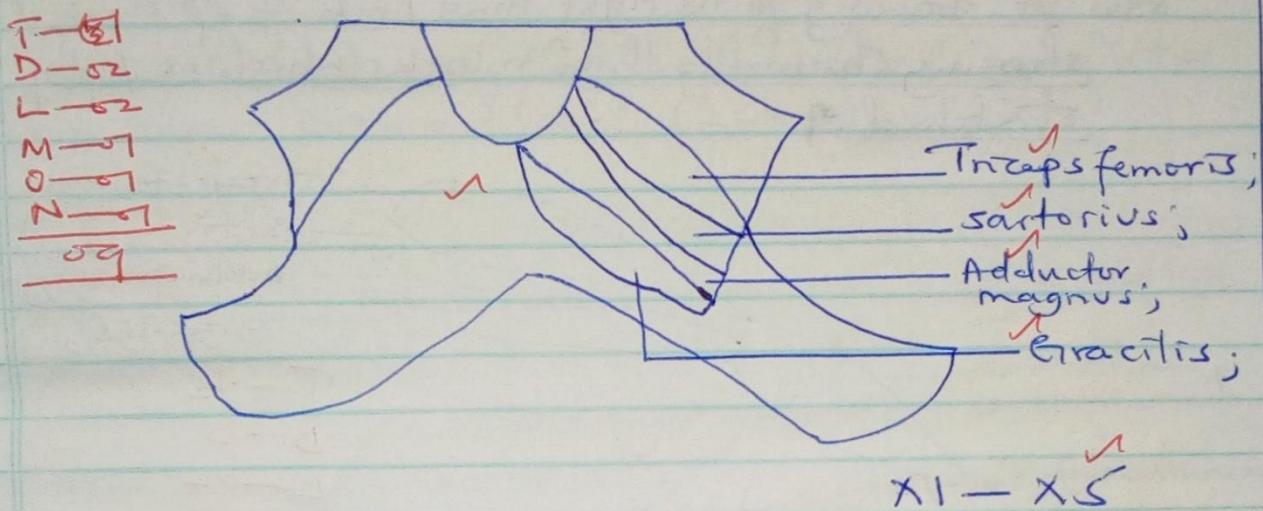


- ix) State the adaptations of the buccal cavity to perform its function; (6marks)
- Sohu -
- ; Sharp teeth; for firm grip / killing of the prey;
 - ; Wide gape; allows for ingestion of large pieces of food materials;
 - ; Internal nares for entry and exit of respiratory gases;
 - ; The tongue for capturing the prey; / Flattened tongue for trapping the prey;
 - ; Eustachian tube for equalization of pressure;
 - ; Glottis for passage of respiratory gases, to and from lungs;
 - ; Pair of large eye balls; that press against the prey; for easy swallowing;
- 6max

- X) Dissect the specimen R to display the main superficial muscles of the left thigh of the specimen . Draw and label the muscles - (9marks)
- Sohu -

A drawing ^{during} of the main superficial muscles of the left thigh of specimen R.

56



Q. You are provided with specimen T, which is fleshy Killed.

a) place the specimen dorsal side uppermost. How are the following features significant in the life of specimen in its habitat.

i) Fore limb structure, (2marks)

Answer

jointed for flexibility during locomotion; ✓ (any 02)
short; short to absorb shock during landing; ✓
Four webless digits for digging burrows for hiding; ✓

ii) Forelimb location - (2marks)

Ventral-laterally attached to support the body above the ground;

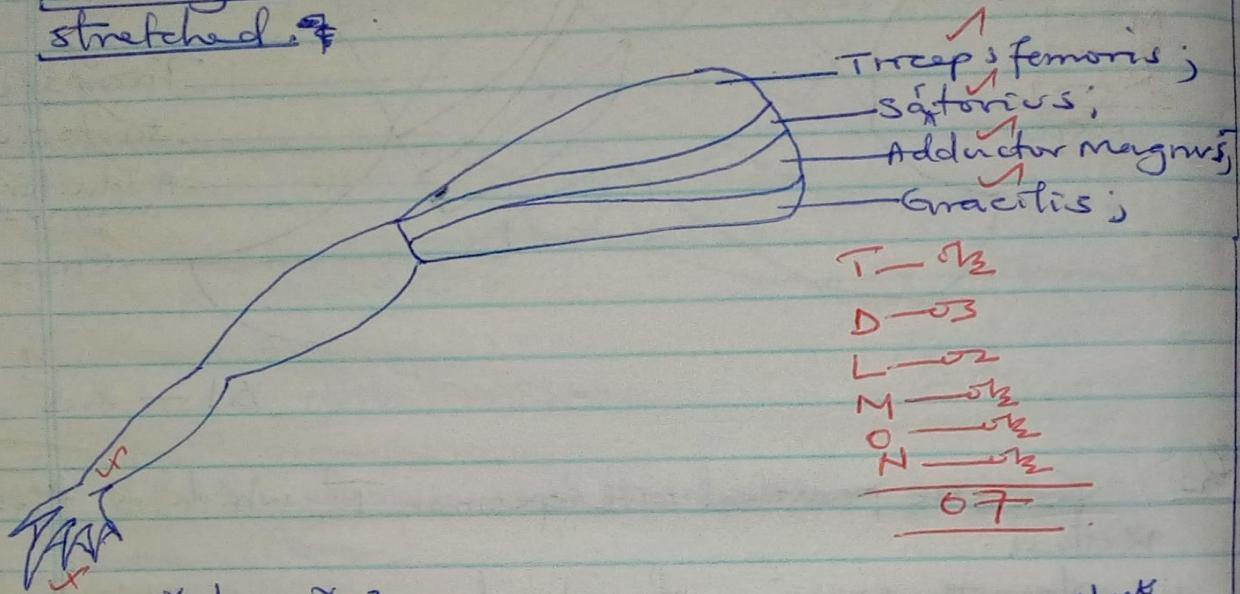
Attached onto the anterior part of the body to raise the head above the ground; ✓ 02

b). Pin the specimen ventral side uppermost with limbs fully stretched. Dissect to remove the skin from the body

07

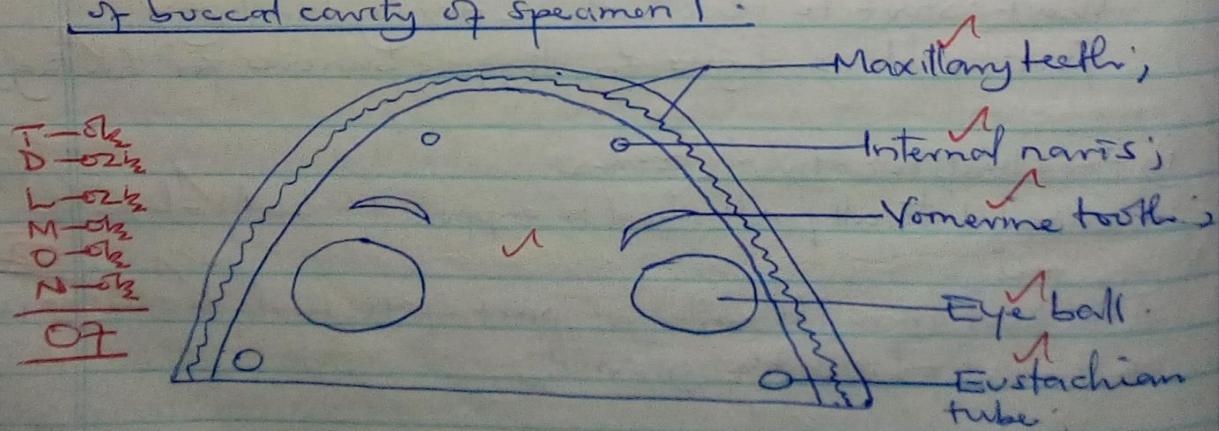
up to the first joint of the limbs. Draw the right hind limb and label only the observable muscles of the thigh. (5marks)

soln. A drawing showing the right hind limb of specimen T showing observable thigh muscles which is fully stretched.



c) Using forceps, open the mouth of the specimen and examine the roof of the buccal cavity. Draw and label its observable features (7marks)

soln. A drawing showing observable features on the roof of buccal cavity of specimen T.



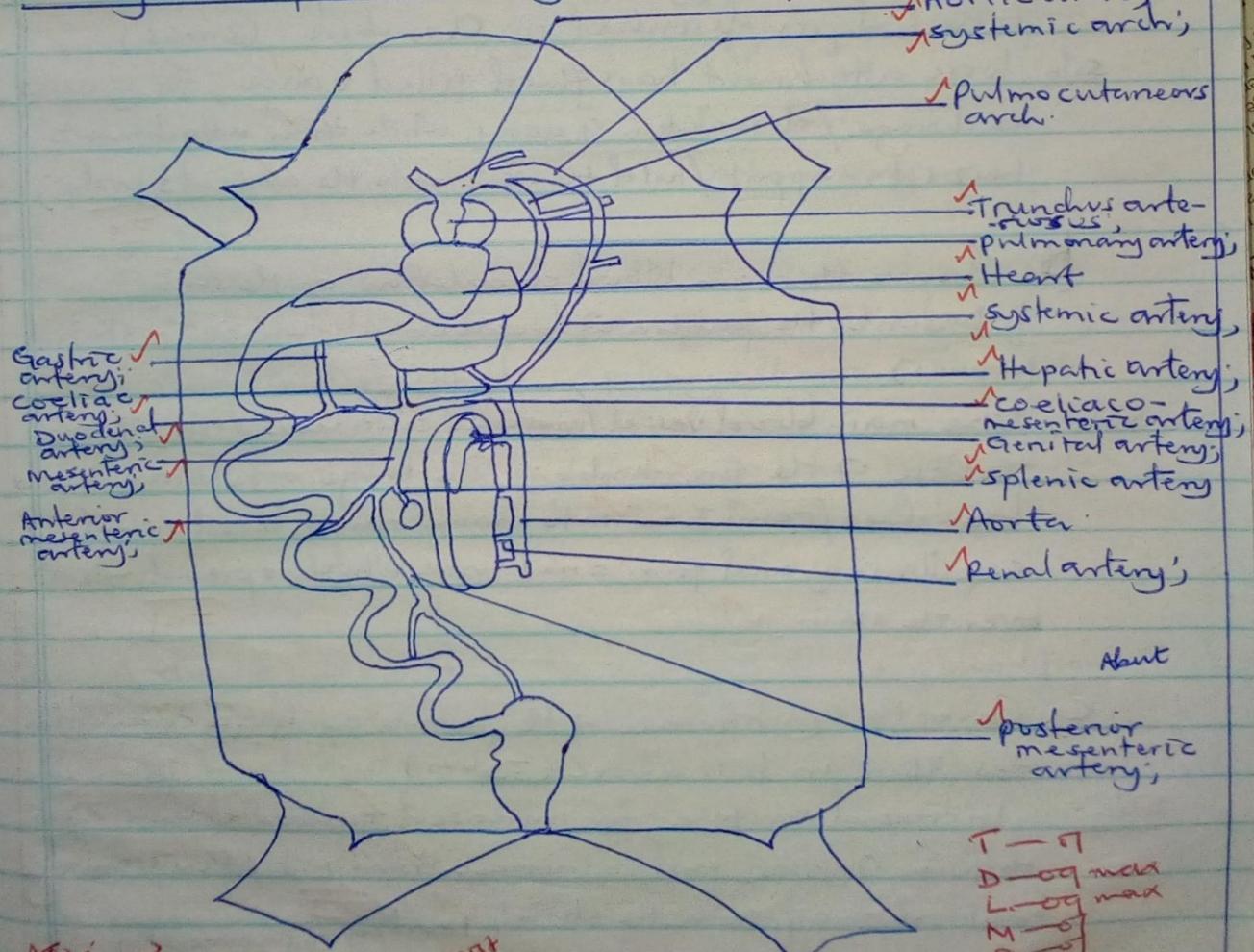
08

d) Dissect the specimen further, to display the internal organs;
 Remove the peri-cardium, without displacing the heart, displace
 the alimentary canal, the left lung and left kidney to the right
 side of the specimen.

Display the blood vessels that supply blood to the organs in the
 lower trunk. Draw and label. (22 mcs)

Soh.

A drawing showing blood vessels that supply blood to the organs
 in the lower trunk when the alimentary canal, left lung and left
 kidney are displaced to the right side of specimen I.



About

posterior mesenteric artery;

T - 7
 D - 09 max
 L - 09 max
 M - 01
 O - 01
 N - 01

22 max

Note:
 some organs
 not labelled,
 not drawn,
 not labelled)
 organs of origin most
 be drawn to earn
 a drawing mark.

X1 - X3

Ques a) Pin the specimen with ventral side uppermost. Dissect and remove skin, taking note of how it is attached to the underlying body wall.

Soln. i) Describe the attachment of the skin to the body wall (3mcs)
The skin is firmly attached to the body wall of fore limbs; hind limbs; and throat region; while it is loosely attached with in lower trunk/abdominal region;

03

ii) Suggest the significance of the way the skin is attached to the body as described in Ques a) above (3mcs)

Soln. loose attachment has fluid filled space; for gaseous exchange/dissolution of gases; while firm attachment helps to support/hold the skin onto the animal's body;

03

b) Observe the main blood circulation on the skin

i) Describe the pattern of blood circulation on the skin (4mcs)

about

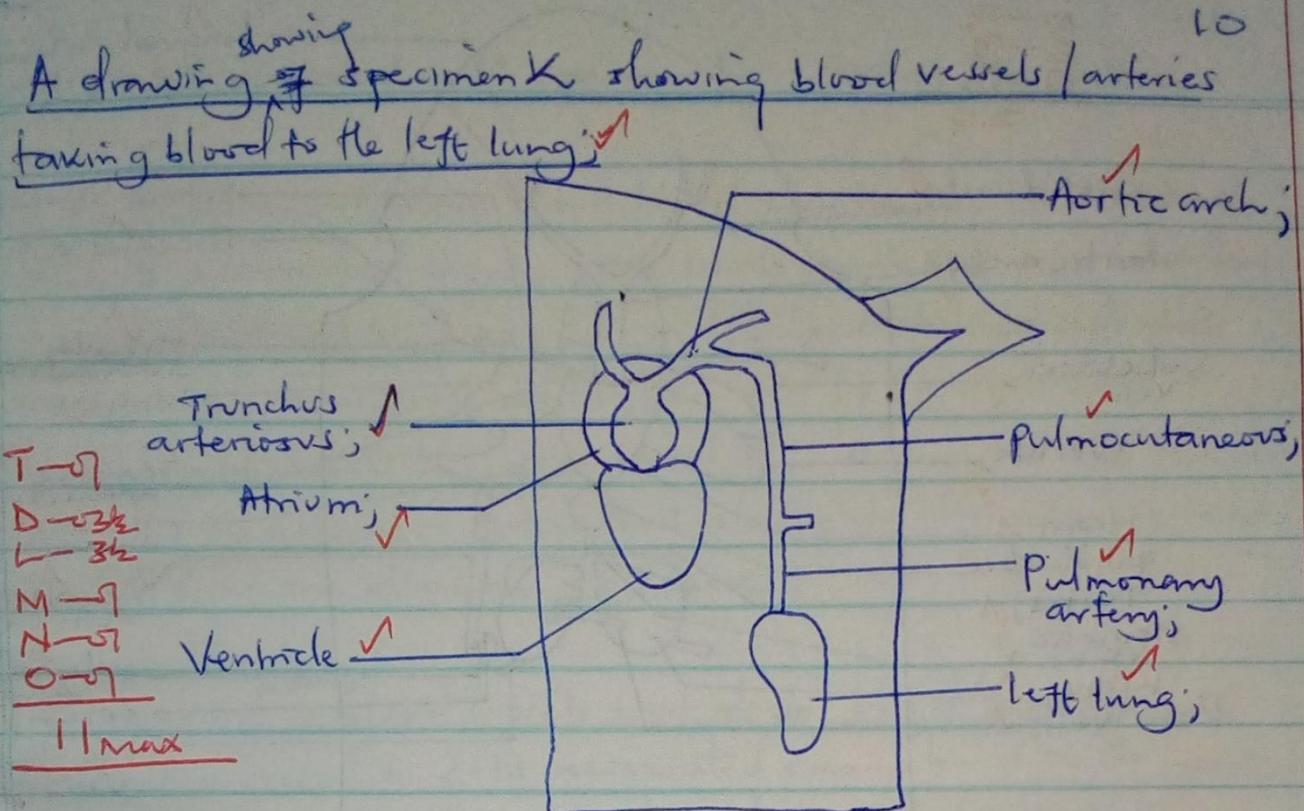
Soln. One main blood vessel/musculo cutaneous vein; from the base of the fore-limbs; The large size blood vessels branches/rami fives into many small blood vessels/capillaries; and form a net work which spread all over the skin;

04

c) Give the significance of the pattern of blood circulation described in b) above (3mcs)

Soln. Increased surface; for increased gaseous exchange/diffusion of gases; and to increase transport/flow/draining of blood away from the skin; leading to increased diffusion gradient.

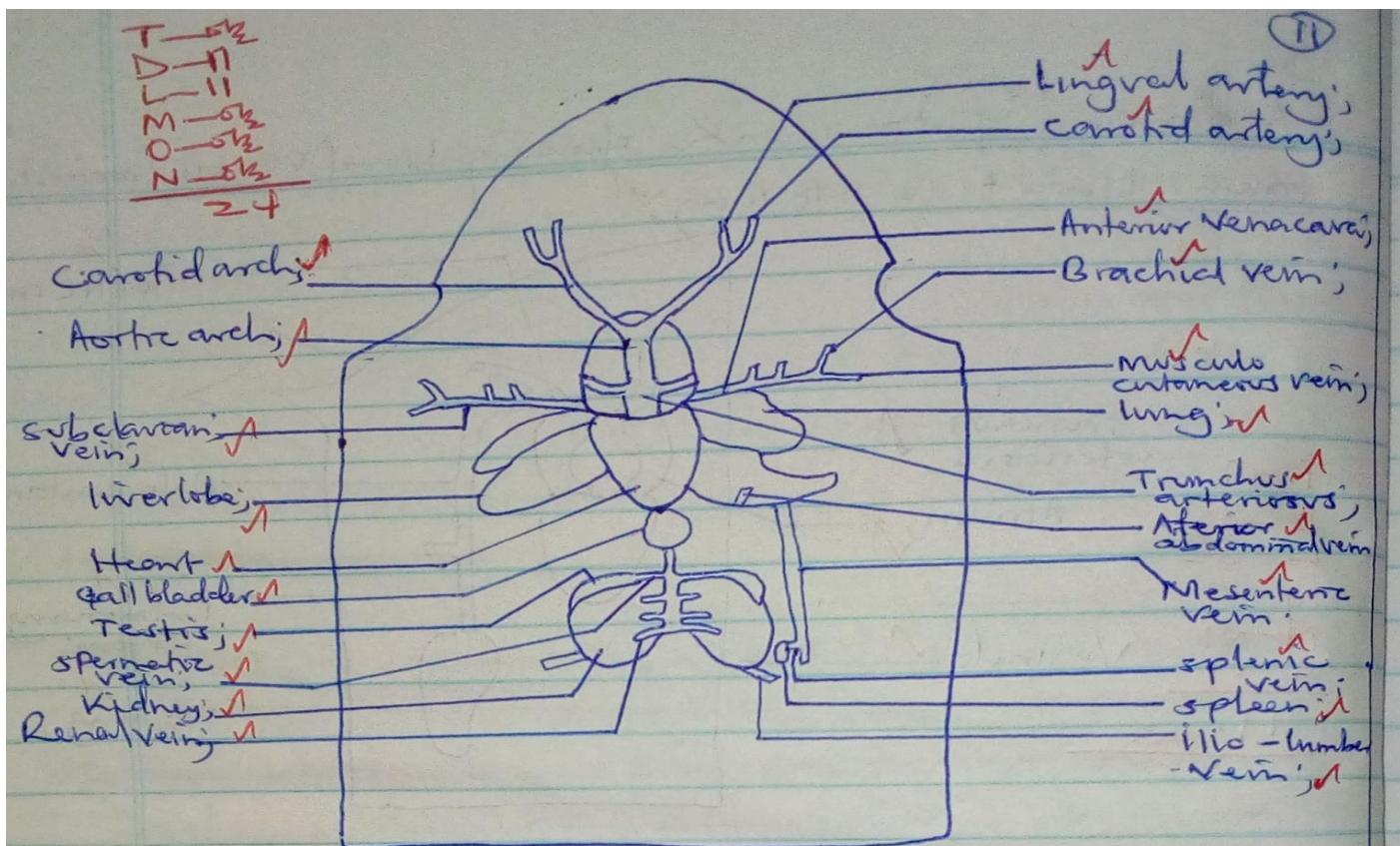
d) Dissect the specimen to display the blood vessels taking blood to the left lung of the animal. Draw and label (11mcs)



x 1 — x 4. Above

- g) Further dissect the specimens to display the structures of the buccal cavity; carefully cut off the whole alimentary canal including the bases of its capillary network. Trace the observable vessels that carry blood
- i) from abdominal region and forelimbs back to the heart
 - ii) To the head region from the heart. Draw and label the vessels and visible un-displaced organs; (2 times)

5th. A drawing showing the observable vessels that carry blood from abdominal region and forelimbs back to the heart, to the head region from the heart and visible un-displaced organs of specimen K



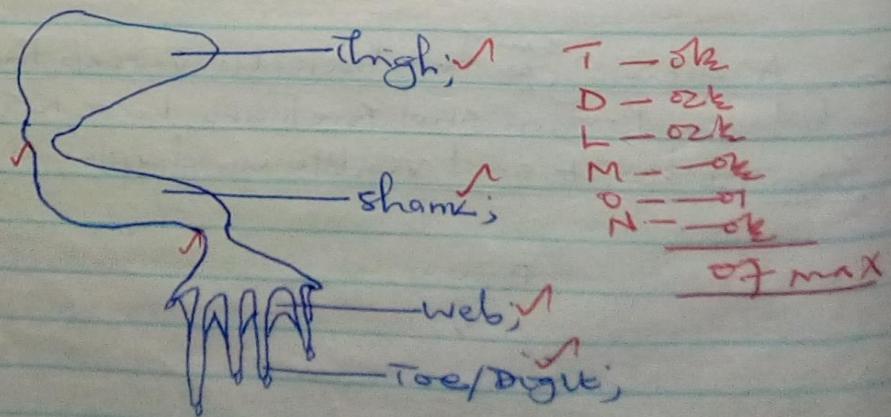
X1 - X3.

About

3) Examine the fore and hind feet of the specimen
Draw and label the ventral side of the hind foot of the
specimen. (7marks)

soh

A drawing showing
the ventral side of the hind foot of
specimen K.

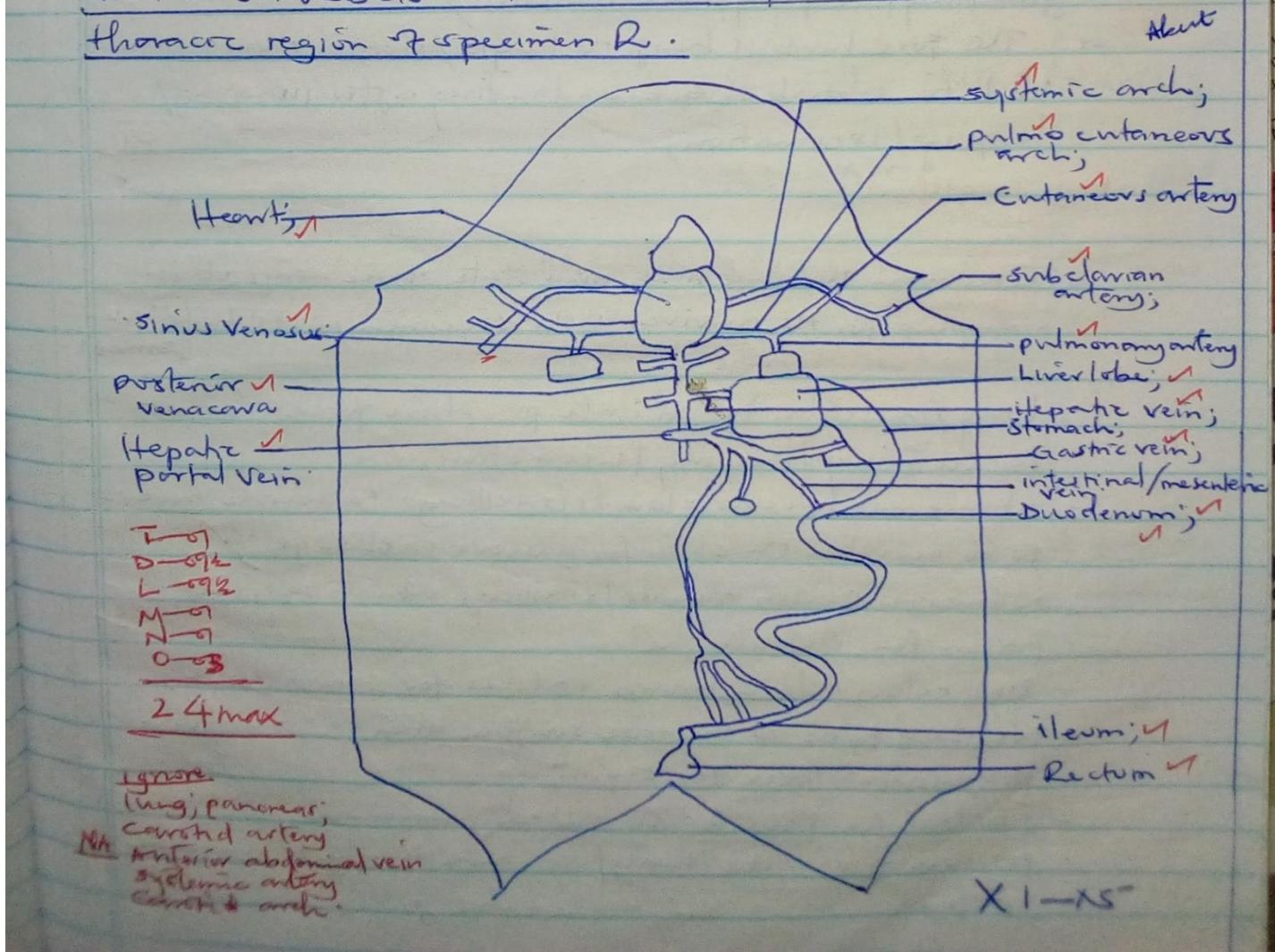


X1 - X4

- 12
- Qn. You are provided with specimen R. Dissect the specimen to display;
- the blood vessels that drain blood from the alimentary canal and its associated organs back to the heart with the alimentary canal displaced to your right and the heart turned upwards and pinned through the ventricles
 - the blood vessels that take blood from the heart to the thoracic region of the animal; Draw and label your dissection showing i) and ii) on one diagram; (2 lines)

Ans:

A drawing showing blood vessels that drain blood from the alimentary canal and its associated organs back to the heart and blood vessels that take blood from the heart to the thoracic region of specimen R.



13

Ques. You are provided with specimen K which is freshly killed.

- a) i) measure the length of the fore and hind limbs and record the results in table. Express the results as a ratio of length of fore limb : length of hind limb. (2mms)

Length(mm)	Fore limb	Hind limb
.	55 ✓ (20-55)	110 ✓ (40-130)
Ratio	1 : 2 ✓	

02

- Reject ratios with units;
- Accept correct values.

- i) ii) State the significance of the ratio (2mcs)

The hind limb is twice as long / longer than the fore limb to generate enough propulsive force for swimming / jumping / leaping / locomotion; ✓

- or The fore limb is half the length / shorter than the hind limb to absorb shock on landing after jumping / leaping / locomotion;

01

Rej. long / short.

About

- b) Examine the hind limb and state three ways it is adapted for the survival of the specimen in its habitat. (3mms)

- long / muscular to generate propulsive force / thrust for swimming / leaping / locomotion; ✓
- Numerous mucus glands / swellings to secrete mucus to moisten the skin for gas exchange; ✓
- Numerous poison glands / swellings which secrete poison for defence; ✓
- Dull colour / dark / brown patches for camouflag;
- Webbed toes to increase surface area to generate propulsive force for swimming;
- Pointed for flexibility for easy movement;
- presence of digits / long / variable length to increase grip;

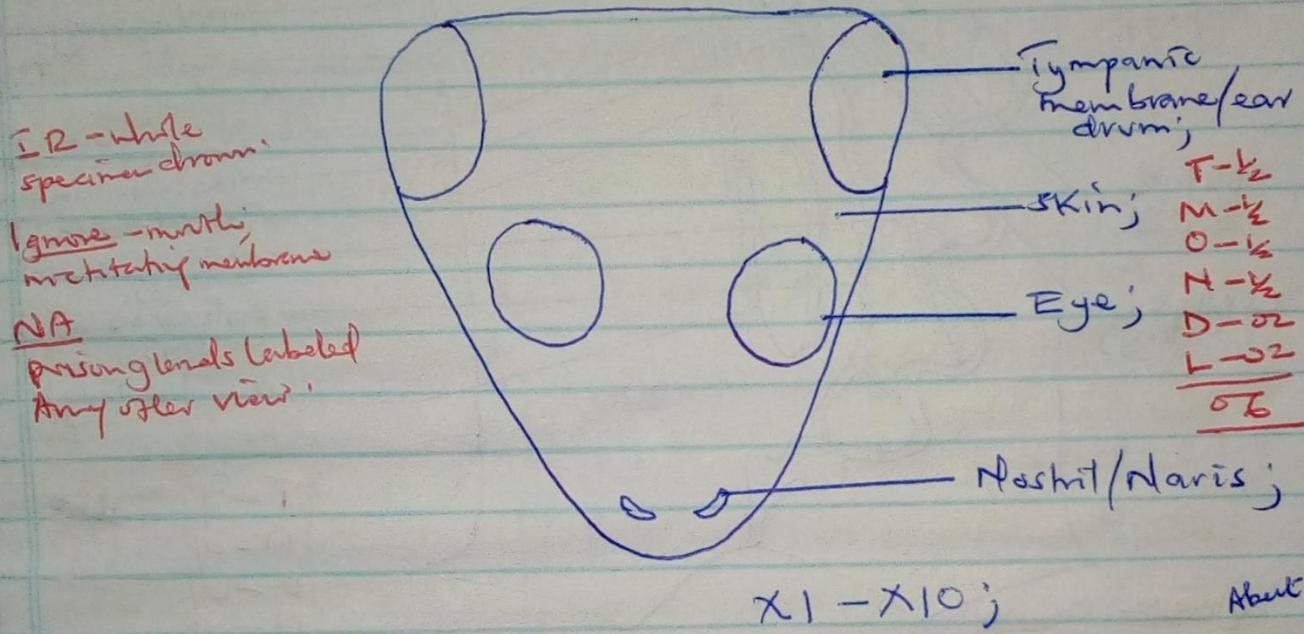
Rej. Webbed feet ;

any 03

14

c) Examine the head of the specimen and draw and label the dorsal view of the anterior part of the head to show the structures for sensitivity; (05 mcs)

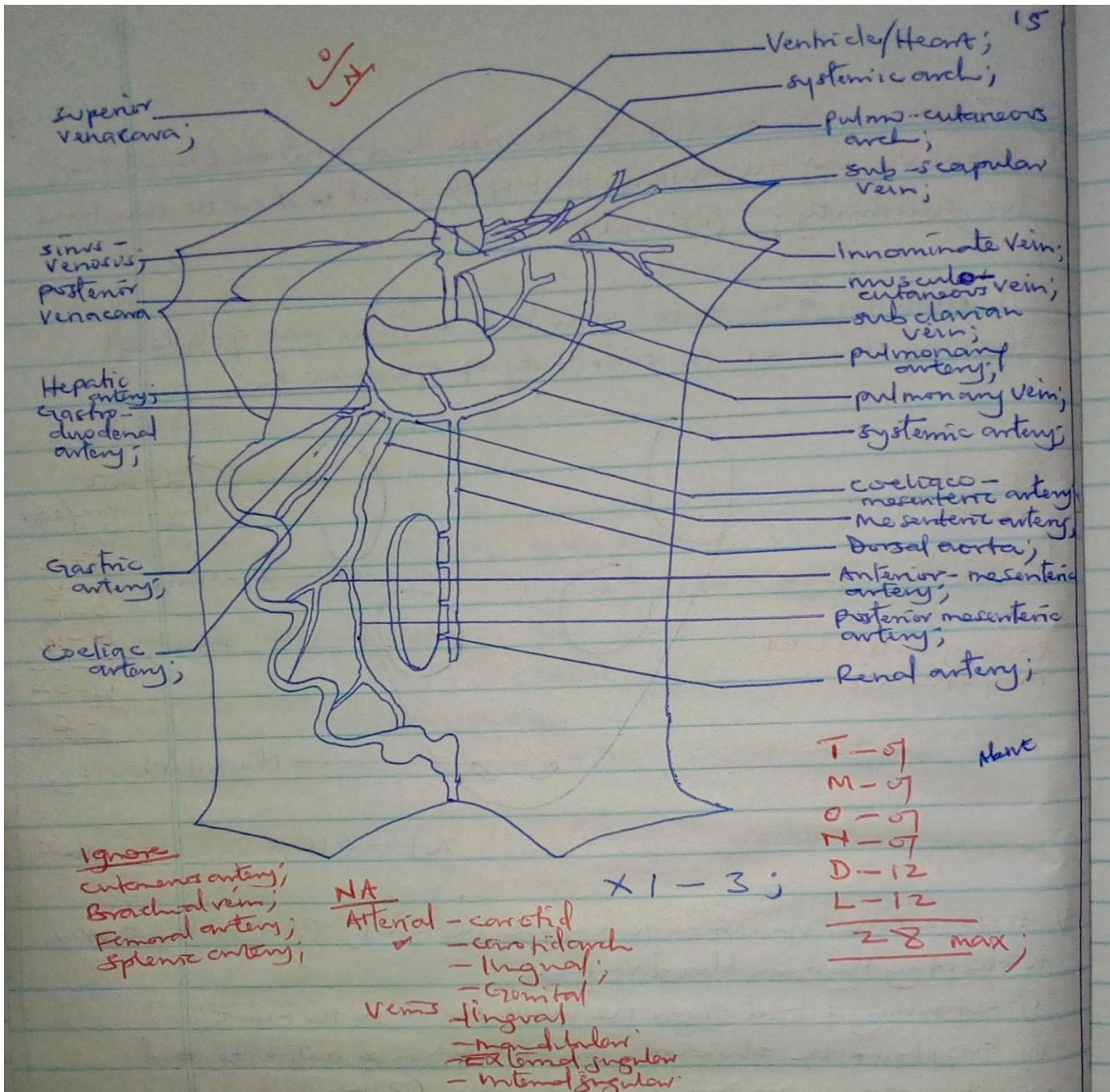
A drawing showing the dorsal view of the anterior part of the head showing structures for sensitivity of specimen K;



d) Dissect the specimen to expose the heart; Turn the heart over to display the main blood vessels;

- returning blood from the trunk region to the heart;
- supplying the structures for absorption of nutrients and excretory organs. Draw and label. (27 mcs)

A drawing showing the main blood vessels returning blood from the trunk region to the heart turned over and blood vessels supplying the structures for absorption of nutrients and excretory organs of specimen K;

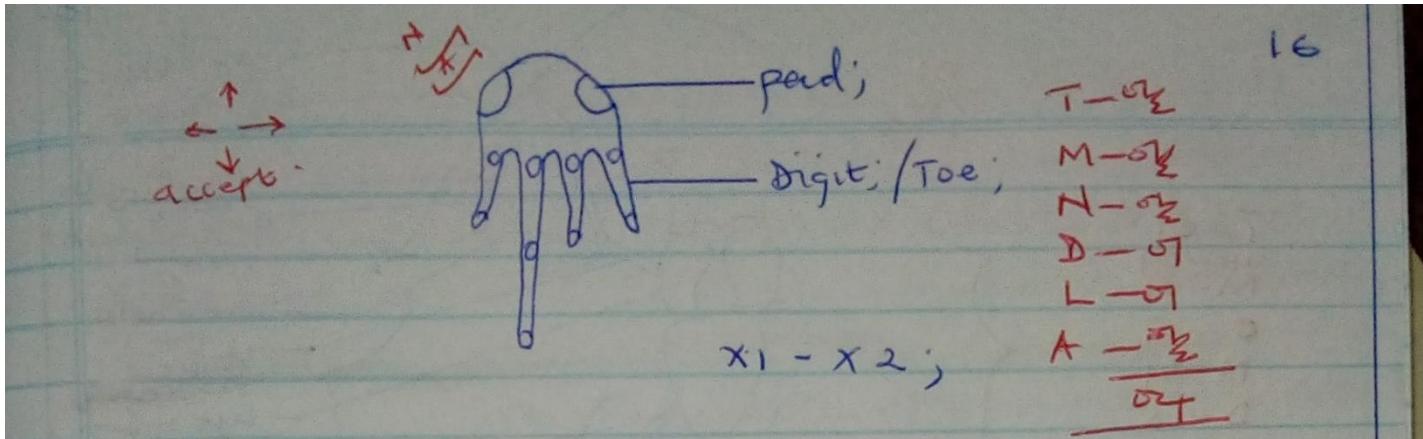


Qn. You are provided with specimen R which is freshly killed. Examine the fore and hind feet of the specimen.

- a) Draw and label the ventral side of the left ^{fore} foot and left hind foot of the specimen. Both drawings should be at the same magnification. (7mes) (8mes)

i) Fore foot.

A drawing showing the ventral side of the left fore foot of specimen R;



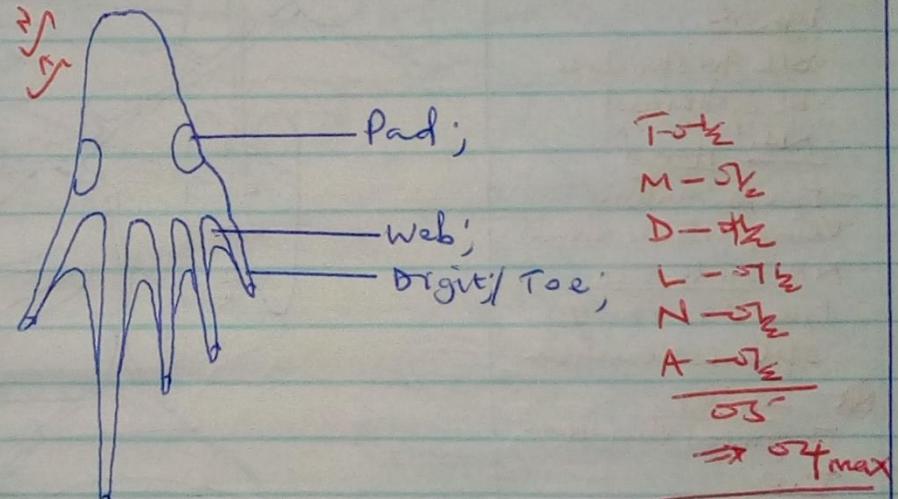
ii) Hind foot;

A drawing showing the ventral side of the left hind foot of specimen R.

A - accuracy;
different digits
will different length
only foot should be
drawn;
correct number of
digits;

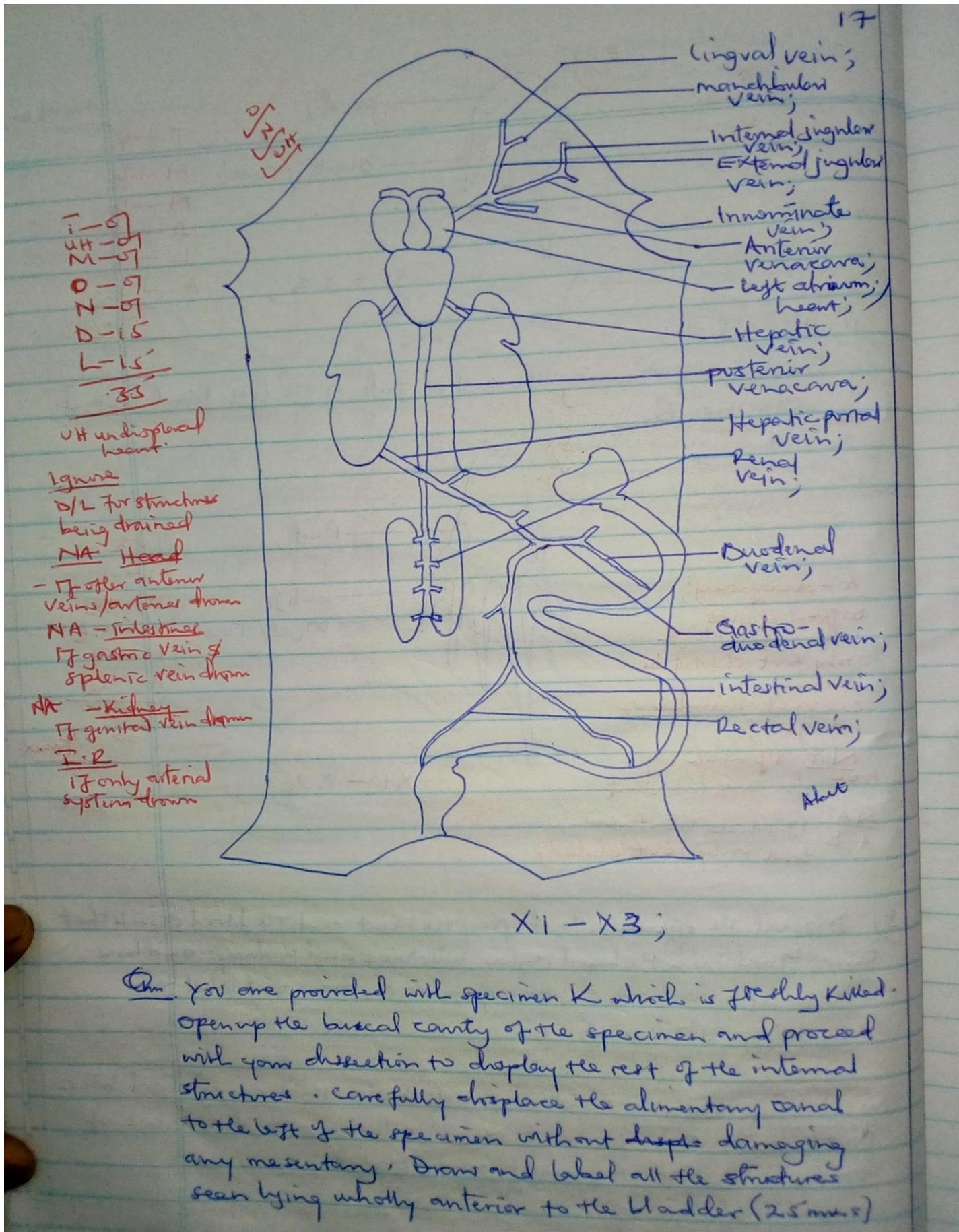
NA if whole leg
A & P drawn & labelled

NA if whole leg drawn
A, P but only foot labelled;

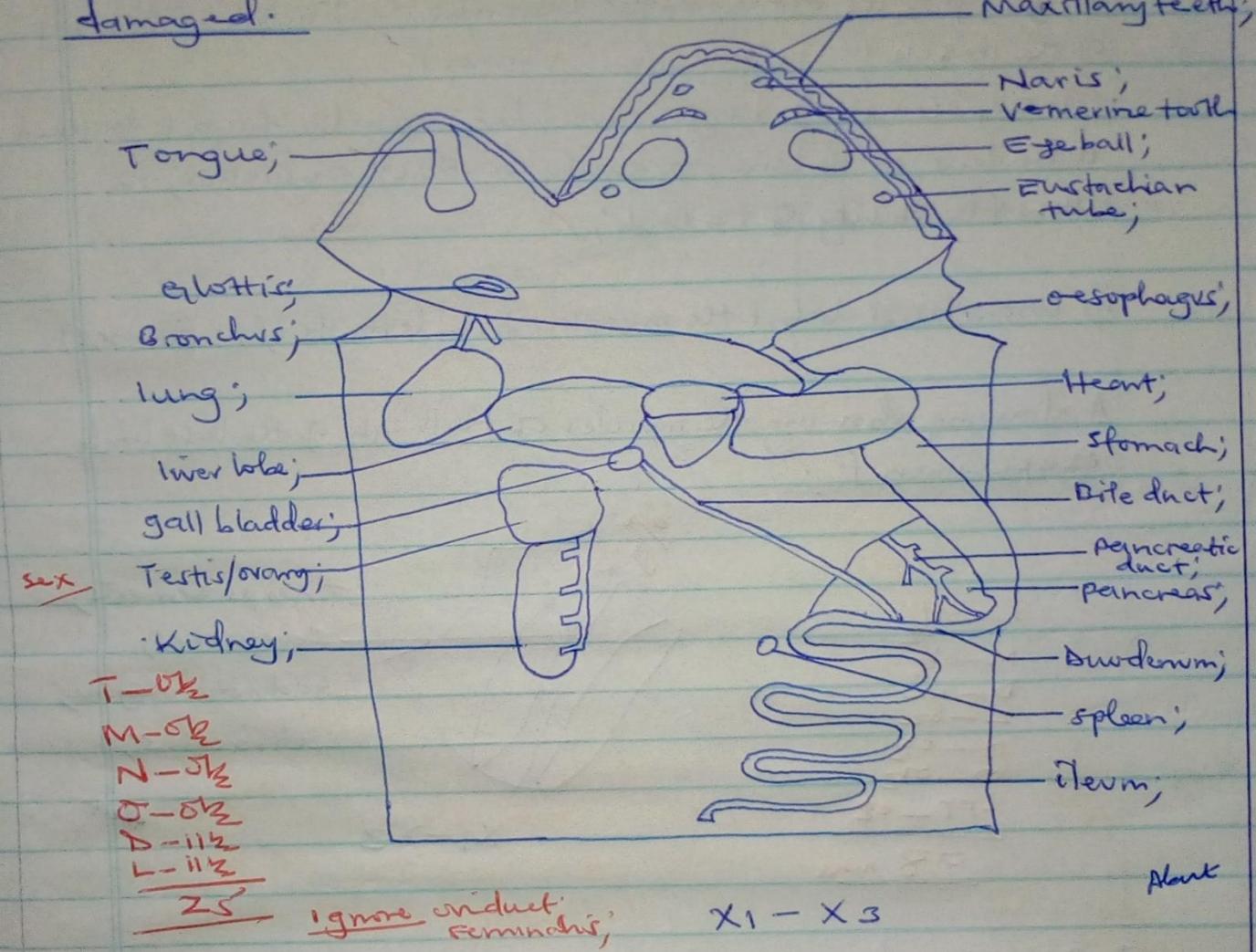


b) Dissect the specimen to display the heart and the blood vessels that carry blood from the head region, intestines and kidneys and back to the heart. without displacing the heart, draw and label your dissection; (36mcs)

A drawing showing the blood vessels/veins that carry blood back to the heart from the head region, intestines and kidneys of specimen R with the heart undisplaced;



A drawing of all the structures seen lying wholly anterior to the bladder of specimen K with alimentary canal displaced to the left and the buccal cavity opened and mesentery not damaged.



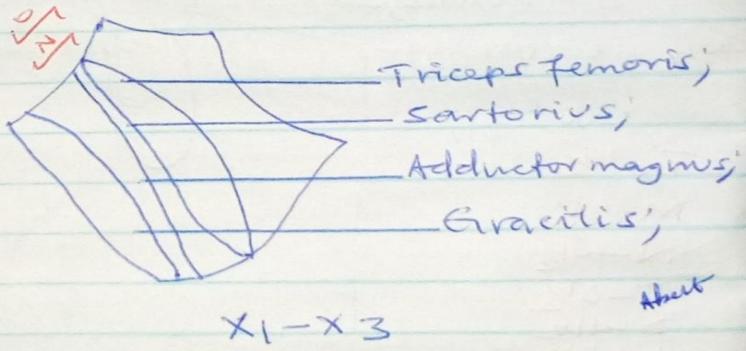
- Qn. You are provided with specimen P which is freshly killed.
- Examine the skin from dorsal side in the trunk region of the specimen. From your observation, state three adaptations of the skin from this part for survival of the specimen on land; (3marks)
- Has poison glands for protection; ✓
 dull brown coloured for camouflage; ✓ 13
 thin; & large surface area for gaseous exchange; ✓

- b) Pin the specimen with ventral side uppermost. Dissect the specimen to display the muscles of the left thigh;
 i) Isolate the first muscle block on the outer part of the left thigh up to its attachment. Describe the structural efficiency of the muscle to its function (3 marks)
 (Triceps femoris) large; muscular; spindle shaped attached to tendons; on the bone; to easily contract and relax; to allow flexibility of the limb; ✓ 03

- ii) Draw and label the muscle of the left thigh. (8 marks)

A drawing showing the muscles of the thigh of the left limb of specimen P;

T - 01
 M - 02
 D - 02
 L - 02
 N - 02
 O - 02
 LFT - 02
08 max



- C) By further dissection, display the blood vessels that;
 i) carry blood to the structures for removal of wastes from the body of the specimen and;
 ii) drain the hind limbs and pelvic region.
 iii) Draw and label the structures displayed in i) and ii) above on the same drawing to include the heart in ventral view. (27 marks)

A drawing showing blood vessels supplying structures responsible for removal of wastes from the body of specimen P and blood vessels draining the hind limbs and pelvic region to include the heart in dorsal view.

