UACE BIOLOGY PAPER3/P530/3 2022

at

HOLY CROSS LAKE VIEW

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QUESTION 1 : APPROACH TO DISSECTION

a) External anatomy e.g

External structures of the head, limbs and body covering

b) Inner structures e.g

structures in the mouth cavity

c) Superficial structures. e.g

visible structures after removing the skin such as ***glands, nerves, muscles*** *and* ***superficial blood vessels***

d) Internal anatomy/internal structures (25-35 MARKS)

EXTERNAL ANATOMY : SKILLS EXAMINED

Classification with reasons basing on observable structures

- Reasons basing on the structural features of head region
- Reasons basing on the trunk region
- Reasons basing visible structural features on thorax only
- Reasons basing on the locomotory structures

▶ ***Note :Wrong taxon group- results into loss of marks for the reasons. E.g***

Class: arthropoda, reasons 3 main body parts, 3 pairs of legs e.t.c

Habitat : **i**f aquatic or land /terrestrial

REASONS - **Like giving your adaptations**

- Reasons basing on the head
- Reasons basing on the lower trunk
- Reasons basing on the legs
- Reasons basing on the upper trunk

Sex identification : with reasons and description of the identified structures

- **Reasons basing on the lower trunk region**
- **Reasons basing the head**
- **Reasons basing on the appendages. e.g antennae**
- **Reasons basing on the lower trunk region**
- **Basing on ventro-posterior or dorso-posterior structures**
- **Describe the structures used to identify the sex**

Description :involves critical observation of the structures

Key words used:

Observe –SENSE OF SIGHT

Examine-ALL YOUR SENSES CAN BE USED IF APPLICABLE

- Describe the structural features of the **HEAD**
- **Observe** the structural features on the head ,and describe
- **Examine** the structural features on the head and describe

Adaptation: There must be evidence of structural feature and function

HOW TO STATE ADAPTATION

- Descriptive word -structure - Purpose/function
- Correct adaptations given only $0^{1}/_{2}$ mark
- Correct adaptation & correction function 01 mark
- Correct adaptation but wrong function 0 is awarded
- Wrong descriptive ,write structure , wrong function 0 mark
- **Wrong descriptive words used attracts no mark**

- Example: long antenna for sensitivity

Drawing and labelling

Drawing of different views of the external structures

- Dorsal view
- Anterior view
- Lateral view/side view
- Posterior view
- Ventral view
- Dorso-posterior
- Ventro-posterior

NOTE:

DORSAL SIDE /SURFACE-Draw what you see on that surface

DORSAL VIEW-draw what you see and so

Drawing basing on the view e.g anterior, dorsal, ventral, posterior, lateral view.

Wrong view attracts 0 mark

Comparison of body structures

- Fore limb and hind limb
- Posterior wings and anterior wings
- Dorsal skin surface and ventral skin surface
- Distribution of far/rat and poison glands/toad
- Whisker length (anterior and posterior whiskers)

Explain the importance of the observed differences

Position/location of the body parts: significance of the position of a given structure/organ

Measurement of external body parts and calculate ratio then give significance of the obtained ratio

Measurement of appendages and other body structures

Measure and record the following structures, record in millimeters/mm

- Antenna length……mm
- Trunk length……mm
- Abdomen length……mm
- Head length……mm
- Head thickness……mm
- Head width……mm
- Tail length…… mm
- Whole body length……mm

- Calculate the **ratio** and give the significance of the ratio

Point of attachment of the external structures

- Antennal socket, wings
- Relate point of attachment of the structure to animals survival

INNER STRUCTURES

- **Mouth inner structures**
- **Structures on the roof and floor**

Structures on the floor **Tongue**
Structures on the roof • Eye orbit, • internal naris, • vomerine teeth, • opening into the Eustachian tube, • maxillary teeth

Structures on the floor • **Incisor teeth,** • **molar teeth**
Structures on the roof • **Incisor, teeth** • **Molar teeth** • **ridges** • **palate**

INTERNAL ANATOMY

STEPS INVOLVED WHEN ANSWERING

- Identify the body region from which the question is coming from.
- Identify the body organs in that body region
- Identify the roles of structures/functional words used
- Identify the type of blood vessels to be drawn
- Identify any Necessary organ displacements.
- Identify Location/position of structures. e.g. left or right

Sample questions on organ displacement

Question 1:

Displace the stomach and duodenum to the right, place the heart dorsally, cut and remove the structures posterior to the duodenum.

Draw and label the exposed structures in the abdominal region. (24marks)

Question 2

Pin the heart in its ventral state ,pull the left lung below the heart after removing the pericardium. Without breaking the mesentery, move the stomach and duodenum apart to expose the structures in between, move the ileum and rectum to the left. draw and label the exposed structures in the abdominal cavity

- Identify the key words/phrases underline them
- Ensure you have understood the meaning of the underlined parts
- Identify the traps and the bonus marks in the question
- Make a list of the required parts
- Make a simple sketch of the required drawing

FUNCTIONAL WORDS USED

- EXCRETORY ORGANS- *Must be involved in formation of the wastes*

e.g: kidney, lungs, skin(its external), Liver., malpighian tubules(cockroach)

- PASSAGE e.g gullet , passage of material- parts of alimentary canal
- DIGESTION (CHEMICAL OR PHYSICAL) e.g stomach, ileum, Duodenum, mid gut
- REPRODUCTION e.g gonads like testis and ovaries, mushroom shaped gland
- SECRETION e.g some parts of the Alimentary canal, gonads ,adrenal gland,
- REMOVAL/ELIMINATION OF UNWANTED MATERIALS e.g :kidneys, colon ,rectum etc
- VENTILATION -e.g. diaphragm, trachea, intercostal muscles, rib cage, lungs

- **IMMUNITY e.g lymph nodes, thymus gland,**
- **SENSITIVITY e.g nervous system**
- **ABSORPTION OF NUTRIENTS e.g some parts of the alimentary canal**
- **TRANSPORT OF MATERIALS (IN A GIVEN REGION)**
- **URINARY STRUCTURES. E.g kidney, ureter, bladder**
- **Structures through which food materials passes**
- BLOOD COMPOSITION (RICH IN NUTRIENT , RICH IN NITROGENOUS WASTES)
- BODY CAVITY/COELOM (ABDOMINAL AND THORACIC CAVITY)

KEY WORDS USED IN DISSECTION QUESTIONS

- POSTERIOR TO OR ANTERIOR TO
- EXCLUDING –LEAVING OUT
- EXCLUSIVELY- LIMITED ONLY TO
- BLOOD CIRCULATION –BOTH VEINS AND ARTERIES
- PROXIMITY-NEAR BY
- MESENTERY –CONNECTIVE TISSUE ASSOCIATED WITH PARTS OF ALIMENTARY CANAL
- TRUNK REGION –CHEST/THORACIC AND ABDOMINAL REGION
- SITU/VISCERA-UNDISPLACED/UNDISTURBED STATE
- CARRYING BLOOD TO/SUPPLYING/ROUTES OF BLOOD FLOW TO - ARTERIES
- CARRYING BLOOD FROM/DRAINING-VEINS
- **Obscured structure-structures previously covered**

KEY WORDS USED

- Discard/cut out. e.g alimentary canal is cut and remove –don’t display that part in your drawing.
- Cut and remove- to expose structures that were previously covered
- Excluding a particular part- don’t expose it in the drawing
- **Proximal – at the beginning /starting point**
- **Distal –At the end**
- **Exclusively ,Mesentary ,Dorsally**

ORGAN DISPLACEMENT (bonus marks)TOAD

- HEART: Dorsally, anteriorly, displaced heart,RIGHT, forward, towards the head-to expose the sinus venosus, pulmonary vein, hepatic vein and origin of the anterior venacava
- Situ ,ventrally, undisplaced/undisturbed heart
- Turn the left kidney over the right-to expose arteries supplying them
- Displace the parts of **alimentary canal** to the left- to expose the veins draining the al.canal
- Displace the **al.canal** to the right- to expose the arteries supplying the al.canal
- Pull out the liver or the lung- to expose Hepatic vein or pulmonary vein

ORGAN DISPLACEMENT (bonus marks) RAT

- HEART to the **right**-To expose pulmonary vein, bronchus,P.Artery
- Liver – anteriorly -to expose the hepatic portal vein
- Alimentary canal to the left –to expose the veins draining the al.canal
- Alimentary canal to the right-to expose arteries supplying al.canal
- Stomach(rat) to the right- to expose structures previously covered e.g kidney
- Duodenal loop to the right- to expose original of bile duct
- Ileum to the left –to expose tributaries of hapetic portal vein
- Caecum down wards- to expose chain of lymph nodes

TITTLE MARKS ARE AWARDED ACCORDING TO THE FOLLOWING

- Drawing showing
- Parts drawn in the specimen/Body of the question
- Any key instruction e.g
- Displacement of the part at the end

- DRAWING SHOWING .....DISPLAYED PARTS /TO BE DRAWN.....SPECIMEN K .....DISPLACE PART

ACCURACY MARKS

- Number of organs
- Shape of organs/structures
- Size of organs
- Position of the organs within the animal's body
- Relationship with neighboring structures
- Length of the structure under study
- Number of segments

CURRENT TRENDS OF MARKING

AWARDING OF MARKS

Major drawings	Minor drawings
D/L-Structures displayed on	D/L-Structures displayed on
M-01	M-0.5
T-01	T-0.5
N-01	N-0.5
O-01	O-0.5
A-01 S/D-01	A-0.5

INTERNAL ANATOMY

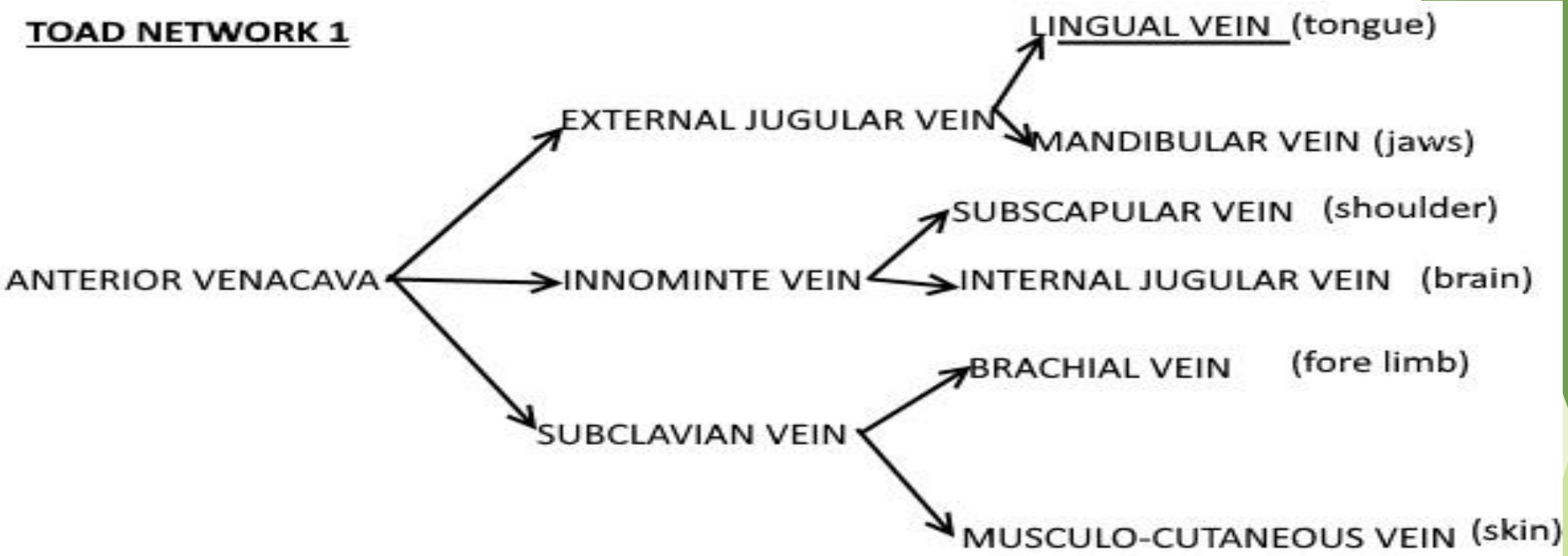
- **B**lood vessels- Read them according to the network
- **Toad network 1 (CARRY BLOOD TO AND FROM HEAD &CHEST REGION)**

a) **Veins**

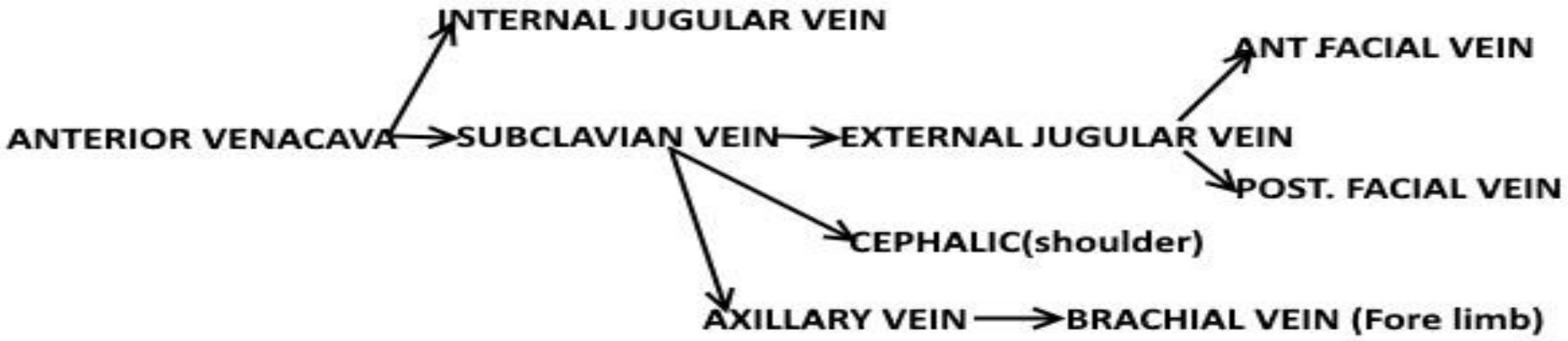
- **Anterior venacava** branching into vessels

- To head,
- Fore limbs, pulmonary vein (chest/thoracic)
- Musculo-cutaneous-skin

TOAD NETWORK 1



RAT NETWORK 1



Network 2

- **Posterior venacava**
- **Organs**
- Liver
- Gonads (ovaries and testis
- Kidneys
- Adrenal gland (rat)

- **Network 3 -abdominal region**

(alimentary canal, spleen ,pancreas and the liver)

- Hepatic portal /coeliac .A
- Alimentary canal and associated organs
- Liver
- Pancreas
- Spleen –splenic vein/artery-common trap

- **Network 4- pelvic region and hind limb**

- Renal portal vein
- Pelvic vein
- Femoral and sciatic-hind limbs

b) Arteries

Network 1-head region, chest region

Aortic arch- carotid arch, systemic arch ,pulmo-cutaneous arch

Network two – kidneys, gonads, adrenal glands,

Dorsal aorta

Network 3-alimentary canal and associated organs

- Coeliaco-mesenteric artery

Network 4-hind limb and pelvic region

- Common iliac artery

PHYSIOLOGY –HIDDEN THEORY

STEPS INVOLVED

- Discover the theory topic or sub topic
- Aim of the investigation
- Explanation depending on the results obtained in the tables above
- **Table 1**
- Discover the unknown extracts-make critical observations
- **Table 2**
- Investigate the physiological process
- Confirm –if the process has occurred or not under a given experiment and conditions

HOW TO EXPLAIN ANY PHYSIOLOGY EXPT

- WHAT HAPPENED
- HOW DID HAPPEN
- WHY DID IT HAPPEN

E.G . Effect of temperature on osmotic influx of water

QUESTION 3-Anatomy

- Microscopy stained tissues using phloroglucinol and iodine
- Shoot system: Stem, flowers ,fruits,
- Root

A) **Plant anatomy**

- Inflorescence and floret
- Stems of monocots and dicots
- Fruits
- Stems with modifications
- Root system e.g.Tap root and fibrous and adventitious

MICROSCOPY

Type of organ used in the question. Examples

- Leaf epidermal layers- guard cells and stomata
- Irish potato/food storage organ- parenchyma cells/tissue
- Onion epidermal layer- epidermal cells
- Stem cross section-arrangement of vascular bundles
- Root cross section- vascular bundles
- Flower –cross section of ovary to determine the number of carpels
- Flowers/florets of which are small-gynoecium, stamens, pollen grain

Type of stain used in the question

- **Phloroglucinol stain** –lignified tissues like sclerenchyma in the cortex, xylem.
- Iodine solution – parenchyma cells that store starch
- Methyl blue –to colour the tissues/ cells under study
- Water is not a stain but it used to maintain the turgidity of the cells

Type of objective lens used in the question

- Lower power- whole structure /organ needed to be drawn.
- Medium power/high power-section of cells to be drawn.

Location of the cells on the major structure/organ

- **Focus on the pith region**
- **Focus on the cortex region**

Habitat from which the specimen was picked

- Aquatic: **water lily- aerenchyma tissue-modified parenchymatous tissue-large air spaces**

spirogyra

Leaf stalk, leaf lamina stomata distribution, roots, stem

- **Land/terrestrial arid/desert: Stomata**
- **Rotting material on land: moulds**

ANIMAL ANATOMY

a) Animal parts

- Insects, arachnids earth worms and millipedes
- Taxonomy
- Structures of small sized parts

b)Lower organisms

- Spirogyra
- Fungus
- Lichens-leaf like type /foliated type
- Mosses
- Ferns –reproductive structures

INFLORESCENCE

a) KEY AREAS WHEN DESCRIBING INFLORESCENCE

- Number of florets – which can be numerous/5/3/10 or of numerous of two types
- Floret stalked/ asessile or unstalked /sessile
- Attachment of floret -e.g. on the tip of the expanded peduncle or alternately attached along the peduncle

- Arrangement of the floret - circular pattern/closely packed/ alternately /whorly /oppositely
- Floret being unisexual or bisexual
- Grouping of the florets
- Presence of bracts
- Actinomorphic or zygomorphic florets

- **b) Extra questions on arrangement of floret**
  - Advantages of arrangement of florets
  - Disadvantages of arrangement of florets
- **c) Extra questions on attachment of florets**
  - Advantages of attachment of florets
  - Disadvantages of attachment of florets
- **d) Advantages of presence of bracts**

FLORET/FLOWER

DESCRIPTION OF A FLORET/FLOWER

A) Stamens /androecium

- **Number of stamens-** numerous/8/5/9/10
- **Attachment of stamens**

i) Staminal tube/filament tube

ii) Corolla tube/fused with the petals

iii) Free- if originating from the receptacle

- **Anthers** e.g. Bilobed, elongated/long, circular/spherical in shape
- **Filament** e.g. hairy, smooth, long or short, thin or thick, slender

e.t.c

B) PISTIL /GYNOECIUM

- **Number of carpels** e.g. 1/2/3/5/4
- **Stigma** e.g. hairy, lobed , fused, sticky(using the finger tips),
- **Style** e.g. long, short, thin , slender, hairy
- **Ovary** e.g. superior or inferior, broad base, hairy,
  - Shape ovary e.g. oval, round, elongated/long,

c) Simple experiments on Mendel 1st law

- Genetics principals. White beans=beakers and Black beakers

i)Mendel's 1st law- 40 black, 40 white

20BB, 40BW, 20WW

- ii)Natural selection.

15black, WW-Increases, WB-Increases, BB-decreases

- Speciation

iii)Extinction

5black, WB-Low, WW-increases, BB-decreases=0

d) Calculation of magnification like 2009 paper

- Diameter of field of view (F.O.V)

CHALLENGES OF P530/3

WEAKNESS OF CANDIDATES

- Poor drawing skills
- Failure to follow instructions
- Failure to dissect specimen.
- Failure to follow guidelines for making good biological drawings e g. frames, label lines in ink etc.

- Spotting of the specimen by learners
- Practicing from wrong sources i.e books read by learners
- Lack of practice in all the specimens
- Failure to use technical terms which explaining certain concepts
- Failure to interpret questions properly
- Poor mathematical skills and conversions of unit
- Inability to construct the dichotomous key.

THANK YOU
MAY GOD BLESS YOU

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