Previous IPE

SOLVED PAPERS

MARCH -2025 (TS)

PREVIOUS PAPERS

IPE: MARCH-2025(TS)

SR ZOOLOGY

Time : 3 Hours **[Max. Marks: 60]**

SECTION-A

I. Answer ALL the following VSAQ: **10 × 2 = 20**

1. What is chyme?
2. What is triad system?
3. Name the blood vessels that enter and exit the kidney.
4. "Colostrum is very much essential for the new born infants". Justify.
5. Define the terms layer and broiler.
6. Write the names of any four mononuclear phagocytes.
7. Human skull is described as dicondylic skull. Give the reason.
8. Name the yellow mass of cells accumulated in the empty follicle after ovulation. Name the hormone secreted by it and what is its function?
9. What is tomogram?
10. What is 'Amniocentesis'? Name any two disorders that can be detected by amniocentesis.

SECTION-B

II. Answer any SIX of the following SAQs: **6 × 4 = 24**

11. What are the functions of liver?
12. Explain Darwin's theory of Natural Selection with industrial melanism as an experimental proof.
13. Explain the different types of cancers.
14. Explain how hypothyroidism and hyperthyroidism can affect the body.
15. Describe erythroblastosis foetalis.
16. Explain the process of inspiration and expiration under normal conditions.
17. Draw a labelled diagram of the T.S of the spinal cord of man.
18. Distinguish between homologous and analogous organs.

SECTION-C

III. Answer any TWO of the following LAQs: **2 × 8 = 16**

19. Describe chromosomal theory of sex determination.
20. Describe male reproductive system of a man. Draw a labelled diagram of it.
21. Describe the structure of the heart of man with the help of neat labelled diagram.

IPE TS MARCH-2025
SOLUTIONS

SECTION-A

1. What is chyme? **[TS 17,19,25][AP 15, 17,23,25]**

A: 1) **Chyme:** It is the **acidic semi digested fluid food** formed in the stomach.
2) It is formed by the **churning movements** of the stomach muscles.

---

2. What is triad system? **[AP 24][TS 15,16,17, 19,20,22,25]**

A: 1) **Triad System:** The triad is a skeletal muscle with 1T-tubule and the 2 terminal Cisternae.
2) Each T tubule is flanked on either side by several terminal cisternae of the sarcoplasmic reticulum.

---

3. Name the blood vessels that enter and exit the kidney. **[TS 25]**

A: 1) The blood vessels that **enter the kidney** are **renal artery.**
2) The blood vessels that **exit the kidney** are **renal vein.**

---

4. "Colostrum is very much essential for the new born infants". Justify.[TS 16,17,18,22,25]

A: 1) **Colostrum**: **Colostrum is the first milk produced by the mother after delivery** (child birth). It has plenty of **IgA antibodies** to protect the infant from infections. **[AP 23]**
2) These antibodies are transferred from mother to the infant. It is called natural passive immunity.

---

5. Define the terms layer and broiler. **[TS 19,20,22,25] [AP 15, 17,19,24,25]**

A: 1) Layers are birds which are exclusively raised for the production of eggs.
2) Broilers are birds which are raised only for their meat. They are raised only upto 8 or 10 week and sent to market.

---

6. Write the names of any four mononuclear phagocytes. **[TS 23,25]**

A: **Mono nuclear phagocytes:**
1) Histiocytes of connective tissue
2) Kupffer cells of liver
3) Microglia in the brain
4) Osteoclasts of bone.
5) Synovial cells of synovial fluid.

7. Human skull is described as dicondylic skull. Give the reason. [TS 25]

A: The occipital bone has two condyles on either side of foramen magnum, which articulate with atlas and hence called dicondylic skull (as in amphibians).

---

8. Name the yellow mass of cells accumulated in the empty follicle after ovulation. Name the hormone secreted by it and what is its function? [TS 25] [AP MAR-16,20,23]

A: 1) After ovulation, the empty follicle is filled with **yellow mass of glandular cells** called **corpus luteum.**

2) It secretes **progesterone** which maintains pregnancy.

---

9. What is tomogram? [AP 25] [AP 22]

A: **1) Tomogram:** It is a **3-D cross sectional picture** of the part of the body seen on CAT scan. CAT scan is a medical imaging method using several beams of x-rays.

2) It is used to locate blood clots, tumors, fracture in the head, density of bones.

---

10. What is 'amniocentesis'? Name any two disorders that can be detected by amniocentesis. [TS 18, 19,20,23,25][AP 16,17,18,19,20]

A: 1) **Amniocentesis** is a diagnostic procedure to detect genetic defects in the unborn baby.

2) The disorders that can be detected are

(i) Down syndrome (ii) Edward's syndrome and (iii) Turner's syndrome.

3) In this procedure, Amniotic fluid is drawn and foetal cells are tested.

4) But, it is misused and has become a practice to know the sex of the child.

SECTION-B

11. What are the functions of liver? [TS 15, 19,20,23,25]

A: Important Functions of liver: Secretion, Synthesis , Storage, Detoxification, T-Regulation.

1) Liver secretes **Bile juice**. (It helps in the emulsification and digestion of fats).
2) Liver helps in the synthesis of **Carbohydrates.**
3) Liver helps in the synthesis of **Lipids** (cholesterol, triglycerides).
4) Liver helps in the synthesis of **Plasma proteins**

   (like albumin, globulin and blood clotting factors).
5) Liver stores **excess Glucose**, some vitamins & minerals.
6) Liver detoxifies **'Toxic substances'** that enter the gut along with food.
7) Liver removes unwanted substances and microbes through Kupffercells present in sinusoids.
8) Liver acts as a **'Thermo regulatory organ'** (keeps the same temperature in the body).
9) Liver performs **Deamination** and **formation of urea** via ornithine cycle.
10) Liver acts as a **Haemopoietic organ** (produces RBC) in foetus .
11) Liver acts as **Erythroclastic organ** (destructs aged RBC) in adults.

---

12. Explain Darwin's theory of Natural Selection with industrial melanism as an experimental proof. [AP 16,17,18,23,24,25][TS 15,16,17,19,25]

A:
1) Darwin's theory of natural selection explains that nature has its own way to eliminate the organisms which cannot survive.
2) 'Natural selection of darker forms' due to Industrial pollution is known as 'industrial melanism'.
3) 'Peppered moth' is taken as a scientific example to epxlain this.
4) These moths were available in two colours grey and black.
5) Grey moths were abundant before industrial revolution in all over England.
6) Pollution from industries in the form of soot turned barks of trees into black.
7) So grey moths were easily identified and were more predated by birds.
8) Thus grey moths decreased in number, black moths increased in the population.

13. Explain the different types of cancers. **[AP 18,24][TS 15,17,18,19,24,25]**

A: Based on the origin, cancers are classified as follows:

1) **Sarcoma:** Cancer of **connective tissue.**

2) **Sporadic cancer:** Cancers that occur **without any family history.**

3) Carcinoma: Cancer of **epithelia tissue** or cells. It is the **most common type of cancer.**

4) **Lymphoma:** Cancer of **Lymphatic system**

5) **Leukemia:** A **liquid tumor**. It is the cancer of bone marrow resulting unrestricted production of W.B.C [Leukemia- blood cancer]

6) **Familial cancer:** Cancers that are **inherited from parents or grand parents.**

---

14. Explain how hypothyroidism and hyperthyroidism can affect the body.

A: I) Hypothyroidism: **[TS 16,25][AP 17,16,22]**

1) It is due to **hyposecretion(low)** of **Thyroid hormones T3 & T4.**

2) It is characterized by enlargement of the thyroid gland called as simple goiter.

3) Inadequate supply of iodine or impairment in the thyroid glands leads to this condition.

4) Untreated congenital hypothyroidism leads to thyroid dwarf-characterized by stunted growth, mental retardation, low IQ, abnormal skin, deafness, mutism etc.

5) Hypothyroidism in adults results in myxoedema characterized by lethargy, mental impairment, puffiness of face, dry skin etc.

II) Hyperthyroidism:

1) It is due to **hypersecretion(abnormally high)** of **Thyroid hormones T3 & T4.**

2) Over activity of thyroid is also due to cancer of the gland.

3) In adults, it causes exophthalamic goiter characterised by protruded eye balls.

4) It also effects the physiology of the body, like increased Body Metabolic Rate.

15. Describe erythroblastosis foetalis. **[TS 17,25] [AP 16,17,19,22,23]**

A: 1) **Erythroblastosis foetalis (Haemolytic disease) is an alloimmune condition** that develops in an Rh positive foetus, whose father is Rh positive and mother is Rh negative.

2) The genetic consequence in this marriage is the Rh incompatibility between the mother (Rh^-) and the growing foetus(Rh^+)

3) At the time of delivery, the Rh^+ blood cells may enter the mother's blood through ruptured placenta.

4) Mother's immunity system is sensitized and Anti Rh antibodies are produced.

5) The first child is safe because delivery is over and antibody formation in mother takes time.

6) During the second pregnancy, if the second child is Rh positive, these antibodies cross the placental border and enter the foetal blood circulation. The blood cells of the Rh positive foetus are destroyed causing HDN(Haemolytic Disease of New born)

7) To compensate loss of cells, foetal hemopoietic system releases erythroblasts (early stage of RBC) into circulation. That is why this disease is called erythroblastosis foetalis.

8) Now a days the mother is given anti D (anti Rh anti bodies), when she is pregnant which prevent the formation of antibodies during pregnancy i.e., to prevent sensitization of mother's immunity system.

---

16. Explain the process of inspiration and expiration under normal conditions.

A: I) Inspiration: **[TS MAR-15,22,24,25]**

1) **Intake of atmospheric air into the lungs** is called Inspiration. It is an **active process**.

2) It takes place by the **contraction of diaphragm muscles**.

3) Contraction of external intercostal muscles raise the ribs side ways and increase the thoracic volume in dorso-ventral axis.

4) When the ribs and diaphragm are drawn out they pull the pleural membrane attached to lungs.

5) Then the pressure inside the lungs decreases than that of the atmosphere.

II) Expiration:

1) Sending out air from lungs is called expiration. It is a **passive process**.

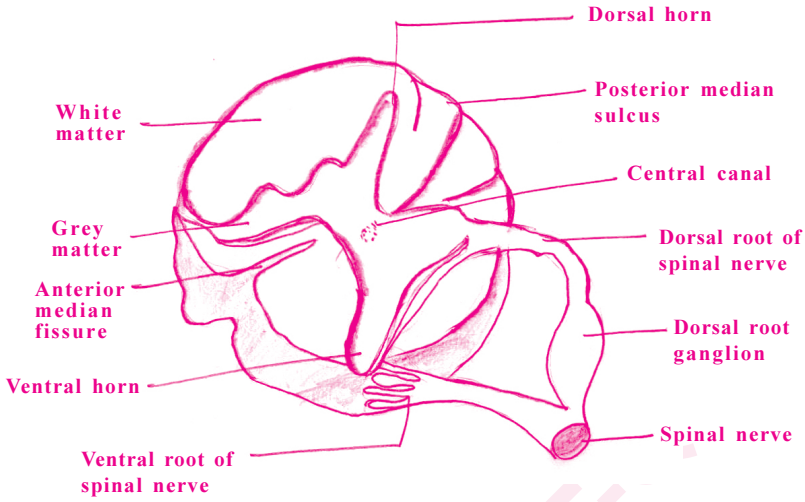
2) During Expiration, the external intercostal muscles and muscles of diaphragm **relax.**

3) Then the volume of the thoracic cavity is reduced.

4) The air is forced out through air passages.

17. Draw a labelled diagram of the T.S of the spinal cord of man. [TS MAR-23,25][TS MAY-22]

A:



T.S. of spinal cord

---

18. Distinguish between homologous and analogous organs.

[TS 15,17,18,19,24,25][AP 15,17,18,19,23,24,25]

A: Homologous and Analogous organs are evidences of evolution from comparative anatomy.

Homologous organs	Analogous organs
1) The organs which have similar structure and origin but not necessarily the same function are called homologous organs.	1) The organs which have different origin but have same function are analogous organs.
2) They suggest divergent evolution.	2) They suggest convergent evolution.
3) **Ex:** The forelimbs of vertebrates, Flipper of Whale, wings of birds, hand of man and wings of bat	3) **Ex:** Wings of butterfly and wings of birds.
4) All these organs have same arrangement of bones but their functions vary to suit their mode of life.	4) When the animals live in same habitat and lead a similar mode of life they tend to have same body form.

SECTION-C

19. Describe chromosomal theory of sex determination. [TS 17, 17, 19,20,23,25]

A: Chromosomal theory of Sex determination:

In most of the animals, a pair of chromosomes are responsible for the determination of sex. These two chromosomes are called **sex chromosomes (or allosomes).**

The two different chromosomes in the pair are X-chromosome & Y- chromosome

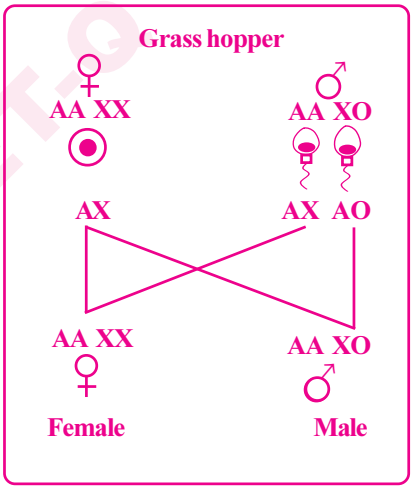
There are two types of sex chromosomal mechanism methods:

I) Male Heterogametic method **II) Female Heterogametic method**

I) Male Heterogametic method: In this type, the female has two 'X' chromosomes and the male has only a single 'X' chromosome.

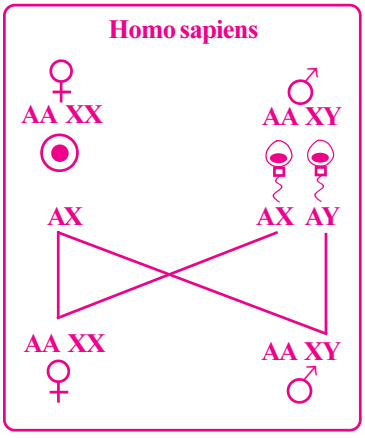
This is of two types: (1) XX-XO (2) XX-XY

1) XX-XO type:



(i) It is found in grass hoppers.
(ii) Karyotype of female is AAXX and Karyotype of male is AAXO.
(iii) Females have two X chromosomes and males have only one X chromosome.
(iv) Unpaired X chromosome determines the sex of offspring.
(v) The sperms are two types. 50% of sperms have AX complement and other 50% have only A complement.
(vi) All the ova contains AX chromosomes.
(vii) The sex of the offspring is decided by the sperm that fertilizes the ovum.
(viii) If AX sperm is fertilised the child will be female
(ix) If AO sperm is fertilised the child will be male.

2) XX-XY type:



(i) It is found in human beings .
(ii) Female is homogametic with Karyo type AAXX
Male is hetero gametic with Karyotype AAXY
(iii) Females have 2 'X chromosomes &
Males have 1'X' chromosome & 1 'Y' chromosome.
(iv) 'Y' chromosome determines the sex of offspring.
(v) 50% of sperms are AX and other 50% are AY.
(vi) All the ova contains AX chromosomes.
(vii) The sex of the offspring is determined by the sperm that fertilizes the ovum.
(viii) If AX sperm is fertilized the child will be female (AAXX)
(ix) If AY sperm is fertilized the child will be male (AAXY)

20. Describe male reproductive system of a man. Draw a labelled diagram of it.

A: MALE REPRODUCTIVE SYSTEM: [AP 16,17,18,20,23,24][TS 16,17,18,19,22,24]

Male Reproductive system consists of 6 parts:

I) Testes II) Epididymis III)Vasa deferentia IV) Urethra V)Penis VI) Accessory Glands

I) Testes (Testicles):

(1) Testes are a pair of oval pinkish **male primary sex organs.**

(2) They are suspended outside the abdominal cavity within a **pouch** called **scrotum.**

(3) The scrotum is connected to abdominal cavity through inguinal canal.

(4) Spermatic cord is formed by the blood vessels, nerve and vas deferens.

(5) Tunica albuginea project inside the testis as septa.

(6) There are about 250 testiscular lobules in each testis.

(7) Each lobule contains 2 or 3 highly coiled seminiferous tubules.

(8) Each seminiferous tubules consists of germinal epithelium and sertoli cells.

(9) Germinal epithelium produces sperms.

(10) Sertoli cells nourish the sperms.

(11) Regions outside the seminiferous tubules are called interstitial spaces which contain Leydig cells.

(12) They produce male hormone testosterone called **androgens.**

(13) Testosterone controls the development of secondary sexual characters and spermatogenes.

(14) Seminiferous tubules open in rete testis. Rete testis opens into vasa efferentia.

(15) Vasa efferential open into a highly coiled epididymis.

II) Epididymis :

(1) It is a **narrow tightly coiled tube** located along **posterior** surface of each testis.

(2) Vasa efferentia leave the testis and open into epididymis .

(3) **Epididymis** provides space for **maturation** and **storage of sperms**.

(4) Epididymis is divided into 3 regions
(i) caput epididymis (ii) corpus epididymis and (iii) cauda epididymis.

(5) Caput epididymis receives the sperms from the testis through vasa efferentia.

III) Vasa deferentia:

(1) The Vasa deferentia is a long, narrow, muscular tube.

(2) It starts from the tail of the epididymis, passes through the inguinal canal into the abdomen and loops over the urinary bladder.

(3) The two ducts open into urethra at the centre of the prostate gland.

IV) Urethra:

(1) The **urethra originates from the urinary bladder** and extends through the penis to its external opening called urethral meatus.

(2) The **urethra** provides an **exit for urine** as well as for semen during ejaculation.

(3) Urethra is shared terminal duct of the reproductive and urinary systems.

(4) Urethra is the urinogenital duct of man which passes through penis to open outside.

V) Penis:

(1) The penis serves as a **urinal duct.**

(2) It is the **intromittent organ** that transfers spermatozoa to the vagina of a female.

(3) It has **3 columns of tissue**. Two upper **corpora cavernosa** and **one ventral corpus spongiosum.**

(4) Skin and a subcutaneous layer enclose all three columns, which consist of special tissue.

(5) It helps in erection of the penis to facilitate insemination.

(6) The terminal enlarge part is glans penis covered by loose skin(fore skin) called **prepuce.**

VI) Male accessory genital glands:

(1) Seminal vesicles:

(i) A pair of simple tubular glands is present below the urinary bladder. Each seminal vesicle opens into the corresponding vas deference.

(ii) Its secretion constitutes 60% of total seminal fluid. It is alkaline and viscous fluid.

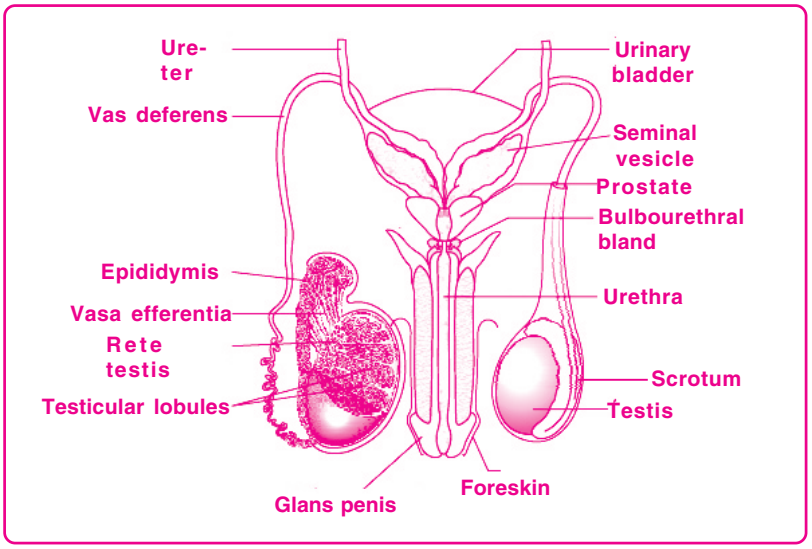
(iii) **Fructose acts as the main energy source of the sperm.**

(2) Prostate gland: (i) It is present below the urinary bladder. Its contribution to seminal fluid is 15-30%. (ii) Its secretion is **slightly acid** . It **activates the sperms** and provides nutrition.

(3) Bulbourethral glands:

(i) These are present below the prostate gland. They add an alkaline fluid to semen during the process of ejaculation.

(ii) The fluid secreted by these glands **lubricates the urethra.**



STRUCTURE OF MALE REPRODUCTIVE SYSTEM

21. Describe the structure of the heart of man with the help of neat labelled diagram.

[AP 18,22,23,24,25][TS 17,16,19,20,22]

A: Structure of the Human heart: Human heart is a hollow muscular, cone shaped and pulsating organ situated betweeen lungs. Its size is about a clenched fist.

Human heart consists of 4 parts:

I) Pericardium II) Heart wall III) External Structure IV) Internal Structure

I) Pericardium: Heart is covered by **double walled pericardium**. The outer layer is fibrous pericardium and inner layer is serous pericardium. In between these two layers, there is **pericardial fluid** which reduces friction and allows free movement of the heart.

II) Heart wall: It consists of 3 layers.

(1) Outer epicardium (2)Middle myocardium (3)Inner endocardium.

III) External Structure : Human heart has four chambers.

(1) Two small upper chambers are called **atria** (L.A & R.A)

(2) Two large lower chambers are called **ventricles** (L.V & R.V)

(3) Atria and ventricles are separated by a deep transverse groove called **coronary sulcus**.

(4) The ventricles are separated by two inter ventricular grooves, in which the coronary arteries and their branches are located.

IV) Internal structure: 1) Atria 2) Ventricles 3) Nodal tissue 4) Aortic arches.

(1) Atria:

(i) Atria are thin walled **blood receiving chambers**. The right one is larger than the left.

(ii) The two atria are separated by thin **inter-atrial septum**.

(iii) Atria and ventricles are separated by a membrane called atrio -ventricular septum.

(iv) In the foetal heart, the atrial septum has a small pore called **foramen ovale**.

(v) In adults, **fossa ovalis** is present in the inter atrial septum

(vi) Bicuspid valve is in between L.A & L.V.

(vii) Tricuspid valve is in between R.A & R.V.

(2) Ventricles :

(i) These are thick walled blood 'pumping chambers' (lower chambers)

(ii) The two ventricles are separated by an **interventricular septum.**

(iii) The wall of the left ventricle is thicker than the right ventricle

(iv) The inner surface of the ventricles is raised into muscular ridges called **columnae carneae.**

(v) Some of these ridges are large and conical, and are called **papillary muscles**.

(vi) **Chordae tendineae** are collagenous cords that connect papillary muscles to the tricuspid valve and the bicuspid valve in the heart .

(3) Nodal tissue (Pacemaker):

(i) It is a **modified heart muscle**. It consists of **two nodes SAN, AVN** and **fibres**.

(ii) **SAN(SinoAtrial Node)** is located in the 'right upper corner of right atrium', (close to the opening of superior venacava.)

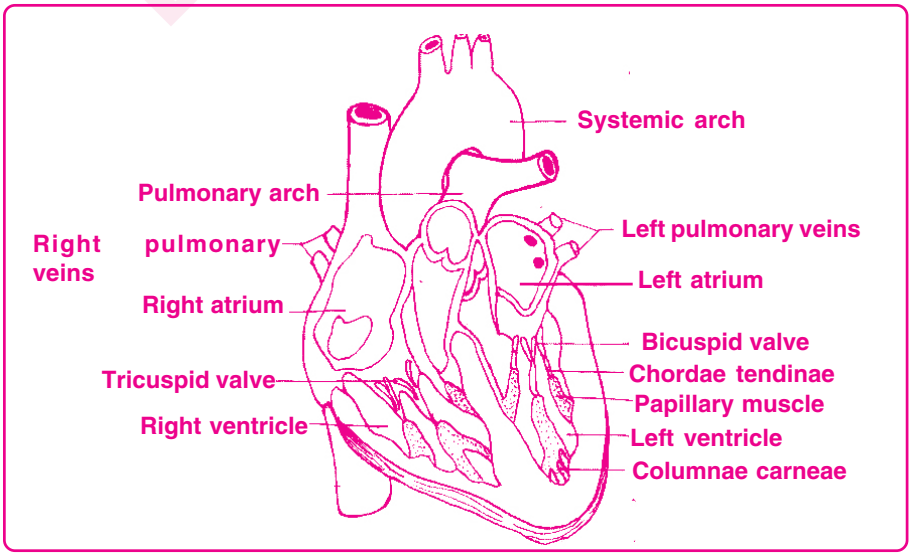
(iii) **AVN** (AtrioVentricular Node) is located in the 'lower left corner of the right atrium', (close to the opening of coronary sinus.)

(iv) AVN forms AV bundle or "His" bundle. It is divided into right and left bundle branches.

(4) Aortic arches: There are two aortic arches in man.

(i) Pulmonary Arch: It arises from the left anterior angle of the right ventricle. Its opening is guarded by the pulmonary valve and it carries deoxygenated blood to the lungs.

(ii) Systemic Arch: It arises from the left ventricle. Its opening is guarded by the aortic valve. It transports oxygenated blood to different parts of the body through its branches.



INTERNAL STRUCTURE OF THE HEART