



Important Instructions to examiners:

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills.)
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.



Q. No	Sub Q.N.	Answer	Marking Scheme
Q1		Attempt Any TEN of the following	20
	a)	Write any two function of blood. Ans : a) It transports oxygen and nutrients to various tissues. b) It transports waste products to organs of excretion. c) It carries hormones from endocrine glands to various tissues. d) It redistributes water from one part of body to the other. e) It contains antibodies and white blood cells which protects the body from diseases. f) Clotting of blood protects against hemorrhage.	02
	b)	List the instrument related to heart. Ans: (any two) 1. ECG machine. 2. Defibrillator. 3. Pacemaker. 4. Heart lung machine. 5. Heart rate meter. 6. Phonocardiograph. 7. Sphygmomanometer.	02
	c)	Name different organs of digestive system. Ans : (any four) 1. Mouth. 2. Pharynx. 3. Oesophagus. 4. Stomach. 5. Small intestine. 6. Large intestine. 7. Rectum. 8. Anus.	02
	d)	Identify the instrument related Respiratory system. Ans : (any two) 1. Spirometer. 2. Ventilator. 3. Respiration rate meter. 4. X-ray. 5. Nebulizer.	02
	e)	Write any two function of kidney. Ans : 1) To secrete and excrete urine. 2) Excretion of excess Sault. 3) Excretion of harmful substances drugs and toxins. 4) Regulation of PH of blood.	02



f)	Give two function of joint. Ans : 1. It allows movement in one direction only. 2. It allows rotational movement such as elbow. 3. It gives gliding movement. 4. Two pairs of articular surfaces allow movement in one direction only. For ex Knee.	02
g)	List instruments related to Nervous system. Ans: (any two) 1. Electroencephalograph 2. CT 3. MRI 4. Nerve muscle stimulator. 5. X-ray	02
h)	Write any two function of Skeletal muscle. Ans : 1)They give shape, form and appearance to the body. 2) They protects the vital organ of the body. 3)They keep the joints in proper position 4)They produce movements of the body. 5)They help in venous return and lymphatic drainage.	02
i)	Define Blood pressure. Write normal value of blood pressure in adult. Ans: Blood pressure : It is the force or pressure that the blood exerts on the walls of blood vessels. Normal value of blood pressure in adults : 1) Systolic blood pressure : 100 to 120 mm Hg 2) Diastolic blood pressure : 60 to 80 mm Hg.	01 01
j)	List any two function of skin. Ans : 1) Protection of underlying structures from injury. 2) Excretion of salts like sodium chloride and metabolites like urea. 3) Provides sensation which gives the awareness of environment. 4) Secretion of sweat and sebum. 5) Regulation of body temperature. 6) Synthesis of vitamin D from ergosterol of skin by the action of UV rays of sun.	02
k)	List the Endocrine glands. Ans: (any four) 1. Pineal gland 2. Pituitary gland 3. Pancreas 4. Ovaries 5. Testes 6. Thyroid gland 7. Parathyroid gland, 8. Hypothalamus and 9. Adrenal glands.	02

l)	<p>Write any two functions of ear.</p> <p>Ans:</p> <p>Functions of ear :</p> <ul style="list-style-type: none"> - It detect, transmit and transduce sound to the brain. - It maintain our sense of balance. 	02
m)	<p>State the function of retina.</p> <p>Ans:</p> <p>Function of retina :</p> <ul style="list-style-type: none"> - It capture and convert light rays into electric signals. These signals then travel to the brain through the optic nerve where they are converted into the images we see. - It also allow the eye to identify color. 	02
n)	<p>List any two instrument related to urinary system.</p> <p>Ans:</p> <ol style="list-style-type: none"> 1. Cystoscopy 2. Ureteroscopy 3. Dialysis machine 4. Urinary catheters 5. Ultrasound 	02
Q2	<p>Attempt any <u>FOUR</u> of the following:</p> <p>a) Draw the structure of cell and mention organelles of cell.</p> <p>Ans :</p> <div style="text-align: center; margin: 10px 0;"> </div> <p style="text-align: center;">Fig : Structure of Cell</p> <p>Living things are made of cells. Some organisms consist of just one cell, while others are made of trillions of cells. Each one of these cells functions as a tiny factory, with individual parts that work together to keep the cell alive and, in turn, keep the organism going. These parts are called organelles.</p> <ul style="list-style-type: none"> • Cell membrane: Separates the cell from outside environment, Selectively permeable • Cell wall : Additional support, protection , Gives cell its shape • Nucleus: Controls cell activities • Nuclear membrane/ Envelope: Allows material to move into & out of Nucleus (RNA pass through pores) • Nucleolus: Assembly of ribosome's take place here • Cytoplasm: Chemical reactions take place here • Ribosome: Site of protein synthesis. • Golgi Apparatus: Sorts & packs protein into vesicle & transports them. • Lysosome: Digests food, bacteria, worn out organelle. 	16

b) **Classify the joints.**

Ans :

Joints are classified as: –

1. Fibrous:

The bones of fibrous joints are joined by fibrous tissue, such as the sutures in the skull or the pelvis. Fibrous joints allow no movement at all. Ex: Teeth

2. Cartilaginous:

The bones of cartilaginous joints are joined by cartilage, such as the sternocostal joint between the sternum and first rib. These joints allow a very small amount of movement. Ex: Vertebrae in the spine.

3. Synovial :

Ex: Elbow/Knee, Top of the neck (atlas and axis bones), Shoulder/Hip, Wrist/MCP & MTP joints, metacarpal joints.

04

c) **Describe anatomy of Heart with a neat labeled diagram.**

Ans:

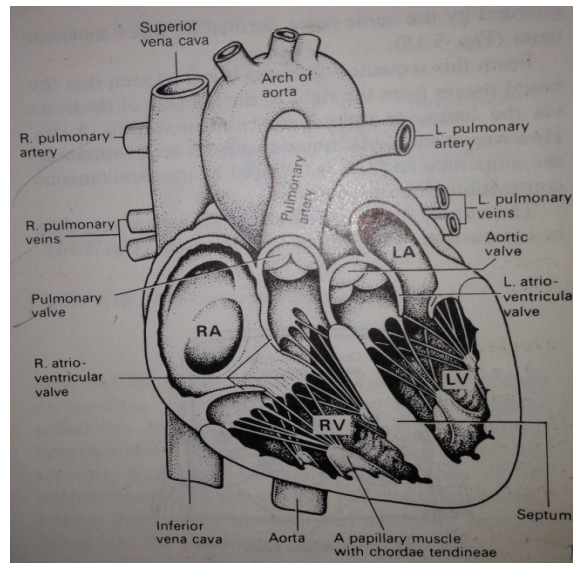


Fig: The Heart

The human heart is a four-chambered muscular organ, shaped and sized roughly like a man's closed fist with two-thirds of the mass to the left of midline.

The heart is enclosed in a pericardial sac that is lined with the parietal layers of a serous membrane. The visceral layer of the serous membrane forms the epicardium. Three layers of tissue form the heart wall. The outer layer of the heart wall is the epicardium, the middle layer is the myocardium, and the inner layer is the endocardium. The internal cavity of the heart is divided into four chambers:

- Right atrium
- Right ventricle
- Left atrium
- Left ventricle

The two atria are thin-walled chambers that receive blood from the veins. The two ventricles are thick-walled chambers that forcefully pump blood out of the heart. Differences in thickness of the heart chamber walls are due to variations in the amount of myocardium present, which reflects the amount of force each chamber is required to generate. The right atrium receives deoxygenated blood from systemic veins; the left atrium receives oxygenated blood from the pulmonary.

02

02



d) **Mention the juices secreted by digestive organs and their function.**

Ans :

The five major organs that secrete digestive juices are the salivary glands, stomach pancreas, liver and small intestine.

- Salivary Glands :

The main salivary glands are found in the cheeks, under the tongue and around the jaw. They secrete about 1 quart of saliva each day.

Function of saliva :

1. Amylase, also called ptyalin, is an enzyme in saliva that breaks down carbohydrates.

Carbohydrates are found in foods like bread and rice.

2. Lysozyme is another salivary enzyme, which helps to keep the mouth free from germs.

3. Saliva also contains mucus, which coats the food and enables each bite to travel smoothly through the digestive tract.

- Stomach :

Gastric juices are secreted from glands lining the stomach.

Function of Gastric juices:

1. To break down food in the stomach and kill bacteria.

2. The gastric juices break down the food in the stomach.

3. This nutrient is passed into the small intestine for further digestion and absorption to occur.

4. Gastric juices allow the body to absorb B-12.

5. A necessary nutrient for nervous system function and the production of blood cells.

6. Gastric juice excretes toxins, heavy metals and certain drugs like opium.

- Pancreas :

1. Pancreatic fluid contains digestive enzymes that help to further break down the carbohydrates, proteins, and lipids in the chyme.

2. It makes “enzymes to digest proteins, fats, and carbs in the intestines” and produces the hormones insulin and glucagon.

- Liver :

Functions of Bile Juice

1. The liver produces a greenish juice called bile, which is stored and concentrated by the gall bladder.

2. Function of bile juice.

3. It stimulates the functions of the proteolytic enzymes and Amylase.

4. It dissolves fatty acid, and glycerol.

5. It coordinates with lipase to convert the fat into fatty acids.

6. It helps in the absorption of the fatty acids and glycerol.

7. With the help of other digestive juices it neutralizes the acidic nature of food.

- Small intestine.

1. MALTASE digest maltose to glucose

2. SUCRASE digests sucrose to glucose and fructose.

3. LACTASES digest lactose to glucose and galactose.

4. LIPASE digests fats to fatty acids.

5. PEPTIDASES digest small peptides to single amino acids.

04

e) Describe the anatomy of urinary system with a neat labeled diagram.

Ans :

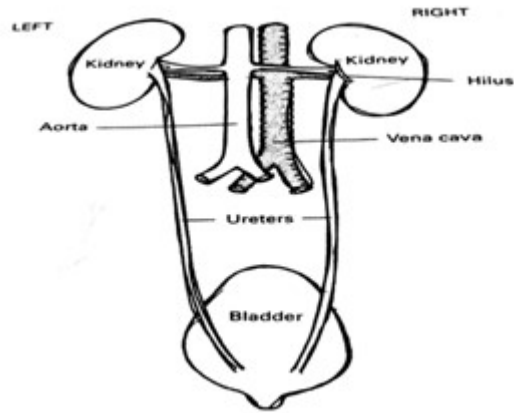


Fig: The urinary System

The urinary system, also known as the renal system, consists of the two kidneys, ureters, the bladder, and the urethra. Each kidney consists of millions of functional units called nephrons. The purpose of the renal system is to eliminate wastes from the body, regulate blood volume and pressure, control levels of electrolytes and metabolites, and regulate blood pH. The kidneys have extensive blood supply via the renal arteries which leave the kidneys via the renal vein. Following filtration of blood and further processing, wastes (in the form of urine) exit the kidney via the ureters, tubes made of smooth muscle fibers that propel urine towards the urinary bladder, where it is stored and subsequently expelled from the body by urination(voiding). The female and male urinary system are very similar, differing only in the length of the urethra.

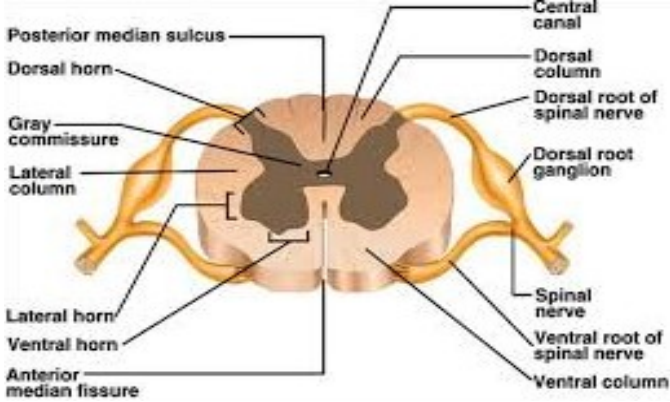
Urine is formed in the kidneys through a filtration of blood. The urine is then passed through the ureters to the bladder, where it is stored. During urination (peeing) the urine is passed from the bladder through the urethra to the outside of the body.

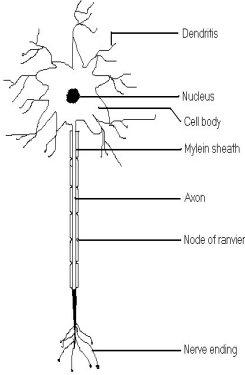
About 1-2 litres of urine are produced every day in a healthy human, although this amount may vary according to circumstances such as fluid intake.

The urinary system refers to structures which conduct urine, formed in the nephrons of the kidney, to the point of its excretion. There are two kidneys in the human body, on the right and the left. Urine begins to be created within a nephron, which is a small unit within the kidney. It travels through the structures of the nephron and into the collecting duct system, which is a system of larger vessels within the kidney. The collecting ducts join together to form calyces and ultimately major calyces, larger and larger ducts. These drains into a structure called the pelvis of the kidney, and enter the ureter. The ureter is a tube-like structure which carries the urine from the kidneys to the bladder. The ureters enter the bladder from within the bladder. Urine collected in the bladder is discharged through the urethra, which ends at the external urethral orifice.

02

02

	<p>f) Describe the structure of Spinal cord. Ans :</p>  <p>The spinal cord works a bit like a telephone switchboard operator, helping the brain communicate with different parts of the body, and vice versa. Its three major roles are:</p> <ul style="list-style-type: none"> • To relay messages from the brain to different parts of the body (usually a muscle) in order to perform an action • To pass along messages from sensory receptors (found all over the body) to the brain • To coordinate reflexes (quick responses to outside stimuli) that doesn't go through the brain and are managed by the spinal cord alone. 	04
Q3	<p>Attempt any <u>FOUR</u> of the following:</p>	16
	<p>a) Name the different types of tissue. Ans: Different types of tissue are as follows :</p> <ol style="list-style-type: none"> 1) Epithelial tissue 2) Connective tissue 3) Muscular tissue 4) Nervous tissue 	04
	<p>b) Describe the conduction system of heart. Ans:</p> <p>The cardiac conduction system is group of specialized cardiac muscle cell in the walls of the heart that send signals to the heart muscle causing it to contract. The main components of the cardiac system are the SA node, AV node, bundle of His, bundle branches and purkinje fibers. The SA node starts the sequence by causing the arterial muscle to contracts. From there signal travels to the AV node, through bundle of His, down the bundle branches, and through the purkinje fibers, causing the ventricles to contracts. This signal creates an electrical current that can be seen on graph called an Electrocardiograph.</p>	04
	<p>c) Describe gas exchange in lungs. Ans:</p> <p>Exchange of gases takes place at alveoli because of pressure of oxygen is more in inspiratory air, exchange of gases & diffusion process according to pressure law. Oxygen present in inspired air diffused and equalizes it with quantity present in deoxygenated blood, in the same way diffusion of carbon dioxide takes place more quantity diffused along with lower quantity of Co₂ in inspired air.</p>	04

d)	<p>List any four instruments related to Digestive system and write its function.</p> <p>Ans : The instruments related to digestive system are :</p> <ol style="list-style-type: none"> 1. Endoscope: The term endoscopy is used to refer to an examination of the upper part of the gastrointestinal tract. 2. X-ray-The tests utilize barium or an iodine-containing agent that allows visualization of the digestive tract and a form of X-ray machine called fluoroscopy. 3. Colonoscopy: This instrument used for examining the colon or large intestine. 4. CT: CT images within a range that is useful for the assessment of diseases of digestive system. 5. Ultrasound: Ultrasonography is most commonly used in the upper digestive tract and in the respiratory system. 6. MRI: magnetic resonance imaging (MRI) to obtain pictures of the bile ducts. 	04
e)	<p>Draw the structure of neuron and describe it.</p> <p>Ans : Neurons is a basic unit of nervous system. It has large cell body and size is varying according to the position and function. Each cell has clearly defined nucleus and protoplasm. The cell has several process called dendrites and axons. Dendrites are short branches through which impulses are enters to the cell. Axons are cylindrical single part or fiber through which impulses are passes out of cell. Axons are measuring about few millimeters to meters centimeters and continuous to the termination of cell.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Fig : Structure of Neuron</p>	02 02
f)	<p>Give anatomy of Eye with a sketch.</p> <p>Ans : Eye is the organ of vision or sight its function is to focus image on retina where retina is composed of nervous tissues which refers signals generated by light to the brain its vision centre.</p> <p>Structure of Eye : Eyes are spherical organs lies within fat. It has three coats (layers)</p> <ol style="list-style-type: none"> a) Outer fibrous coat b) Vascular pigmented coat c) Inner nervous coat 	02

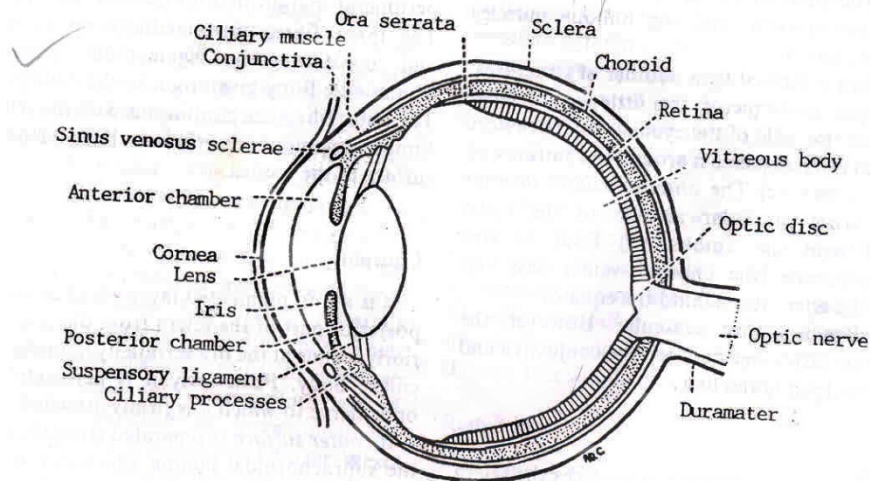


Fig. 19.1. Sagittal section through the eyeball.

A) Fibrous coat –

It has two parts Sclera and Cornea

- a) **Sclera** – It is a posterior part, firm membrane which maintains shape of eyeball. It is white in colour and forming white part of eye. Anteriorly covered with conjunctiva which is protective covering which reflect over inner side of eyelids.
- b) **Cornea** – It is anterior fibrous coat projects little outside from spherical shape of eyeball. It is transparent covering which allows passing light rays inside eye by bending to focus on retina.

B) Vascular , pigmented coat –

It has three part Choroid, Ciliary body and Aqueous humour

- a) **Choroid** – It lines front part of eyeball, dark brown in colour and provides blood to other part of eye particularly to the retina.
- b) **Ciliary body** – It is a thickened part of middle coat consists of muscular and glandular tissues, ciliary muscles controls shape of lens. These are also known as muscles of accommodation. Ciliary glands produces watery fluid.
- c) **Aqueous humour** – It lies in front of lens and passes veins through angle formed by Iris and Cornea.

Iris is coloured part eye lies between cornea and lens and divides space between anterior and posterior chambers. It contains muscular tissue arranged in circular and radiating fibres which helps to constrict pupils.

C) Inner, nervous coat –

Inner lining coat is called as retina. It is made by rods and cones. Rods are more numerous around outer edge of retina and sensitive to the movements of object within field of vision and cones are located in centre, they are responsible to vision and colour identification.

Rods consist of pigments called visual purple which synthesized by Vit-A, Deficiency of vit.-causes night blindness.

Optic nerve leaves the area of eye is called optic disc and area which is insensitive to the light is called blind area or blind spot.

CONTENTS OF EYE

- Eyes consist of
- Aqueous humour
 - Vitreous humour
 - Lens



	<p><u>Aqueous humour</u> - It is the front part of eye lies in front of lens which divides by iris in to anterior and posterior chamber. Which consist of muscular fibres by their contraction and relaxation they allow to enter light rays to focus on retina. When light rays are more it will constrict to pass limited required rays to focus on retina and on less it dilates to allow rays to focus on retina.</p> <p><u>Vitreous humour</u> – It is colourless, transparent jelly substance which lies of posterior part of lens which maintains shape eyeball.</p> <p><u>Lens</u> – It is situated immediately behind iris. It is transparent biconcave body lies within capsule which adherent to the ciliary muscles and ciliary body called suspensory ligaments which helps to pull lens and maintains shape for near or far vision.</p> <p><u>Functions-</u></p> <ul style="list-style-type: none">a) Formation of imageb) Identification of coloursc) Displacement of eyeball to form image.	
Q4	Attempt any <u>Four</u> of the following:	16
a)	<p>Classify the blood groups and describe it. Ans : There are four major blood groups determined by the presence or absence of two antigens – A and B – on the surface of red blood cells: Group A – has only the A antigen on red cells (and B antibody in the plasma) Group B – has only the B antigen on red cells (and An antibody in the plasma) Group AB – has both A and B antigens on red cells (but neither A nor B antibody in the plasma) Group O – has neither A nor B antigens on red cells (but both A and B antibody are in the plasma) Universal donor: Type O– blood is considered the “universal donor” because it can be donated to people of any blood type. Universal recipient: Type AB+ blood is considered the “universal recipient” because people with this type can receive any blood type.</p>	04
b)	<p>Mention functions of bone. Ans : (any four) Function of bones.</p> <ol style="list-style-type: none">1. They form supporting framework for the body.2. They give protection to vital organs.3. They form blood cells in red bone marrow in cancellous bone.4. They form joints which are essential for the movement of the body.5. They provide attachment to the voluntary muscle. This helps in the movements of joints.6. Bones serve as a reservoir for calcium and phosphorus, essential minerals for various cellular activities throughout the body.	04



	<p>c) State properties of cardiac muscle. Ans : (any four)</p> <p>1) Contractility: by contraction of the cardiac muscle the heart pumps the blood out of its chamber.</p> <p>2) Conductivity: The impulses for cardiac contraction are conveyed through specialized conduction system.</p> <p>3) Rhythm city: The heart muscle has the inherent property of rhythmic contraction. Cardiac contraction occurs in a regular faction. The two atria and ventricles contracts alternately.</p> <p>4) Refractory Period: during systole the heart does not respond to any other stimuli, however strong it may be. This is called as refractory period.</p>	<p>04</p>
	<p>d) Explain the mechanism of respiration. Ans :</p> <p>The main purpose of respiration is to provide constant supply of oxygen to the cells of the body and removal of carbon dioxide produced by cellular activity. The three basic processes of respiration are</p> <p>1. Pulmonary ventilation 2. External respiration 3. Internal respiration</p> <p>1. Pulmonary ventilation consists of three phases :</p> <ul style="list-style-type: none">- Inspiration (breathing in)- Expiration (breathing out)- Pauses <p>Inspiration means breathing in the air through the nose and mouth during breathing .Air then passes through the trachea into the lungs and finally it lows to alveoli. The process is initiated by muscular contraction. Here the diaphragm and external intercostals muscles get contracted. This results in expansion of thoracic cavity. This increase in lung volume causes rushing of atmospheric air into the lungs. Air inhaled through trachea, finally flows to alveoli in lungs. Alveoli comes in direct contact with blood in capillaries. Oxygen passes across this membrane and is taken up by the hemoglobin of red blood cells and called pure blood this is pumped in arteries to all parts of body The exchange of gases between alveoli and blood capillaries surrounding ,is termed as external respiration.</p> <p>Internal respiration: At completion of the external respiration ,pure blood reaches heart and pumped out from left ventricle to the aorta and finally to tissue cells through the systemic arteries. The exchanges of gases between tissue blood capillaries and tissue cell is termed as internal respiration. Because of difference in partial pressures, oxygen diffuses from blood to cells whereas carbon dioxide from tissue to blood till equilibrium is reached. Thus this deoxygenated blood from tissue capillaries enters t o heart, from heart it is pumped to lungs for purification by external respiration</p>	<p>04</p>
	<p>e) Enlist hormones secreted by male reproductive organs with function of each. Ans : (any 2)</p> <p>The male reproductive system depends upon the action of many different hormones or chemicals, produced by various body glands and enter systemic circulation. Some of these hormones, called "tropic" hormones, cause other hormones to release. Other hormones have direct effects upon organs or body systems, emotions and production of semen. Unlike women, men don't experience cyclic hormone fluctuation throughout the month--instead, their hormone levels stay relatively constant throughout their reproductive years.</p>	<p>04</p>



- Gonadotropin-Releasing Hormone :

Something of a "master" hormone, Gonadotropin-Releasing Hormone (GnRH) is a tropic hormone produced by a part of the brain called the hypothalamus. While GnRH isn't directly responsible for male sexual behavior or characteristics, it nevertheless proves incredibly important, because it causes the release of two other hormones of the male reproductive system.

- Follicle-Stimulating Hormone :

Produced in a part of the brain called the anterior pituitary, follicle-stimulating hormone (FSH) proves active in both male and female reproductive systems. The name comes from the hormone's action in females---males don't produce follicles---but the same hormone responsible for development of a mature egg in women stimulates the production of sperm in the testes of men. FSH is released in response to the stimulation of the anterior pituitary by GnRH.

- Luteinizing Hormone :

Like FSH, luteinizing hormone (LH) is released by the anterior pituitary in response to the action of GnRH. Also like FSH, LH is produced by women as well and named for its action in the female reproductive cycle. In men, LH causes the interstitial cells of the testes to produce the hormone testosterone.

- Testosterone :

Made in the testes, testosterone enters systemic circulation in relatively constant concentrations in a healthy, reproductive-age male. This hormone produces and maintains the secondary sexual characteristics of the male---enhanced musculature, facial and body hair, thickened larynx and deepened voice and enlargement of the genitals. It's also responsible for the sex drive and works with FSH to stimulate the production of sperm.

- Inhibin :

The hormone inhibin is produced by cells in the testes that are responsible for monitoring the health and maturation of sperm. If sperm levels are high, making nutrients for the developing sperm scarce, the testes release inhibin. The inhibin travels through the bloodstream to the brain, where it prevents the secretion of GnRH. In the absence of GnRH, FSH and LH levels fall and sperm production slows. This is one of the major mechanisms whereby male hormones are maintained at relatively constant concentration.

f) Describe central nervous system with suitable diagram.

Ans:-

The Central nervous system consists of brain present in the cranial cavity and spinal cord present in the vertebral column.

Brain:- the peripheral part of the brain is made of grey matter and the medulla of the brain is made of white matter. The brain and the spinal cord are completely surrounded by three membranes or membranes which lie between the skull and the brain. They are named as

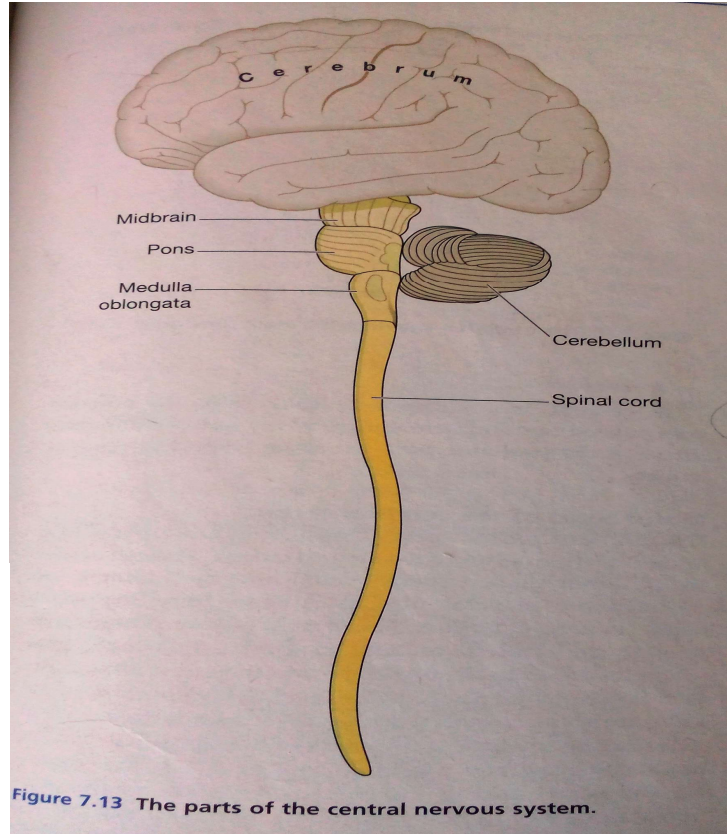
1) The duramater 2) piameter 3) arachnoidmater.

The brain is formed of cerebrum, the mid brain, the pons varolii, the medulla oblongata, the cerebellum.

Spinal cord:- it is an elongated and almost cylindrical part of the central nervous system. It is situated in the neural canal of the vertebra.

Central nervous system (CNS) is related with sensory & motor activity. It enables a person to adjust with external environment. The function of CNS occurs according to the will power of the person. It supplies nerves to skeletal muscles (motor nerves) & Sensory nerves carry

impulses from senses organs to brain.



02

Q5

Attempt any **FOUR** of the following:

16

a) **State the composition of blood and mention function of each constituent.**

Ans:

Composition of Blood :

Blood consist of solid and liquid part. Solid part contains blood cells (Corpuscles) and liquid part contains plasma. Blood cells form 45% and plasma form 55% of its whole contains.

PLASMA

Plasma or fluid part of blood is clear, straw colored watery fluid.

Component of plasma :

Water- It forms 90 % of whole

Mineral salt- includes chlorides, phosphates and carbonates of sodium, potassium and calcium.

Plasma protein-Albumin, globulin, prothrobin and heparin.

Food stuff in their simplest form- glucose, amino acid, fatty acids, glycerol and vitamins

Gases in solution- oxygen, carbon dioxide, nitrogen.

Waste products from tissue- urea, uric acid and creatinine.

Antibodies and autotoxins- these protects against bacterial infection.

Hormones- from duct gland Enzymes

Salts- they mainly maintains electrolyte balance.

In the blood ,there are three types of blood cells or corpuscles

- a) Erythrocytes or red blood cells.
- b) Leucocytes or white blood cells.
- c) Thrombocytes or platelets.

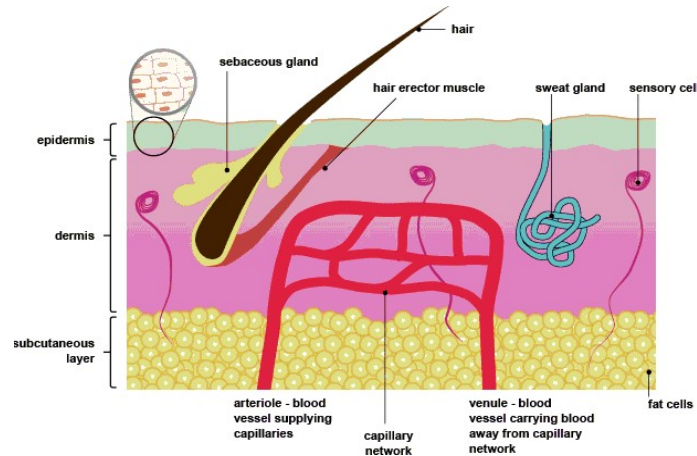
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b)	<p>Compare artery and vein. Ans : (any four)</p> <table border="1" data-bbox="215 258 1421 1050"> <thead> <tr> <th data-bbox="215 258 821 296">Artery</th> <th data-bbox="821 258 1421 296">Vein</th> </tr> </thead> <tbody> <tr> <td data-bbox="215 296 821 409">1) Arteries carry oxygenated blood, away from the heart except pulmonary artery.</td> <td data-bbox="821 296 1421 409">1) Veins carry deoxygenated blood, towards the heart except pulmonary veins.</td> </tr> <tr> <td data-bbox="215 409 821 485">2) These are mostly deeply situated in the body.</td> <td data-bbox="821 409 1421 485">2) These are superficial and deep in location.</td> </tr> <tr> <td data-bbox="215 485 821 560">3) These have thick elastic muscular walled.</td> <td data-bbox="821 485 1421 560">3) These are thin-walled.</td> </tr> <tr> <td data-bbox="215 560 821 598">4) These posses narrow lumen.</td> <td data-bbox="821 560 1421 598">4) These posses wide lumen.</td> </tr> <tr> <td data-bbox="215 598 821 674">5) Valves are absent.</td> <td data-bbox="821 598 1421 674">5) Valves are present which provide unidirectional flow of blood.</td> </tr> <tr> <td data-bbox="215 674 821 711">6) These are reddish in color.</td> <td data-bbox="821 674 1421 711">6) These are bluish in color.</td> </tr> <tr> <td data-bbox="215 711 821 787">7) These show spurty movement of blood giving pulse.</td> <td data-bbox="821 711 1421 787">7) These show sluggish movement of blood.</td> </tr> <tr> <td data-bbox="215 787 821 863">8) Blood in arteries moves with pressure.</td> <td data-bbox="821 787 1421 863">8) Blood in veins moves under very low pressure.</td> </tr> <tr> <td data-bbox="215 863 821 938">9) Arteries empty up at the time of death.</td> <td data-bbox="821 863 1421 938">9) Veins get filled up at time of death.</td> </tr> <tr> <td data-bbox="215 938 821 1050">10) If arterial wall is injured, the blood comes out like a fountain in a large area all around the artery.</td> <td data-bbox="821 938 1421 1050">10) If venous wall is injured, blood comes out, collects in a pool in a small area around vein.</td> </tr> </tbody> </table>	Artery	Vein	1) Arteries carry oxygenated blood, away from the heart except pulmonary artery.	1) Veins carry deoxygenated blood, towards the heart except pulmonary veins.	2) These are mostly deeply situated in the body.	2) These are superficial and deep in location.	3) These have thick elastic muscular walled.	3) These are thin-walled.	4) These posses narrow lumen.	4) These posses wide lumen.	5) Valves are absent.	5) Valves are present which provide unidirectional flow of blood.	6) These are reddish in color.	6) These are bluish in color.	7) These show spurty movement of blood giving pulse.	7) These show sluggish movement of blood.	8) Blood in arteries moves with pressure.	8) Blood in veins moves under very low pressure.	9) Arteries empty up at the time of death.	9) Veins get filled up at time of death.	10) If arterial wall is injured, the blood comes out like a fountain in a large area all around the artery.	10) If venous wall is injured, blood comes out, collects in a pool in a small area around vein.	04
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c)	<p>Define : i) Tidal volume ii) Vital capacity Ans: i) Tidal Volume: The volume of gas inspired or expired (exchanged with each breath) during normal quiet breathing is known as tidal volume. ii) Vital Capacity: The greatest volume that can be inspired from the resting end expiratory position.</p>	02 02																						
d)	<p>Explain role of stomach and liver in digestive system. Ans: Role of Stomach : - The main function of the stomach is to break down and digest food in order to extract necessary nutrients from food. - It acts as a temporary storage for food that allows digestive enzymes , pepsins to act. - The stomach releases acids and enzymes for the chemical breakdown of food. - The stomach releases food into the small intestine in a controlled and regulated manner. - Hydrochloric acid in stomach defends against microbes. Role of Liver : - Bile production and excretion - Excretion of bilirubin, cholesterol, hormones, and drugs - Metabolism of fats, proteins, and carbohydrates -Enzyme activation -Storage of glycogen, vitamins, and minerals -Synthesis of plasma proteins, such as albumin, and clotting factors -Blood detoxification and purification.</p>	02 02																						

e) Describe the structure of skin.

Ans:



The skin is a very important organ. It is a waterproof barrier over the surface of your body, it keeps out infection, it protects the delicate tissues underneath and it can repair itself if it is damaged. In homeostasis, the skin plays a very important part in maintaining the body temperature within narrow limits. It is important both for losing heat when your core temperature goes up and for conserving heat if your core temperature starts to fall. The structure of the skin is very well adapted to its function in temperature control.

Structure of the skin

The skin has three main layers - the epidermis, the dermis and the subcutaneous layer.

Layers of the skin :

- Epidermis :

The epidermis is on the outside. This has a basal layer which is always forming new cells through cell division so the epidermis is made up from layers of cells. The new cells gradually move towards the surface, which takes 1-2 months. As they move up they gradually die, become flattened and develop keratin. The outermost layer of the epidermis is made of flat dead cells which are continually worn away by friction. The keratin and oil from the sebaceous help to make the skin waterproof.

- Dermis :

The dermis is the middle layer. It contains

Connective tissue - packs and binds the other structures in the skin.

Elastic fibres - make the skin stretchy and resilient.

Capillaries - tiny blood vessels which are supplied by arterioles.

Hair erector muscles - to move the position of the hairs.

Sensory cells - these respond to sense touch, pressure, heat, cold and pain.

Nerve fibres - to activate muscles and glands and relay messages from the sensory cells to the brain.

Pigment cells which produce melanin - a very dark pigment.

Sweat glands which open onto the surface as pores.

Hair follicles - pits in the epidermis which grow hairs.

Sebaceous glands - produce oil to keep hair follicle free from dust and bacteria, and to help to waterproof the skin.

The subcutaneous layer:

The subcutaneous layer is the final layer of the skin. This is a layer of fat found in the lower part of the dermis and underneath it. The thickness of this layer varies depending on the place

in the body and from person to person. A store of fat is useful to the body as insulation and it can be used for energy when the intake of nutrients is insufficient. The skin has three layers. Beneath the surface of the skin are nerves, nerve endings, glands, hair blood vessels.

f) **Draw the outline structure of female reproductive system.**

Ans:

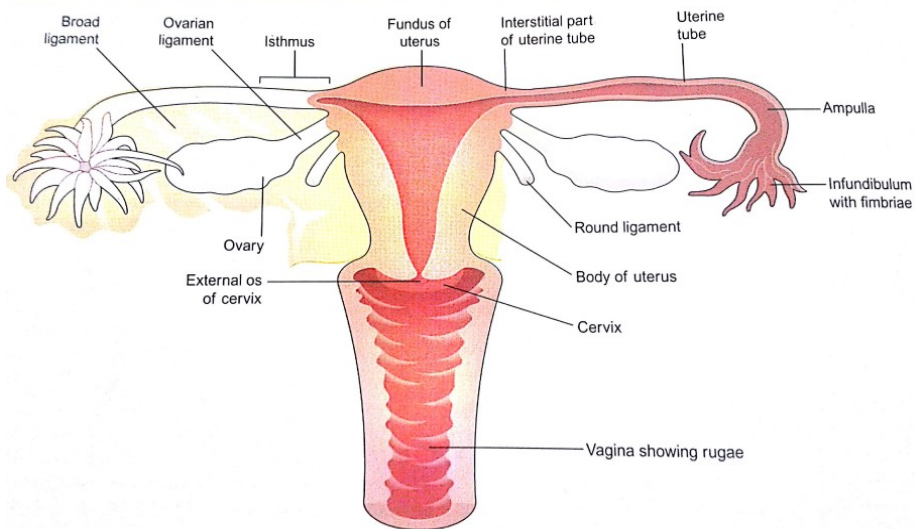


Fig : Female Reproductive System.

04

Q6 Attempt any Four of the following:

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a) Explain meaning of :

i) Heart rate

ii) Cardiac output

Ans : i) **Heart rate:** Heart rate is the speed of the heartbeat measured by the number of contractions of the heart per minute (bpm)

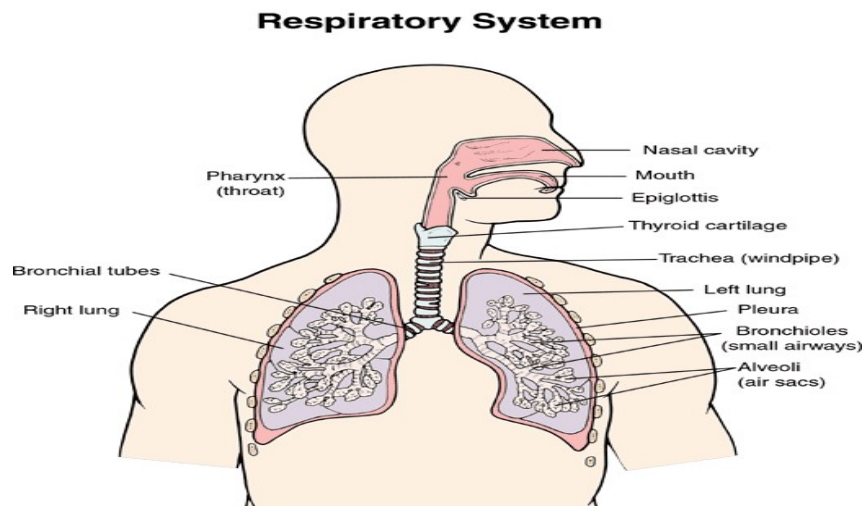
ii) **Cardiac output :** It is defined as the quantity of blood pumped by the heart in one minute. Cardiac output = Stroke volume x Heart rate.

02

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b) **Draw a labeled diagram of respiratory system.**

Ans:



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	<p>c) Enlist the organs of male and female reproductive system. Ans : Organs of Male Reproductive System are as follows : (any four)</p> <ul style="list-style-type: none">- Testis- Scrotum- Pair of Seminal Vesicles- Ejaculatory Duct- Deferent duct- Epididymis- Bulbourethral Glands- Prostate Gland- Penis- Urethra <p>Organs of Female Reproductive System are as follows : (any four)</p> <p>1) External genitalia-</p> <ul style="list-style-type: none">- Labia majora.- Labia minora- Hymen <p>2) Internal genitalia-</p> <ul style="list-style-type: none">- Vagina- Uterus- Uterine (fallopian) tubes- Ovaries	<p>02</p> <p>02</p>
	<p>d) Describe autonomic nervous system. Ans : Autonomic nervous system is mainly concerned to the control the internal organs, function of these organs are not under willing control. Mostly organs of special senses, vital organs and secretory glands are provided by cranial nerve fibers. The autonomic nervous system plays an essential role in keeping the body's internal environment Ex. temperature, salt concentration, blood sugar, oxygen and carbon dioxide level in blood, etc in proper balance, a condition called homeostasis. The autonomic nervous system also plays a major part in emotional experience and expression. When emotionally excited, the body shows many changes for ex. blood pressure and heart beat increase, mouth is often dry, stomach has "butterflies" in it. These and other body actions are controlled by the autonomic nervous system. The autonomic nervous system has two divisions : - Sympathetic division - Parasympathetic division. The sympathetic division, is the emergency system. It prepares the body to put out energy and to protect it from effects of injury. It shuts the gut down, speeds up the heart, increases blood pressure, dilates (makes bigger) the pupils of the eyes, makes more glucose (blood sugar) available in the blood for energy, etc. The parasympathetic division is the "housekeeping" division. It acts to replace and recover from the activities of living. Its action is opposite of the sympathetic division. It activates the gut for digestion, slows the heart rate, decreases the blood pressure, etc.</p>	<p>04</p>



	<p>e) Describe the hearing mechanism. Ans : Human ear is stimulated on producing sound waves at the rate of 30 and 30000/seconds and sound waves travels at speed of 340 meter/ second. Sound waves are generally carried by air but also pass through solid and liquid. Sound waves are generally passes rapidly through solid. Hearing process is conducted by collection of sound waves which leads to the vibration of tympanic membrane when waves pass through external acoustic meatus which sets the ossicles (Ear ossicles carry the vibrations received by tympanic membrane to the internal ear) and fenestra vestibule. Vibrating causes vibration of perilymph causes vibrations of endolymph which stimulates nerve endings of vestibulocochlear nerve and this nerve carries stimulus at the centre of hearing located in temporal lobe of brain where it is appreciated or interpreted. Appreciation brought stimulus through auditory nerve to the centre of hearing but identification depends on previous experience and power of reasoning.</p>	04
	<p>f) Enlist the names of hormones secreted by anterior pituitary gland (lobe) and state their function. Ans : (any four) 1) Pituitary gland: -<u>Growth hormone</u>: This hormone promotes growth in childhood. For adults, it helps to maintain healthy muscle and bone mass. -<u>Prolactin</u>: In women, it stimulates milk production. In males, low levels are linked to sexual problems; however, most males make no use of the hormone. -<u>Adrenocorticotropic</u>: This hormone promotes the production of cortisol, which helps to reduce stress, maintain healthy blood pressure and more. -<u>Thyroid-stimulating hormone</u>: Just as the name implies, this hormone helps to regulate the body's thyroid, which is crucial in maintaining a healthy metabolism. -<u>Luteinizing hormone</u>: In women, this hormone regulates estrogen. In men, it regulates testosterone. -<u>Follicle-stimulating hormone</u>: Found in both men and women. It stimulates the releasing of eggs in women and helps ensure the normal function of sperm production in men. The back part of the pituitary gland is called the posterior pituitary. It produces the following two hormones: -<u>Oxytocin</u>: This hormone causes pregnant women to start having contractions at the appropriate time and also promotes milk flow in nursing mothers. -<u>Antidiuretic hormone</u>: Commonly referred to as vasopressin, this hormone helps to regulate water balance in the body.</p>	04