



WINTER- 14 EXAMINATION

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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.



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Q 1) Solve any eight of the following:

(16 marks)

a) Why lysosomes are called as suicidal bags ? (2 marks)

It is filled with digestive enzymes. These enzymes can **digest** proteins, nucleic acids , mucopolysaccharides glycogen & foreign substances. When cell is old or injured, these rapidly destroy organelles. As they digest their own contents, it is known as suicidal bag.

b) Write functions of ovary. (2 marks)

1. Production of ova by *ovulation* .During this matured graafian follicle breaks and liberates ova.
2. Production of oestrogen.
3. Production of progesterone.

c) Define pupil. How its size is controlled ? (def. 1 mark , reasn-1mark)

Definition-The central adjustable opening in the iris behind the cornea is called pupil. The iris contains radial muscles to dilate (widen) and circular muscles to constrict the pupil. The pupil vary in size depending upon intensity of light. In bright light, pupil is constricted while in dim light it is dilated.

d) Give functions of endocrine pancreas. (3 functions, 2 marks)

Pancreatic islets (islets of Langerhans) –there are three types of cells

α -secrete glucagon: Glucagon increases the blood glucose level.

β - secrete insulin: insulin decreases the blood glucose levels

Delta cells- secrete somatostatin. Somatostatin (GHRIH) inhibits the secretion of both insulin & glucagon



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e) Name different types of blood groups. (4 groups, 2 marks)

The blood group is classified on the bases of ABO system & Rh factor as follows.

1. Blood group A
2. Blood group B
3. Blood group AB.
4. Blood group O.

On the basis of presence or absence of Rh factor as RH +ve or Rh -ve

f) Name sinuses present in the skull. (4 names ,2 marks)

1. Frontal sinuses.
2. Maxillary sinuses.
3. Sphenoid sinuses.
4. Ethmoid sinuses

g) Define Digestion. Give Composition of gastric juice.(def.-1 mark, comp -1mark)

Definition- The conversion of complex food into simple form by enzymes so that it is easily absorbed in the blood is described as digestion.

Composition of Gastric juice- water, mineral salts, mucus, hydrochloric acid, Enzymes such as pepsinogen, gastric renin and the intrinsic factor.

h) Give classification of WBC's. (2 marks)

WBC's are classified into two classes-

- 1) **Granulocytes** – a)Neutrophils
- b) Eosinophils
- c) Basophils.



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2) Agranulocytes- a)Lymphocytes

b)Monocytes

i) Give four functions of skeleton (0.5 marks for each point)

1. They form the supporting framework of the body
2. They give protection to delicate organs
3. They act as store house of calcium phosphate & other minerals salts
4. They form joints which are essential for the movement of the body.
5. haemopoiesis takes place due to presence of bone marrow.
6. Gives muscle attachment.
7. forms the boundaries of the cranial, thoracic & pelvic cavities.

j) Enlist the organelles of the cell. (2 marks)

Mitochondria, lysosomes, Nucleus, Microfilaments & Microtubules, Endoplasmic reticulum, Golgi apparatus, Centriole, ribosomes.

k) Name the valves of the heart . (2 marks)

Right atrio-ventricular valve or Tricuspid valve, Left atrio-ventricular valve or bicuspid or mitral valve, Aortic Semilunar valve and Pulmonary semilunar valve

l) Name the bones of lower limb (2 marks)

1 Femur, 1 tibia, 1 fibula, 1 patella, 7 tarsal bones, 5 metatarsal bone and 14 phalanges

Q. 2 Attempt any four of the following .

(12 Marks)

a) Give functions of respiratory system.(0.5 marks for each point)

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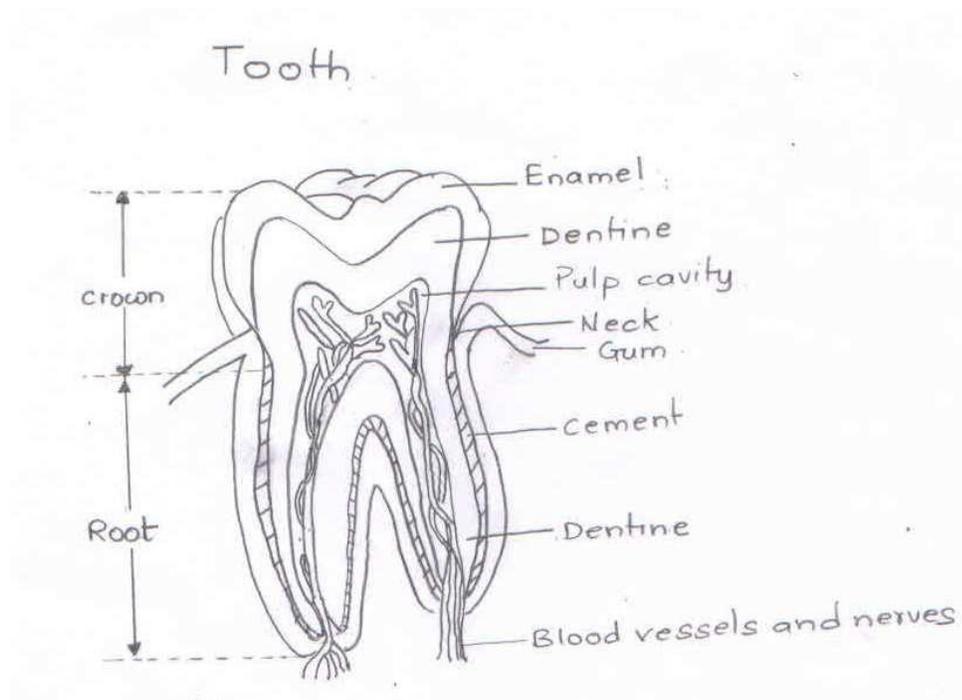
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The function of the respiratory system is to deliver air to the lungs, bringing oxygen in the body and expelling the carbon dioxide in the air.

1. Nose associated with sense of smell.
2. filtration, warming & humidification of air
3. Exchange of O₂ & CO₂.
4. Production of sound due to larynx.
5. Sense of taste due to taste buds in pharynx & epiglottis.
6. Volatile substances like ammonia is excreted by lungs.
7. water regulation-water vapour is partly excreted by expiration.
8. Heat is lost during expiration.

b) Draw a well labeled diagram of L.S. of tooth (3 marks)





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c) Explain portal circulation give its importance. (circulation-2 marks,importance-1 marks)

The portal circulation

In all parts of the body, the venous blood passes from the tissues to the heart by the direct route. But, in the portal circulation, venous blood from the capillary bed of the abdominal parts, the spleen & the pancreas to the liver via the portal vein. The portal vein is formed by union of gastric vein from stomach, superior & inferior mesenteric vein from small and large intestine, splenic vein from spleen & cystic vein from gall bladder. The blood passes through the capillary bed, the hepatic sinusoid in the liver before entering the general circulation via the inferior vena cava.

Importance of portal circulation

Blood with high concentration of nutrients are absorbed from the stomach & intestine & goes to liver first for modification. i.e. nutrients undergoes hepatic metabolism & nutrient level in the blood are regulated. The venous blood then leaves liver via hepatic vein & joins the inferior vena cava.

d) Define – i) Cardiac Output. (1.5 marks) ii) Hypertension. (1.5 marks)

Cardiac Output- It is the amount of blood ejected per minute. It is also termed as minute volume.

It takes in account the rate and force of cardiac contraction.

Cardiac Output= Stroke volume X Heart Rate

$$70 \text{ ml} \times 72 = 5040 \text{ ml / minute.}$$

Hypertension- Increase in the arterial blood pressure –systolic pressure above 140 mm of Hg or diastolic pressure above 90 mm of Hg is called as hypertension.



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e) Give functions of lymphatic system.(3 marks)

- 1) It collects and returns tissue fluids from the intercellular spaces to the blood.
- 2) It plays an important role in returning plasma proteins to the blood .
- 3) Lymphatic node produces & transports lymphocytes to the circulatory system .
(antibodies formation by lymph node to protect body against infection.)
- 4) It absorbs and transport fatty acids and fats from the digestive system.
- 5)Lymph nodes play an important role in defence mechanism by way of filtration of lymph & trapping microorganism .

f) What are accessory glands of male reproductive system?(1 mark) Explain their functions.(2 marks)

The accessory gland of male reproductive system are:- Seminal vesicles, Prostrate gland ,Cowper's gland

- 1) Seminal vesicle-. It secretes fructose , prostaglandin and fibrinogen. (Fructose utilized by sperm for ATP production. Prostaglandin helps in motility of sperm & fibrinogen helps in coagulation of semen).
- 2) Prostrate gland . It secrets acidic fluid.(It contains citric acid to provide ATP to sperm ,acid phosphate prostaglandin helps in contraction of uterus & seminoplastin as antibiotic to destroy bacteria)
- 3) Cowper's gland/Bulbourethral gland . It secrets fluid to neutralize the acidity of the urethra.

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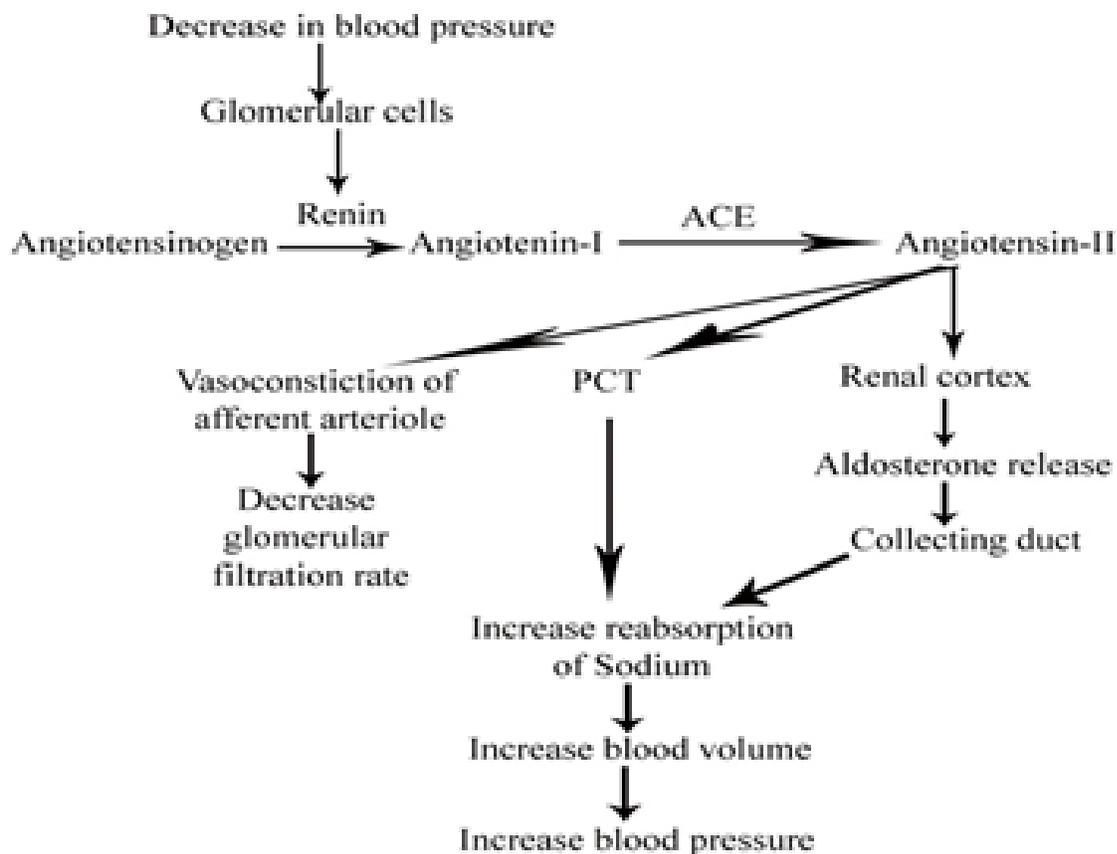
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Q. 3 Attempt any FOUR of the following

(12 Marks)

a) Explain renin-angiotensin-aldosterone system. (3 Marks)

When arterial blood pressure drops, it leads to decrease renal blood flow. Due to this, there is a secretion of renin from juxta glomerular cells of kidney. Renin circulates in the blood and reacts with Angiotensinogen to form Angiotensin I. Angiotensinogen converting enzyme converts Angiotensin I to Angiotensin II, which is a powerful vasoconstrictor. It also stimulates adrenal cortex to release aldosterone which increases renal reabsorption of sodium & water. This leads to an increase in blood volume & ECF volume & thus cardiac output & blood pressure increases.





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b) Give functions of large intestine. (0.5 marks for each function)

- 1) In the large intestine absorption of water continues until the familiar semisolid consistency of faeces is achieved.
- 2) Mineral salts, vitamins and some drugs are also absorbed into the blood capillaries from the large intestine.
- 3) Bacteria present in colon are called as intestinal bacterial flora that deals with final digestion of food material and production of vitamins like vitamin K and folic acid & vit.B12.
- 4) Peristalsis is absent. At regular interval, the contents move due to wave of contraction due to Mass movement.
- 5) Formation and expulsion of faeces from the body is one of the important functions of large intestine. This is called as defecation.
- 6) Mucus secreted by goblet cells act as lubricant to prevent mechanical irritation.

c) Name the ventricles of brain. Give functions of CSF. (Name of ventricles- 1 Marks, Four functions-0.5 marks each)

Within the brain four irregular shaped cavities called ventricles are present containing cerebrospinal fluid (CSF). They are as follows-

1. The Right & Left lateral ventricles
2. The third ventricle
3. The fourth ventricle

Functions of CSF-

1. It supports and protects the delicate functions of brain.
2. It maintains a uniform pressure around brain and spinal cord.



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3. It acts as cushion and shock absorber for the brain and spinal cord.
4. It keeps brain and spinal cord moist and is responsible for interchange of substances between fluid and nerve cells.

d) Explain how B.P. is measured clinically. (Instrument name and parts-1 mark, Procedure- 2 Marks)

Blood pressure is usually measured by an instrument called as Sphygmomanometer. It consists of a mercury manometer, cuff and hand pump.

Procedure-

- ⇒ Tie the cuff around the upper arm of an individual.
- ⇒ Tight the release valve and inflate the cuff with air by pressing the rubber bulb till monometer shows reading more than 180 mm of Hg. When the cuff is fully inflated, air pressure is more than blood pressure. So blood flow in the brachial artery is completely obstructed.
- ⇒ Put the chest piece of stethoscope on the cubital fossa and hear for sound. Release the air in the cuff slowly by unscrewing the release valve till the appearance of first sound. Note the manometer reading. This reading is the systolic blood pressure.
- ⇒ Continue releasing the air in the cuff. Later the sound disappears . Note the manometer reading when the sound disappears. This reading is the diastolic blood pressure.

e) Define and give normal values of (Each Definition 1 mark, Normal value 0.5 Mark)

i) Tidal volume This is the amt. of air passing into & out of lungs during each cycle of quiet breathing. Normal tidal volume is 0.5 lit.



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ii) Vital capacity This is the maxi. Vol. of air which can be moved into & out of the lungs during forceful breathing. Normal value is about 3-5 lit.

f) Classify bones according to their shapes and size. Give one example of each.

(Classification with brief explanation of any four classes-2 marks, Example of four classes-1 mark)

Depending upon shape and size bones are classified as

1. Long bones: These consist of an elongated shaft with two extremities. The shaft consists of a cylindrical compact bone and extremities are formed by a thin outer shell of compact tissue with an interior network of spongy or cancellous bone containing red bone marrow. . e.g. femur, tibia, fibula.
2. Short bones: These are roughly box like bones having no shaft but consist of smaller masses of spongy bones covered by a thin layer of compact bone. E. g. Wrist, Carpal and tarsal bones.
3. Flat bones: In this type, a thin layer of cancellous bone is sandwiched in between two layers of compact bones. E.g. sternum, Scapula, bones of the skull.
4. Irregular bones: These bones cannot place in any of the above categories and their shape is not fixed. E.g. vertebrae and most bones of face.
5. Sesamoid bones: These are small bones which are developed in the tendons around certain joints. E.g. patella bone



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Q. 4 Attempt any FOUR of the following

(12 Marks)

a) Explain different phases of gastric secretion. (Each phase- 1 Mark)

There are three phases of secretion of gastric juice

- 1 Cephalic phase- This flow of juice occurs before food reaches the stomach and is due to reflex stimulation of the vagus nerves initiated by the sight, smell or taste of food.
- 2 Gastric phase- When food enters the stomach, it stimulates the enteroendocrine cells in the pyloric antrum and duodenum to secrete hormone gastrin in blood. Circulating gastrin stimulates the gastric glands to produce more gastric juice. Thus gastric acid secretion continues after the completion of the meal. Gastrin secretion is suppressed when the pH in the pyloric antrum falls to about 1.5.
- 3 Intestinal phase- When the partially digested contents of the stomach reach the small intestine, a hormone complex formed by secretin and cholecystokinin is produced by endocrine cells in the intestinal mucosa, which slows down the secretion of gastric juice and reduces gastric motility.

b) Define (Each definition – 1 Mark)

i) Agranulocytosis-

absence of circulating granulocytes in blood is called as agranulocytosis.

ii) Thrombosis-

An abnormal clot that develops in a blood vessel is called as thrombus and this condition is called as thrombosis.

iii) Oedema – Oedema means abnormal accumulation of tissue fluid leading to swelling.

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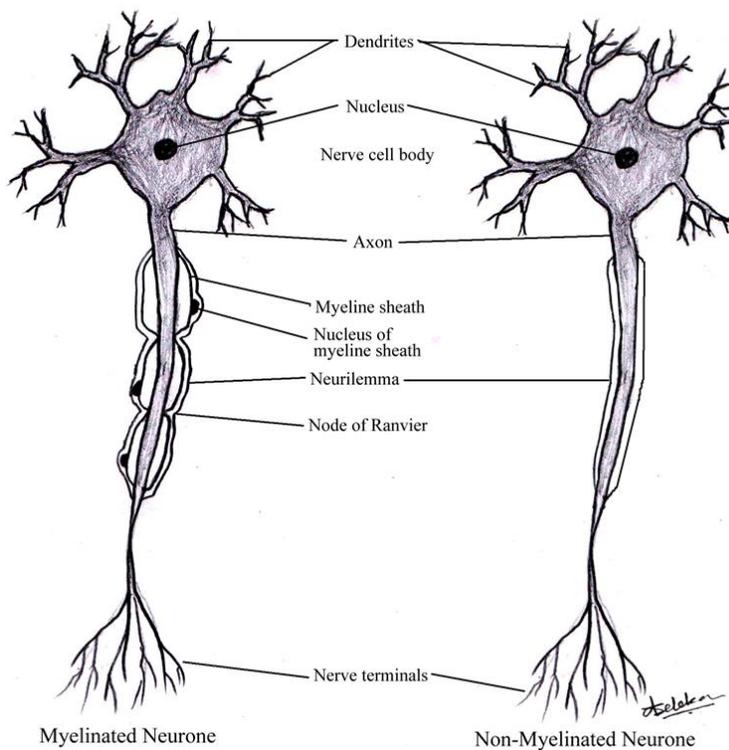
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c) Classify elementary tissues of body. Draw a labelled diagram of neuron. (Classification-1 Mark, Well labelled diagram- 2 marks)

Classification of elementary tissue of the body: -

1. Epithelial tissue
2. Connective tissue
3. Muscular tissue
4. Nervous tissue





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d) Differentiate between exocrine gland and endocrine gland with one example of each.

(Five differences- 0.5 marks each, example- 0.5 mark)

Sr. No.	Exocrine gland	Endocrine gland
1	These glands have ducts to secrete their secretion.	These glands are ductless glands.
2	These glands secrete their secretion in lumen of organs or to the outer surface of the body.	These glands secrete their secretions directly into blood.
3	Secretion of exocrine gland is called as enzymes.	Secretion of endocrine gland is called as hormones.
4	Exocrine glands produce their effect where they secrete their secretion.	Exocrine glands produce their effect on distant organ.
5	These glands are mostly involved in metabolic activities.	These glands are mostly involved in homeostatic activities.
6	Ex. Sweat glands, Digestive glands, Sebaceous gland, lacrimal glands.	Ex. Pituitary glands, Thyroid gland, parathyroid gland, adrenal gland, pineal gland, testis, ovaries

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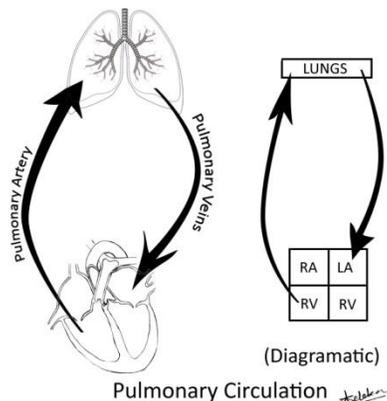
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e) Describe pulmonary circulation with the help of neat diagram. (Description- 2 Marks, Diagram-1 Mark)

Blood circulation from heart to lungs and back from lungs to heart is called as pulmonary circulation. Impure / de-oxygenated blood from right ventricles is carried to the lungs through right and left pulmonary arteries after each ventricular systole. Pulmonary arteries enter the



lungs, divides and subdivided into different branches and finally into small capillaries. Each capillary comes in contact with alveoli of lungs. Here exchange of oxygen from alveoli to blood and exchange of carbon-dioxide from blood to the alveoli take place. Thus here blood becomes oxygenated and pure. Then capillaries join to form the venules and finally form left and right pulmonary veins. Then pure / oxygenated blood from lungs carried to the left atria of heart through left and right pulmonary veins.

f) What is Rh factor? Give its clinical importance. (Rh Factor- 1 mark, Two Clinical importance 1 mark each)

Rh factor is an important antigen found on human RBC's. It is also called as Rhesus (Rh) antigen because first it is found on RBC's of Rhesus monkey. There is no corresponding agglutinin/antibody is present in human plasma for Rh factor. The blood in which Rh factor is present is called as Rh +ve and blood in which Rh factor is absent it is called as Rh -ve blood.



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Clinical Significance

- a) If Rh+ve blood is transfused to an Rh-ve recipient, an anti-Rh factor (antibodies) will be produced in recipient's blood within 12 days. If a second transfusion of Rh+ve blood is given to such recipient after this period, agglutination of donors RBCs takes place
- b) During pregnancy if fetus is Rh+ve whereas mother is Rh-ve, Rh antigens from fetus enter into the mother's blood and stimulates the formation of Rh antibody. Which enters the fetal blood and destroys RBCs of fetus. The fetus may die or if alive suffers from severe anemia. This condition is called as Erythroblastosis fetalis.

Q 5. Attempt any FOUR of the following:

(12 marks)

a) Write the structure(1.5 marks) & function of middle ear. (1.5 marks)

middle ear (tympanic cavity)

Structure: Is irregular air filled cavity. The lateral wall is formed by tympanic mem. The roof & the floor is by temporal bone. the posterior wall is formed by temporal bone & has two windows namely oval & round windows. The Eustachian tube or auditory tube extends from the middle ear to the nasopharynx & air reaches the cavity through this. Auditory ossicles malleus, incus & stapes are the three small bones in the middle ear forms movable joint extending from tympanic mem. to the oval window.

Functions: The Eustachian tube equalizes the pressure on both sides of tympanic mem. for proper hearing.

Sound vibration of tympanic mem. are amplified & transmitted by the auditory ossicles to the oval window of inner ear.



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b) Give composition(1.5 marks) & functions of bile(1.5 marks for any three functions).

composition of bile-

Water, mineral salts, mucus, bile pigments bilirubin, bile salts- sodium taurocholate & sodium glycholate.cholesterol.

Functions of bile

1. Bile salts emulsify the fat.
2. Bilirubin the waste product of RBC breakdown is passed to the intestine where it gets converted to urobilin & stercobilin . Urobilin is excreted in the urine & stercobilin is excreted in the faeces.
3. Bile salts help In the absorption of vit. K & digested fat.
4. Bile contains mucus & mucin which act as a buffer.
5. Bile stimulates peristalsis & produce laxative action.
6. Some substances like copper, zinc, mercury, toxins, bacteria and bile pigments are excreted through bile.

c) Enlist cartilages of larynx. (0.5 marks for each)

It is made up of following cartilages-(hyaline cartilage)

1-thyroid cartilage.

1- cricoid cartilage.(ring shaped)

.1-epiglottis.-elastic cartilage

2-arytenoid cartilages(ladle shaped) 2-cuneiform cartilages (wedge shaped)& 2-corniculate cartilages (horn shaped)

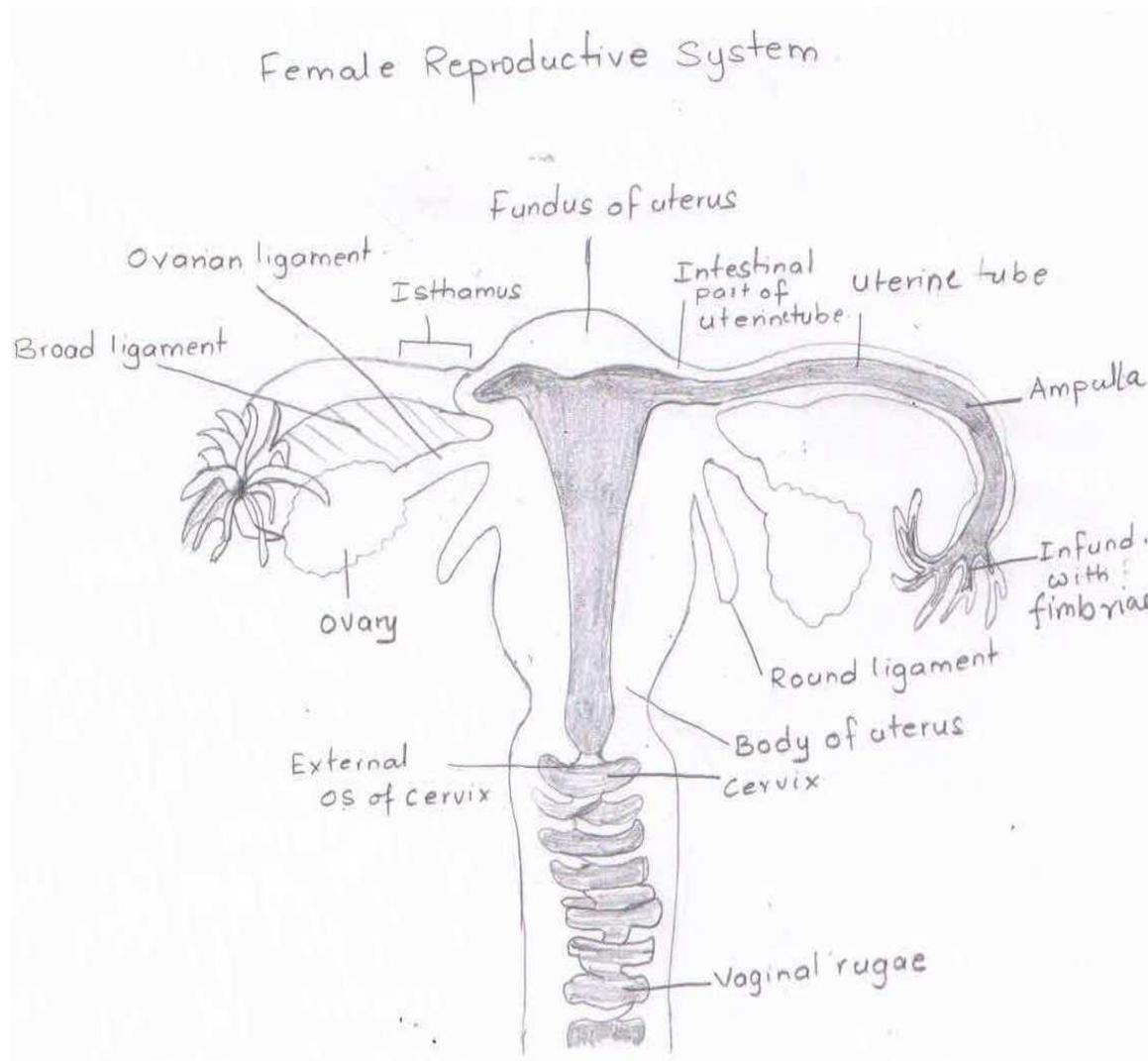
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d) Draw a well labelled diagram of internal organs of female reproductive system.(3 marks)





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e) Define shock.(1 mark) What are different types of shock. (2 marks)

Shock occurs when the metabolic needs of the cell are not met with. There is reduction in the circulating blood volume ,in the blood pressure & cardiac output.

different types of shock are –

hypovolemic shock

when the blood volume reduces due to severe haemorrhage, vomiting diarrhoea, or burns.

cardiogenic shock

cardiac output is reduced due to damaged heart muscle e.g. myocardial infarction.

septic shock

due to severe infection, the toxins are released which causes severe vasodilatation or depression of myocardial muscle.

neurogenic shock

due to sudden pain, emotional experience or spinal anaesthesia .

The reduced sympathetic activity or increased parasympathetic activity reduces the heart rate & cardiac output.

vasodilatation reduces the blood supply to the brain causing fainting.

anaphylactic shock

is a severe allergic reaction to substances like penicillin, peanuts etc.

release of histamine & bradykinin causes vasodilatation, & severe bronchoconstriction.

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f) Define-(1 mark each)

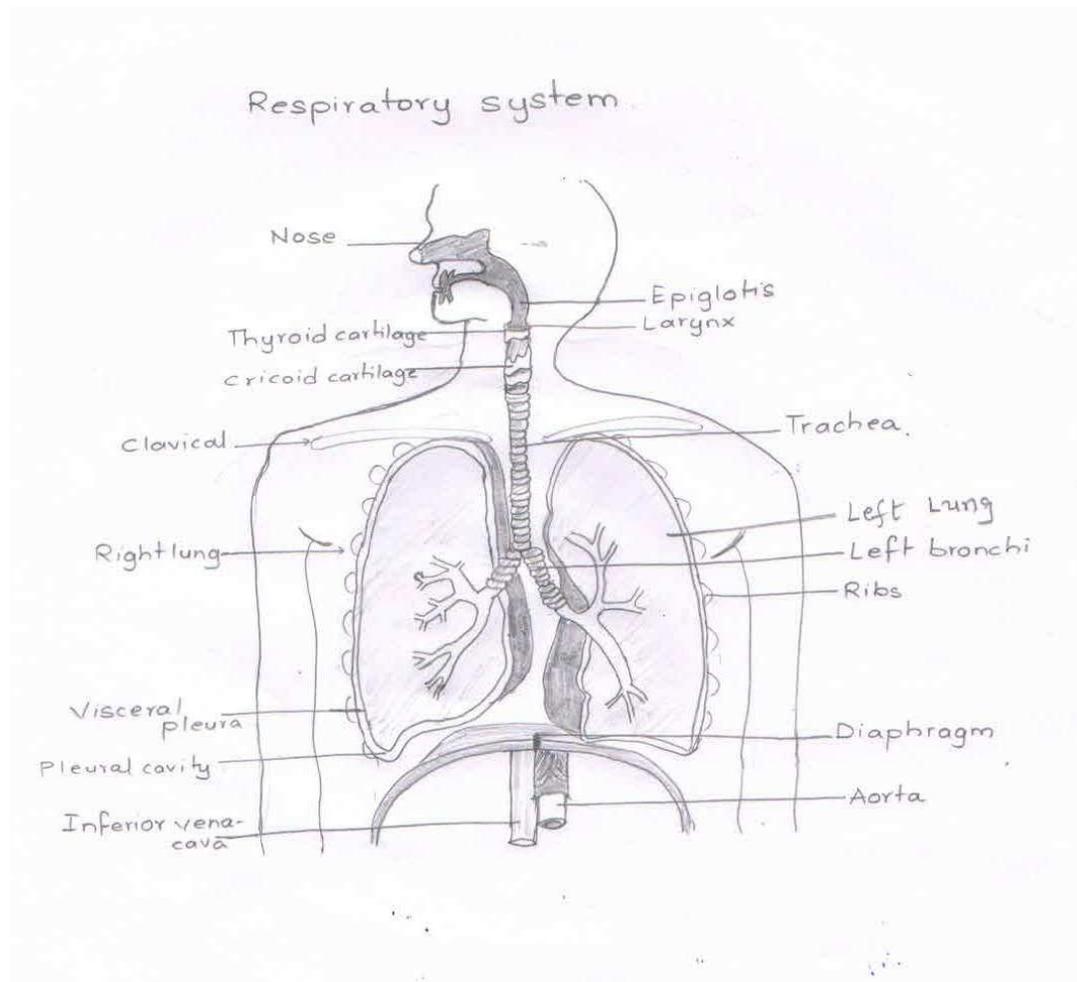
i) **puberty:** Puberty is defined as age at which the internal reproductive organs reach maturity. It marks the beginning of child bearing age.

ii) **Menopause:** It occurs at the age of 45-55 yrs marking the end of child bearing age.

iii) **Neurotransmitter:** Neurotransmitters are endogenous chemicals that transmit signals across a synapse from one neuron (brain cell) to another 'target' neuron.e.g. acetyl choline.

Q6. Attempt any **FOUR** of the following.

a) Draw a well labelled diagram of respiratory system.(4 marks)





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b) Name the sutures of skull with bones involved in their formation.(1 mark each)

Frontal & parietal bones joins at the coronal suture .

The parietal bones articulate with each other at sagittal suture.

The parietal bones articulate with occipital bone at the lambdoidal sutures

The parietal bones articulate with temporal bones at squamous suture.

b) Name the salivary glands of the body.(1.5 mark) Give functions of saliva.(2.5 marks)

There are three pairs of salivary glands - parotid, submandibular, sublingual.

Functions of saliva-

1. chemical digestion of polysaccharides- the salivary amylase acts on the starch & reduces them to disaccharides.
2. Lubrication of food.
3. Cleaning & lubricating the mouth.
4. Non specific defense mech. Due to lysosomes & immunoglobulin.
5. Sense of Taste by lubrication of food.

c) What is retina. (1 mark)Give its structure(2 marks) & function (1 mark).

Retina Retina is the innermost functional (nervous) layer of the eye. **structure** : IT is composed of several layers of nerve cell body & the axons. There are light sensitive cells mainly of two types: the rods and cones. The entire retina contains about 7 million cones and 75 to 150 million rods. The rods are present more in the periphery of the retina. The central retina has macula lutea or yellow spot made up of only cone cells.



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All the nerve fibres of retina form the optic nerve. The small area of the retina where the optic nerve leave the eye is known as optic disc or blind spot as no light sensitive cells are present here.

Functions: It gets stimulated by the light rays Rods function mainly in dim light and provide black-and-white vision, while cones sensitive to bright light & colour.

e) Give classification of nervous system in detail.(0.5 marks for each point)

The nervous system consists of the brain, the spinal cord & peripheral nerves.

The parts of nervous system are grouped as-

The central N.S. Consisting of the brain & the spinal cord.

The peripheral N.S. Consisting of all the nerves outside the brain & spinal cord.

The PNS has two functional division-

The sensory division & The motor division

The motor division has two divisions-voluntary (the somatic N.S). & involuntary (the autonomic N.S.) (smooth muscles, cardiac muscles & glands.) & enteric nervous system. The autonomic n.s. is further classified as sympathetic & parasympathetic n.s.

f) Explain anatomy (2 marks)& physiology(2 marks) of thyroid gland.

Anatomy: It lies in the neck in front of the larynx & trachea.It weighs about 25 gms.it is butterfly shaped,has two lobes one on either side of the thyroid cartilage. On its posterior side are of each lobe are two parathyroid gland.The gland is made up of cuboidal epithelial cells which form spherical follicle. These secretes & store colloid which is a sticky protein **material. Bet.** the follicle there are C-cells which secrete calcitonin hormone.



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Physiology : The gland secretes T₃ (Tri iodo thyronin)T₄ (Thyroxin).iodine is reqd for this. The hormone release is stimulated by TSH from anterior pituitary. There is increase in the basal metabolic rate & heat production. Regulation of carbohydrate ,fat, & protein metabolism. Normal growth & development of skeletal & nervous system.it has effect on heart, skin, muscles, digestive system,& reproductive system. Calcitonin reduces the reabsorption of the ca ions by the renal tubules & decreases the blood levels of calcium.

g) Explain physiology of muscle contraction.(2 marks) Mention the muscles of neck(1 mark) & shoulder(1 mark)

The motor pathway from the brain to the muscles involves two neurons. The upper motor neuron & the lower motor neuron. The axon of this neuron reaches the muscle. Near the termination in the muscle, the axon branches into tiny fibres that form the motor end plate near the muscle fibre. When a nerve impulse reaches neuromuscular junction,The neuro transmitter released is Acetyl choline at this junction. This changes the permeability of the cell membrane to sodium & calcium ions .As a result the muscle becomes depolarized. This causes muscle contraction. The acetyl choline is hydrolysed by enzyme acetylcholine esterase .The calcium ion concentration is decreased in the muscle which causes repolarization which leads to relaxation of muscle.

Muscles of neck: Sternocleidomastoid & Trapezius

Muscles of shoulder: Pectoralis major, Latissimus dorsi, Serratus magnus.