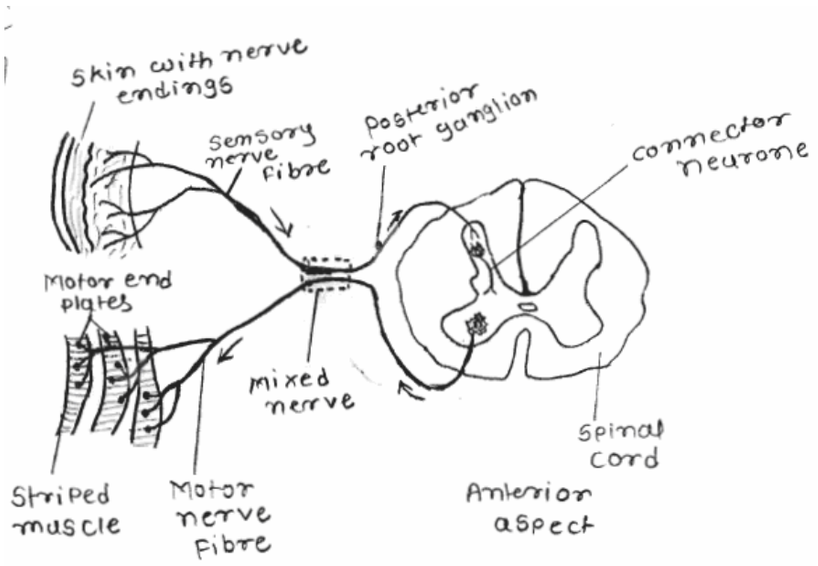
Important Instructions to examiners:

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 anyequivalent 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.	Answers	Marking Scheme
1		**Attempt any EIGHT of the following**	**16M**
1	**a)**	**Define the terms:(1+1=2M)** i) **Meninges:** The brain and spinal cord are surrounded by three membranes, called as meninges. The meninges are outer dura mater, the middle arachnoid mater, the inner pia-mater. ii) **GFR (Glomerular Filtration Rate):** The volume of filtrate formed by both kidneys each minute is called the glomerular filtration rate. Normal value 125ml/min.	**2 M**
1	**b)**	**'Mitochondria is called power house of cell' state reason. (2M)** Mitochondria contains various oxidative enzymes responsible for generating energy for cellular respiration. When oxidative enzymes combine with oxygen and nutrient to form carbon dioxide and water and liberates energy. This energy is used to produce ATP which diffuses throughout the cell and releases its stored energy for cellular respiration. Therefore, 'Mitochondria are also called power house of cell'.	**2M**
1	**c)**	**Classify synovial joints with example. (2M)** Synovial joints: Classified into 6 types- 1.Ball and Socket joint e.g. Shoulder joint, Hip joint 2. Hinge joint e.g. Elbow joint, Knee joint, Ankle joint, interphalangeal joints. 3.Gliding joint e.g. Joint between carpals, joint between tarsals,joints bet. Spinal vertebrae. 4.Pivot joint e.g. Joint between atlas and axis, Radioulnar joints 5. Condyloid joint e.g temporomandibular, metacarpophalangeal and metatarsophalangeal joints. 6. Saddle joint e.g. Joint between trapezium & first metacarpal bone.	**2M**
1	**d)**	**State composition of blood. (2M)** Composition of blood:-It is composed of liquid matrix plasma (55%) & different cells suspended in it (45%).	**2 M**

		Plasma: - Composition:- Water-90-92%, plasma proteins, inorganic salts, nutrients, waste material, hormones & gases. **Blood Cells:** - Red blood cells / Erythrocytes, white blood cells / leucocytes and Platelets or Thrombocytes.	
1	**e)**	**Define Suture. (1M) Name any two sutures and bones involved in it. (1M)** **Suture**-The bones of the skull are united together by immovable joints called sutures. 1) Coronal suture: Frontal & two parietal bones. 2) Sagittal suture: The two parietal bones articulate with each other at sagittal suture. 3) Lambdoidal suture: The two parietal bones articulate with occipital bone at the lambdoidal sutures 4) Squamous suture: The parietal bone articulate with temporal bone at squamous suture.	**2M**
1	**f)**	**Draw and label reflex arc. (2M)**  	**2M**
1	**g)**	**Write the changes occur in male at puberty. (any four points 0.5x4=2M)** Following changes occur in male at puberty**:** **1.** Growth of muscle and bone and a marked increase in height and weight. **2.** Enlargement of the larynx and changing of the voice —it 'breaks‘. **3.** Growth of hair on the face, axillae, chest, abdomen and pubis. **4.** Enlargement of the penis, scrotum and prostate gland. **5.** Maturation of the seminiferous tubules and production of spermatozoa & semen.	**2M**

1	**h)**	**Name the bones of upper limb. (2M)** The bones of upper limb are: 1. Humerus 1 2. Radius 1 3. Ulna 1 4. Carpals 8 5. Metacarpals 5 6. Phalanges 14	**2M**
1	**i)**	**Define plasma (1M) and serum (1M).** **Plasma**: It is the liquid matrix of liquid connective tissue blood. **OR** Blood is composed of clear straw coloured watery fluid called plasma, in which several different types of blood cells are suspended. **Serum**: Serum is plasma without blood clotting factors.	**2M**
1	**j)**	**Enlist the muscles of mastication. (0.5x4=2M)** There are four muscles of mastication : 1. Masseter, 2. Temporalis, 3. Medial and Lateral pterygoid 4. Buccinator	**2M**
1	**k)**	**Explain the terms: (i) Medial (1M) (ii) Lateral (1M)** (i) Medial: Nearer to midline of body or that organ (ii) Lateral: farther from midline of body or that structure.	**2M**
1	**l)**	**Write functions of Lymphatic system. (0.5 x 4=2M)** Functions of Lymphatic system: 1) It drains excessive tissue fluids from the intercellular spaces to the blood. 2) It returns plasma proteins to the blood. 3) It absorbs and transport fatty acids and fats from the digestive system. 4) It plays an important role in immune response of the body either by releasing cytotoxic chemicals or by producing antibodies.	**2M**

2 **Attempt any FOUR of the following:** **12M**

2 a) **State the differences between smooth muscle and skeletal muscle (0.5 x 6 =3M)** **3M**

Sr. No.	Smooth muscle	Skeletal muscle
1.	It is also known as Non- striated muscle as striations are absent	It is also known as striated Muscle due to presence of striations
2.	The cells are spindle shaped with only one central nucleus	The fibres (cell) are cylindrical and has many nuclei
3.	They are not under the control of our will.(involuntary)	They are under the control of our will. (voluntary)
4.	Bundles of fibres form sheets of muscle.	The fibrous tissue enclosing the whole muscle extends beyond the fibres to become the tendon which attaches the muscle to the bone or skin.
5.	No distinct sarcolemma	There is distinct sarcolemma
6.	Present in parts not under control of will like lower part of oesophagus, stomach, intestine, etc.	Present in movable part under control of will like tongue, arms or hands, legs, etc.

2 b) **Explain the mechanism of respiration (3M)** **3M**

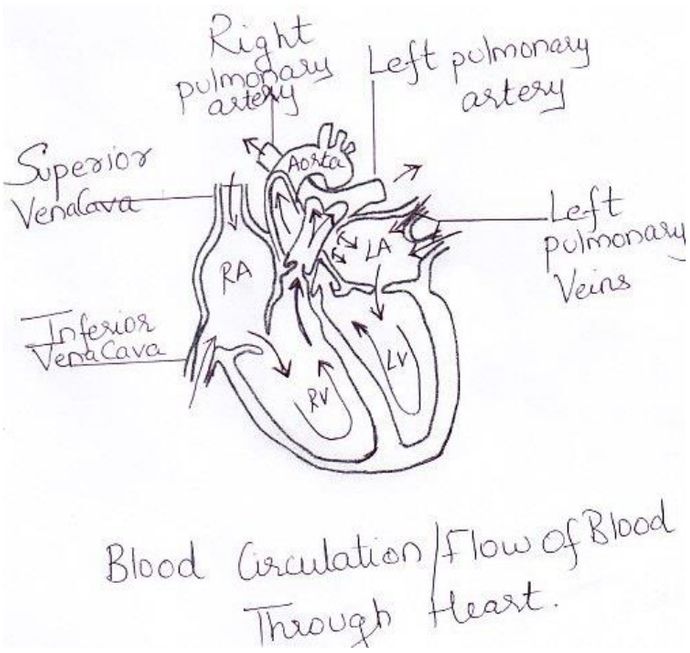
Respiration is defined as exchange of oxygen and carbon dioxide between atmosphere & body cells.

The rate of respiration is 15 to 18 cycles/min. The process of respiration is occurred by muscular activity of intercostal muscles &diaphragm.

Each cycle consists of inspiration, expiration & pause.

Inspiration- The simultaneous contraction of intercostal muscles & diaphragm increases the capacity of thoracic cavity. This reduces the pressure in the lungs. To equalize the pressure the air from atmosphere enters the lungs. The process of inspiration is active as it needs energy for muscle contraction.

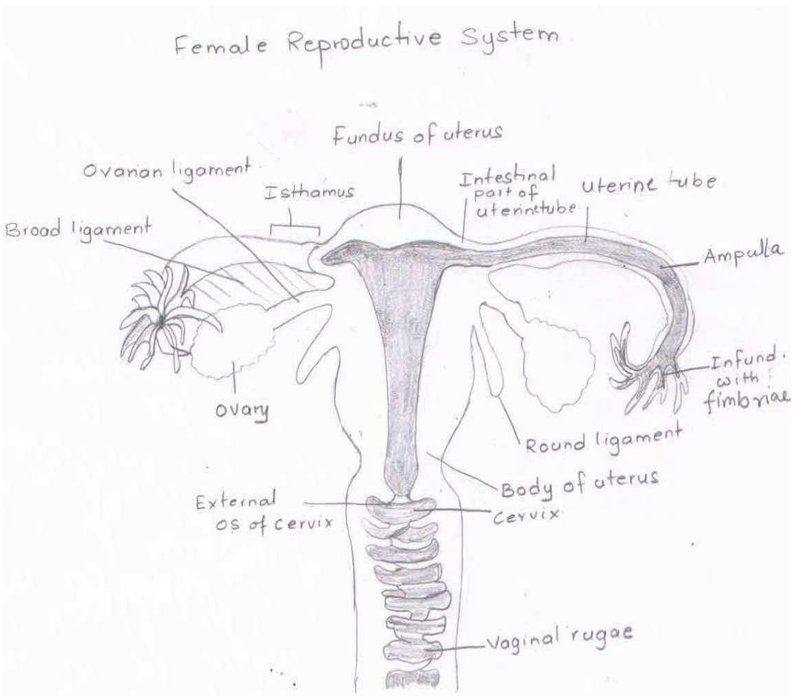
Expiration-Relaxation of intercostal muscles & diaphragm results in decrease in the space in the lungs. As a result, the pressure inside the lungs increases as compared to atmospheric pressure. The air from the lungs is expelled from the lungs. This process is passive as does not require energy. After expiration there is pause & then the next cycle begins.

2	**c)**	**Draw a well-labelled diagram of internal structure of heart showing blood flow. (3M)**  Blood Circulation / Flow of Blood Through Heart.	**3M**
2	**d)**	**Define Skeleton. (1M) State it's function. (0.5 x 4 = 2M)** Definition: Skeleton is the bony framework of the body. **Functions of skeleton**: 1. Gives attachments to muscles & bones. 2. Forms the joint and hence helps in the movement of the body. 3. Forms the boundaries of the cranial, thoracic & pelvic cavities. 4. Heamopoiesis takes place due to presence of bone marrow. 5. They act as store house of calcium phosphate & other minerals salts 6. They form the supporting framework of the body 7. They give protection to delicate organs	**3M**
2	**e)**	**Explain in short: (i) Rheumatoid arthritis (1.5M) (ii) Gout (1.5M)** **(i) Rheumatoid arthritis:** Rheumatoid arthritis is a long-term autoimmune disorder that primarily affects joints. It typically results in warm, swollen, and painful joints. Pain and stiffness often worsen following rest. Most commonly, the wrist and hands are involved, with the same joints typically involved on both sides of the body. The disease may also affect other parts of the body. This may result in a low red blood cell count, inflammation around the lungs, and inflammation around the heart. Fever and low energy may also be present. Often, symptoms come on gradually over weeks to months. While the cause of rheumatoid arthritis is not clear, it is believed to involve a combination of genetic and environmental factors. The underlying mechanism involves the body's immune system attacking the joints. This results in inflammation	**3M**

		and thickening of the joint capsule. It also affects the underlying bone and cartilage. The diagnosis is made mostly on the basis of a person's signs and symptoms. X-rays and laboratory testing may support a diagnosis or exclude other diseases with similar symptoms. Other diseases that may present similarly include systemic lupus erythematosus, psoriatic arthritis, and fibromyalgia among others. **(ii) Gout:** **Gout** is a form of inflammatory arthritis characterized by recurrent attacks of a red, tender, hot, and swollen joint. Pain typically comes on rapidly in less than twelve hours. The joint at the base of the big toe is affected in about half of cases. It may also result in tophi, kidney stones, or urate nephropathy. Gout is due to elevated levels of uric acid in the blood. This occurs due to a combination of diet and genetic factors. At high levels, uric acid crystallizes and the crystals deposit in joints, tendons and surrounding tissues, resulting in an attack of gout. Gout occurs more commonly in those who eat a lot of meat, drink a lot of beer, or are overweight. Diagnosis of gout may be confirmed by seeing the crystals in joint fluid or tophus. Blood uric acid levels may be normal during an attack. Treatment with nonsteroidal anti-inflammatory drugs (NSAIDs), steroids, or colchicine improves symptoms. Once the acute attack subsides, levels of uric acid can be lowered via lifestyle changes and in those with frequent attacks, allopurinol or probenecid provides long-term prevention. Taking vitamin C and eating a diet high in low fat dairy products may be preventive.	
2	**f)**	**Explain formation and composition of Lymph. (1.5 x 2 = 3M)** **Lymph** is a fluid connective tissue. All the body tissues are bathed in tissue fluid; some tissue fluid diffuses through the lymph capillaries forming lymph. **Formation of lymph:** Lymph is the fluid that circulates throughout the lymphatic system. The lymph is formed when the interstitial fluid (the fluid which lies in the interstices of all body tissues is collected through lymph capillaries. It is then transported through larger lymphatic vessels to lymph nodes, where it is cleaned by lymphocytes, before emptying ultimately into the right or the left subclavian vein, where it mixes back with the blood. Since the lymph is derived from the interstitial fluid, its composition continually changes as the blood and the surrounding cells continually exchange substances with the interstitial fluid. It is generally similar to blood plasma, which is the fluid extracellular matrix (ECM) of whole blood. Lymph returns proteins and excess interstitial fluid to the bloodstream. Lymph may pick up bacteria and bring them to	**3M**

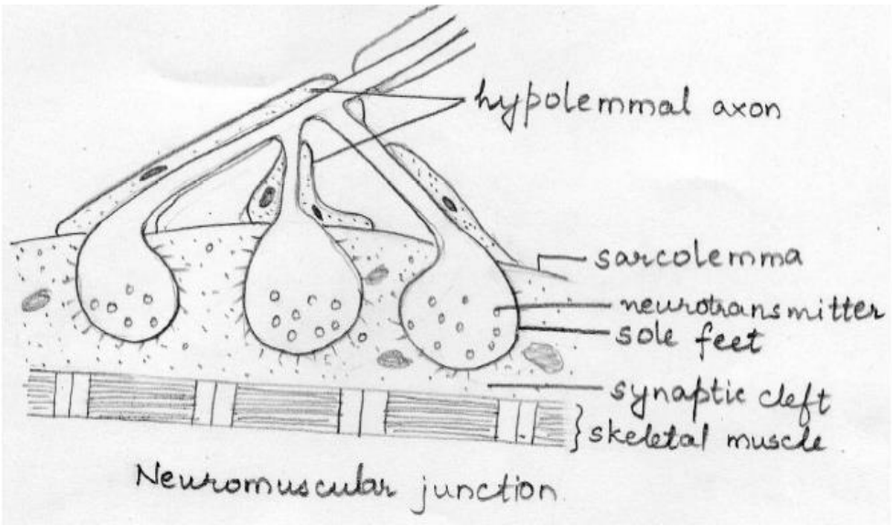
		lymph nodes, where they are destroyed. Metastatic cancer cells can also be transported via lymph. Lymph also transports fats from the digestive system (beginning in the lacteals) to the blood via chylomicrons. **Composition of lymph:** 1)Water: 94%, 2)Solids: 6%. i) Proteins: Total protein content varies from-2.0-4.5%. Three proteins are albumin, globulin and fibrinogen. In addition to this, traces of prothrombin are also found. ii) Fats: It varies between 5-15% depending on diet. iii) Carbohydrates: Sugar- 132 mg per 100 ml. iv)Other Constituents: urea, creatinine, chlorides, phosphorus, calcium, enzymes and antibodies are also present.	
3		**Attempt any FOUR of the following :**	**12M**
	a)	**Explain portal circulation (2M). Give its importance.(1 M)** The venous blood from digestive organs like stomach, small intestine is collected by portal vein. Instead of pouring the blood into the inferior vena cava, the portal vein pours the blood into liver. The portal vein is formed by the union of splenic vein from spleen, inferior mesenteric vein from rectum and colon, superior mesenteric vein from small intestine, gastric vein from stomach and cystic vein from gall bladder. Importance: The blood with high concentration of nutrient goes to the liver first. Here the nutients are modified and it also helps in regulation of material to other parts of the body. The liver is supplied by hepatic artery which provides oxygenated blood to the liver. It is further collected by hepatic veins which pours the blood into inferior vena cava. This course of blood through the liver is called portal circulation. Right atrium ↑ Inferior vena cava ↑ Hepatic vein Blood after leaving liver ↑ Central vein Blood in liver ↑ Sinusoid ↑ Interlobular vein ↑ Portal vein	**3M**

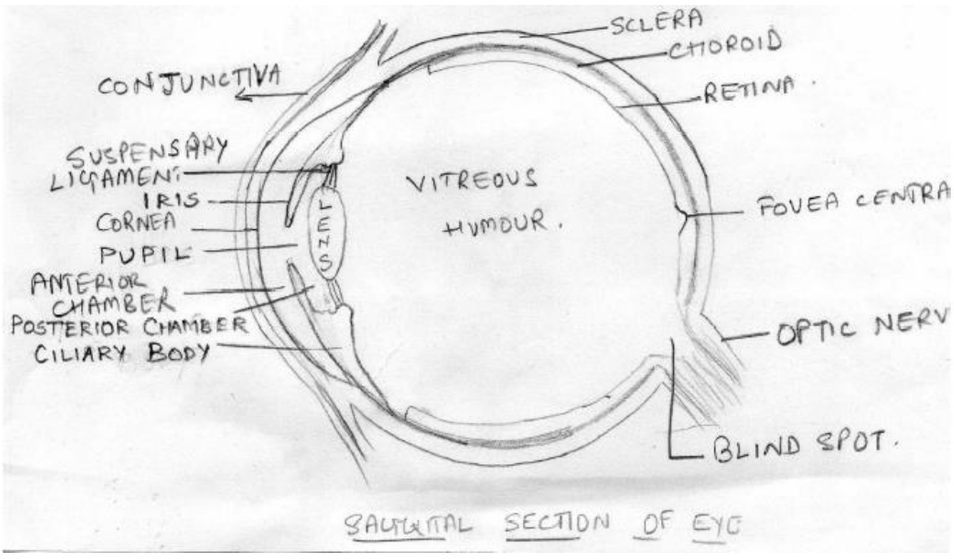
3	**b)**	**State the functions of Liver. (any 6 functions 0.5 x 6 =3M)** 1. Secretion of bile: Bile salts are helpful in digestion and absorption of fats by its emulsification. 2. Glycogenic function: The hepatic cells by the action of enzymes convert glucose into glycogen and it is then stored in the liver. 3. Formation of urea: Hepatic cells by the action of the enzyme cause deamination of amino acid, i.e. amine group is set free which forms urea. 4. Metabolism of fat: Whenever energy is needed, the saturated stored fat is converted to a form in which it can be used to provide energy. 5. Formation of RBCs in foetal life. 6. Destruction of RBCs forming bile pigments and iron. 7. Formation of plasma protein. 8. Formation of heparin, a natural anticoagulant in the blood. 9. Storage of iron and vitamin B_{12} & fat soluble vitamins A,D,E,K 10. Maintenance of body temperature: As a number of chemical reactions occur in the liver, heat is generated which is helpful in maintaining body temp. 11. Excretion of toxic substances: The toxic substances entering the body through alimentary canal are destroyed in liver. **OR** I. Carbohydrate metabolism: It helps in maintaining plasma glucose level with the help of insulin & glucagon. II. Fat metabolism: Stored fat can be converted to a form in which it can be used by the tissue to provide energy. III. Protein metabolism: Deamination of amino acids.-removes nitrogenous portion from amino acid not required for formation of new protein. Urea is formed from the nitrogenous portion which is excreted in urine. Break down of nucleic acids to form uric acid which is excreted in urine. Transamination: Removes the nitrogenous portion of amino acid & attaches it to carbohydrate molecule forming new non-essential amino acid. IV. Synthesis of plasma protein & most blood clotting factors from amino acid. V. Breakdown of RBCs & defence against microbes. This is carried out by Kupffer cells. VI. Detoxification of drugs & noxious sub. VII. Inactivation of hormones VIII. Production of heat IX. Secretion of bile X. Storage of glycogen, iron, copper, & fat-soluble vitamin-A, D, E, K, water soluble vitamin like vit. B12	**3M**

3	**c)**	**Draw a well labelled diagram of female reproductive system.**  	**3M**
3	**d)**	**Write the effects of sympathetic and parasympathetic nerve stimulation on** **i) Heart (1M)** **ii) Blood vessels (1M)** **iii) Pupil (1M)**	**3M**

	Sympathetic	**Parasympathetic**
Heart	The heart rate and force of contraction of heart increases.	Decreases heart rate and forc contraction of heart.
Blood vessels	Coronary artery: Vasodilation Skeletal blood vessels: Vasodilation Other blood vessels: Vasoconstriction.	Coronary artery: Vasoconstri Skeletal blood vessels: Vasoconstriction Other blood vessels: Vasodil
Pupil	Dilation of pupils causing mydriasis	Constriction of pupils causin miosis.

3	**e)**	**'Pancreas is called as exo-endocrine gland.' State reason.** Endocrine glands secrete their secretions (hormones) directly into the blood stream**,** and there is no duct involved. That is they are also called as ductless/glands secretion. The pancreatic islets secrete insulin, glucagon and somatostatin all of which are secreted into the blood stream without ducts, and therefore pancreas is an endocrine gland. Exocrine glands are the glands which secrete their secretion via a duct. The pancreas	**3M**

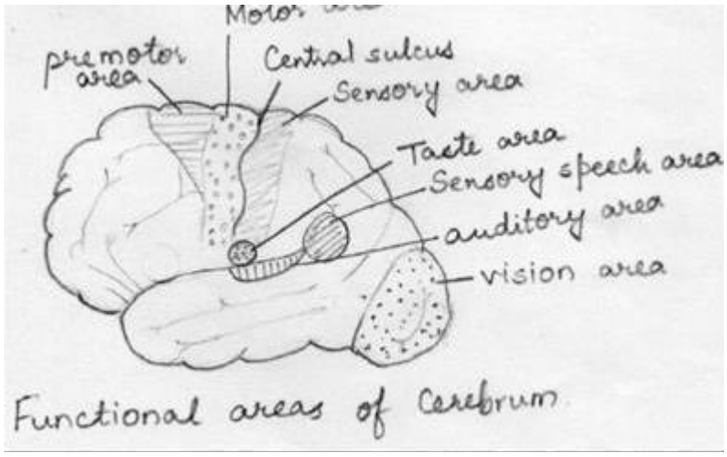
		also makes digestive enzymes, which are collectively known as pancreatic juice, and are secreted into the duodenum of the small intestine through the pancreatic duct. Thus pancreas performs an exocrine function. Thus pancreas performs both the functions; they are called as exo-endocrine gland.	
3	**f)**	**Define and explain neuromuscular junction. (0.5M +2.5M)** Neuromuscular junction: The Neuromuscular junction is the connection between a large myelinated nerve and skeletal muscle fibre.  The muscle membrane through which a nerve fibre passes is called sarcolemma. Near the termination in the muscle, the axon branches into tiny fibres that form the motor end plate near the muscle fibre. The nerve fibre spreads to form branches called Hypolemmal axons which end in club like feet called sole feet. The entire nerve ending is called end plate. Below the sole feet, a small space called synaptic cleft is present. Below this, there are large folds of muscle membrane. The neuro transmitter released is Ach. at this junction which is responsible for stimulating the muscle fibre & causing voluntary muscle movement.	**3M**
4		**Attempt any FOUR of the following**	**12M**
4	**a)**	**Explain the three phases of menstrual cycle.** Menstrual Cycle -Series of events occurring regularly in females every 26-30 days, during reproductive years. Consists of series of changes that take place simultaneously in ovaries & uterine walls, stimulated by changes in blood level of hormones. Days of cycle are numbered from beginning of Menstruation (4), Proliferative phase (10), and Secretory phase (14). <u>Menstruation</u> Decrease level of progesterone & Estrogens stimulate release of PGs, causes constriction of arterioles in endometrium, leads to death of cells. Entire stratum functionalis sloughs off=menstruation, only stratum basalis remains. Menstrual flow consists of 50-150ml of blood, tissue fluid, mucus & epithelial cells.	**3M**

		Lasts for 4-5 days. Proliferative phase One of the follicles from both ovaries, develop and become dominant follicle, starts secreting estrogens. This follicle matures into Graafian follicle (diameter more than 20 mm). Estrogens stimulate repair of endometrium . Cells of stratum basalis undergo mitosis & produce new stratum functionalis . Thickness of endometrium doubles:5-10mm LH causes rupture of mature follicle & ovulation. That is end of this phase. Secretory phase Under influence of LH ruptured follicle transforms into corpus luteum that secretes progesterone, estrogens. Promotes growth and coiling of endometrial glands, vascularisation of superficial endometrium & thickening of endometrium to 12 -18 mm. Under influence of progesterone secretory glands produce large amount of mucusThere is similar increase in secretion of watery mucus by glands of uterine tubes& cervical glands of vagina. If oocyte is not fertilised, degeneration of corpus luteum within 2 weeks into corpus albicans. Levels of progesterone & estrogens decrease, that causes menstruation & cycle continues. This phase is most constant part of cycle lasts for 14 days i.e. from 15 to 28 days.	
4	**b)**	**Draw a well labelled diagram of sagittal section of an eye.**  SAGITTAL SECTION OF EYE	**3M**
4	**c)**	**Mention the digested end products and enlist the enzymes involved in** **i) Carbohydrate (1.5M)** Digestion of carbohydrate involves formation of sugars from carbohydrates by action of enzymes.	**3M**

		In mouth- salivary amylase converts polysaccharides to disaccharides. In small intestines- Pancreatic amylase converts polysaccharides to disaccharides. Sucrase converts sucrose to glucose and fructose. Maltase converts maltose to glucose. Lactase converts lactose to glucose and galactose. **ii) Protein digestion (1.5M)** Digestion of protein is process of conversion of protein into amino acids by action of enzymes. Digestion of protein initiates in stomach and ends in small intestines. In Stomach: Acid from gastric juice converts enzyme pepsinogen into pepsin. This pepsin acts on protein and breakdown into polypeptides. In Small Intestines: By the action of enzyme enterokinase present in intestinal mucosa, chymotrypsinogen and trypsinogen from pancreatic juice get converted into chymotrypsin and trypsin. These enzymes convert polypeptides into bi-peptides and tri-peptides. Enzyme peptidase secreted by enterocytes of small intestine converts bi-peptides and tri-peptides into amino acids. These amino acids further absorbed into blood circulation. In this way digestion of protein takes place.	
4	**d)**	**Define hormone. Enlist the hormones secreted by anterior and posterior pituitary gland. (1M +2M)** Hormone is Chemical messenger secreted by endocrine gland into bloodstream, carried away at a distant where it influences cellular activity. Pituitary Gland has two lobes: Anterior lobe and Posterior lobe Hormones secreted by Anterior lobe: 1. Growth hormone 2. Thyrotrophic hormone/Thyroid stimulating hormone (TSH) 3. Adrenocorticotrophic hormone (ACTH) 4. Gonadotrophic hormones • Follicle stimulating hormone (FSH) • Luteinising hormone (LH)/ ICSH in males 5. Lactogenic hormone (Prolactin) Hormone secreted by Posterior lobe: 1. Oxytocin 2. Antidiuretic hormone (ADH) /Vasopressin	**3M**

4	**e)**	**Explain the functions of skin.** **Functions of skin-** 1. **Protection** - It forms the water proof layer & protects the inner delicate structures. It acts as the barrier against the invasion of the microbes, chemicals & dehydration. The melanin pigment protects against the harmful UV rays. 2. **Regulation of body temperature**- The temperature is constant at 36.8^{o} C. When the metabolic rate of the body increases, the body temperature increases & vice versa. To ensure constant body temp., a balance between heat production & heat loss is maintained by the skin. 3. **Formation of vitamin D -** 7-dehydroxycholesterol is present in the skin. The UV light from the sun converts it to vitamin D. 4. **Sensation** – It contains nerve endings of many sensory nerves which act as organ of sensation of touch, temp., pressure and pain. 5. **Absorption**- Some drugs & chemicals are absorbed through the skin. 6. **Excretion**- Skin is a minor excretory organ & excretes NaCl, urea & substances like garlic	**3M**
4	**f)**	**Explain terms and write normal value:** **i) Vital capacity (1.5M)** This is the maximum volume of air which can be moved into and out of the lungs. **OR** It is the volume of air that passes into and out of the lungs by the most forcible inspiration and expiration (3 - 5 litres) **ii) Tidal volume (1.5M)** It is the volume of air moved in & out of lungs during each cycle of quiet (normal) breathing. (500 ml).	**3M**
5		**Attempt any FOUR of the following**	**12M**
5	**a)**	**What are auditory ossicles? Name the bones involved in it. Explain its functions.(1M+1M+1M)** Auditory ossicles are three very small bones present in tympanic cavity of the ear. (There are three very small bones that extend across middle ear from tympanic membrane to oval window.) They are named according to their shape, namely-i) Malleus (hammer), ii) Incus (anvil), iii) Stapes (stirrup). Sound waves vibrate tympanic membrane and these vibrations are amplified and transmitted by these ossicles to oval window of inner ear which are carried further to perceive the sound.	**3M**

5	**b)**	**Explain the process of urine formation**. Following 3 steps are involved in urine formation: 1) Glomerular filtration 2) Selective reabsorption 3) Tubular secretion 1) Glomerular filtration: - The glomerular filtering membranes acts as ultrafilters.The particles like colloidal, soluble and cell free substances, smaller than endothelial pores are filtered. However big particles like plasma proteins are not filtered. The filtration takes place with the pressure of 35 mm of Hg.This pressure results from different forces involved in glomerular filtration. The GFR i.e. glomerular filtration rate is 120 ml/min, Thus producing 170- 180 litres of filtrate in a day. 2) Selective reabsorption:-Out of 170-180 litres of filtrate, about 99% is reabsorbed, resulting in formation of 1 litre of urine per day. The filtrate contain major amount of water, which is reabsorbed to the extent of 99%. Depending upon the extent to which various substances are reabsorbed they are classified as: a)High threshold substances:They get absorbed completed eg. Glucose and potassium(100%), water (99%), calcium and sodium chloride (98-99%). b) Low threshold substances: Absorbed to some extent eg. Urea , uric acid, phosphate. c)No threshold substances:These are not required by the body at all.eg. Creatinine, sulphates. 3)Tubular secretion: The substances not required by body and not filtered in glomerular filtration are secreted by the tubules. Depending upon extent to which sodium ions are reabsorbed, potassium, & hydrogen ions are secreted, thus maintaining electrolyte balance of the body. Some metabolized substances like ammonia are also excreted. Thus the final filtrate of urine, consists of uric acid, urea and is carried by collecting tubule to duct to the pelvis of ureter. The ureter opens in to urinary bladder where it is stored and finally excreted out.	**3M**
5	**c)**	**Explain the process of micturition.** In infants, accumulation of urine in the bladder activates stretch receptors in the bladder wall generating sensory impulses that are transmitted to the spinal cord, where the spinal reflex is initiated. This stimulates involuntary contraction of the detrusor muscle & relaxation of the internal urethral sphincter and expels urine from the bladder. This is micturition. When bladder control is established, the micturition reflex is still stimulated but sensory impulses also pass upwards to the brain and there is awareness of the need to pass urine as the bladder fills.By learned & contious effert, contraction of the external urethral sphincter and muscles of pelvic floor can inhibit micturition until it is convenient to pass urine.	**3M**

5	**d)**	**Draw labelled diagram of cerebrum showing functional areas.**  Functional areas of Cerebrum	**3M**
5	**e)**	**State the composition and functions of gastric juice. (1M + 2M)** Composition of Gastric juice- water, mineral salts, mucus, hydrochloric acid, Enzymes such as pepsinogen, gastric renin and the intrinsic factor. Functions of Gastric Juice: 1. Water liquefies the food. 2. HCl acidifies the food & stops the action of salivary amylase. 3. HCl kills the microbes, 4. Pepsinogen is activated to pepsin by HCl, This digests protein to peptones and peptides. 5. Intrinsic factor helps in absorption of vit. B12 from small intestine. 6. Mucus prevents mechanical injury to the stomach wall.	**3M**
5	**f)**	**Name any six cranial nerves with function. (0.5 X 6=3M)** **Name and No. of Cranial Nerve** — **Function** 1. Olfactory (sensory) — Sense of smell II. Optic (sensory) — Sense of sight Balance III. Oculomotor(motor) — Moving the eyeball Focusing Regulating the size of the pupil IV. Trochlear(motor) — Movement of the eyeball V. Trigeminal(mixed) — Chewing Sensation from the face VI. Abducent(motor) — Movement of the eye VII. Facial (mixed) — Sense of taste Movements of facial expression VIII. Vestibulocochlear(sensory) — Maintenance of balance	**3M**

		a) Vestibular (b) Cochlear	Sense of hearing	
		IX. Glossopharyngeal (mixed)	Secretion of saliva Sense of taste Movement of pharynx	
		X. Vagus (mixed)	Movement and secretion	
		XI. Accessory(motor)	Movement of the head, shoulders, pharynx and larynx	
		XII. Hypoglossal(motor)	Movement of tongue	
6		**Attempt any FOUR of the following**		**16M**
6	**a)**	**Classify primary tissues in detail**. Tissues are classified into four major types:- 1) Epithelial tissue/Epithelium 2) Muscular tissue 3) Nervous tissue 4) Connective tissue **Epithelial tissues can be classified in two type**:- **1)Simple epithelium**-i) Squamous/pavement epithelium ii) Cuboidal epithelium, iii) Columnar epithelium, iv) Ciliated columnar epithelium 2) **Compound epithelium**:-i) Stratified epithelium and ii) Transitional epithelium. **There are three types of muscular tissues**: 1. Skeletal Muscle/ voluntary/ striated muscle 2. Smooth muscle/ involuntary/ nonstriated 3.Cardiac Muscle **Types of connective tissue.** 1) Areolar tissue 2) White Fibrous tissue 3)Yellow Elastic tissue 4) Adipose tissue 5) Cartilage 6) Bone 7) Blood 8)Lymph		**4M**
6	**b)**	**Write anatomy and physiology of thyroid gland. (2M + 2M)** **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 secrete& store colloid which is a sticky protein m**aterial. Bet.** The follicle there are C-cells which secrete calcitonin hormone. **Physiology** : The gland secretes T3 (Tri iodothyronin)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 calcium ions by the renal tubules & decreases the blood levels of calcium.		**4M**

6 c) Differentiate between arteries & veins. (0.5 X 8=4M) **4M**

Artery	Vein
1. Arteries are the blood vessels which carry the blood away from the heart.	Veins are the blood vessels which bring the blood towards the heart.
2. All arteries except pulmonary artery carry oxygenated blood.	All veins except pulmonary veins bring deoxygenated blood
3. Arteries are thick walled. In artery tunica media is thick.	Veins are thin walled. In veins tunica media is thin.
4. Arteries are elastic	Veins are less elastic.
5. Lumen of the artery is smaller as compared to vein	Lumen of the vein is larger as compared artery.
6. Arteries are branched into arterioles.	Venules reunite to form veins.
7. They are reddish in colour	They are bluish in colour
8. They do not contain valves	They contain valves

6 d) Write the mechanism of coagulation. **4M**

Ans. When the blood vessel is damaged, loss of blood is stopped by the following way.

1**) Vasoconstriction**: - When platelets come in contact with a damaged blood vessel they adhere to it. Serotonin is released which constricts the blood vessel.

2) **Platelet plug formation: -** The adhered platelets attract more platelets which form platelet plug. This forms temporary seal.

3) C**oagulation- (blood clotting)**: The thromboplastin (prothrombinase) released by damaged tissue cells by extrinsic or intrinsic pathway. In presence of calcium ions it converts prothrombin to thrombin. Thrombin acts on fibrinogen & converts it to insoluble fibrin. The fibrin mesh traps blood cells. This is known as clotting.

Prothrombin+ Calcium+ Thromboplastin → Thrombin

(inactive) (from damaged tissue) (active)

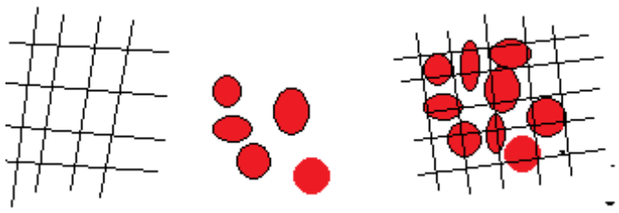
Thrombin acts on

↓

Fibrinogen → Fibrin

(soluble) (insoluble)

Fibrin + Blood Cells → Clot

			
6	**e)**	**Explain conducting system of heart.** **Conducting system of heart** The heart has intrinsic system where by the cardiac muscles are automatically stimulated to contract without external stimulation. The intrinsic system can be stimulated or depressed by nerve impulses from brain, circulating chemicals & hormones. **SA node;** These are small mass of specialized neuromuscular cells in the walls of myocardium of right atrium near the opening of the superior vena cava. It is known as pacemaker of the heart as it initiates the impulses.This causes the atrial contraction.(0.1sec) **AV node- (**atrioventricular node) These are the mass of neuromuscular cells in the wall of the atrial septum near the AV valves. Normally it conducts the impulses that are originated by SA node.It is known as secondary pace maker as it generates the impulses when there is problem with SA node. **Atrioventricular bundle (bundle of His)** These fibres originate from the AV node.At the upper end of ventricular septum they divide into the right & left bundle branches.& within the ventricular myocardium they divide into fine branches known as purkinjefibres. AV node, bundle branches & purkinje fibres convey impulses from AV node to the ventricle for ventricular contraction.(0.3sec)	**4M**
6	**f)**	**Define the terms: (1 M each)** **i)Myopia**: - Also termed as near-sightedness. Near vision is normal but far vision is blurred, because the far image is focused/formed in front of the retina as eye ball length is too long. **ii)Bronchitis** : Bronchitis is inflammation of the bronchi. **iii)Menopause:** Cessation of menstruation in a woman's life at about 45 years of age. **iv)Stenosis:** An abnormal narrowing in a blood vessel or other tubular organ or structure.	**4M**