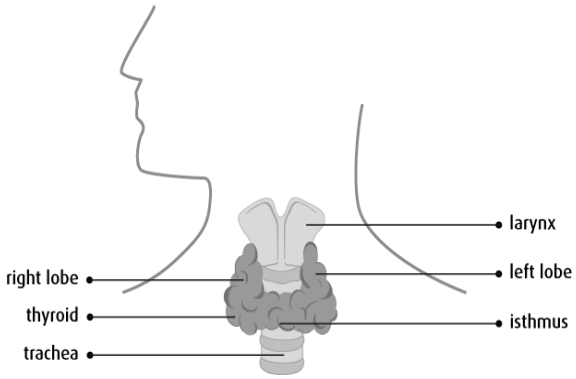
WINTER– 2018 EXAMINATION

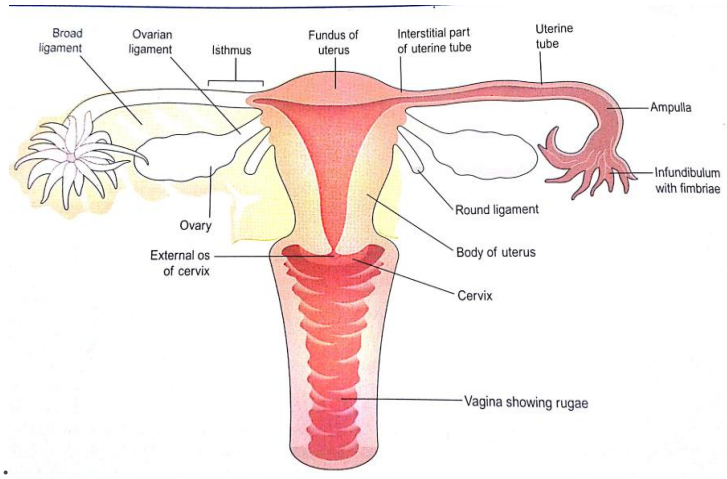
Model Answer **Subject Code:** 22347

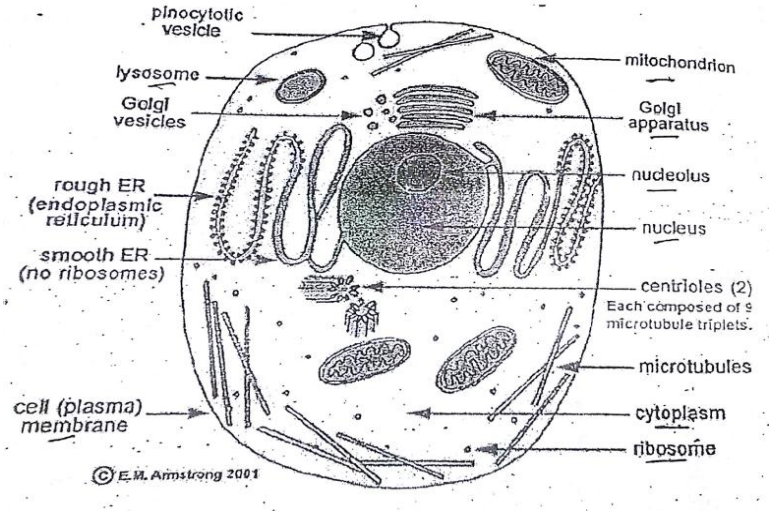
Important Instructions to examiners:

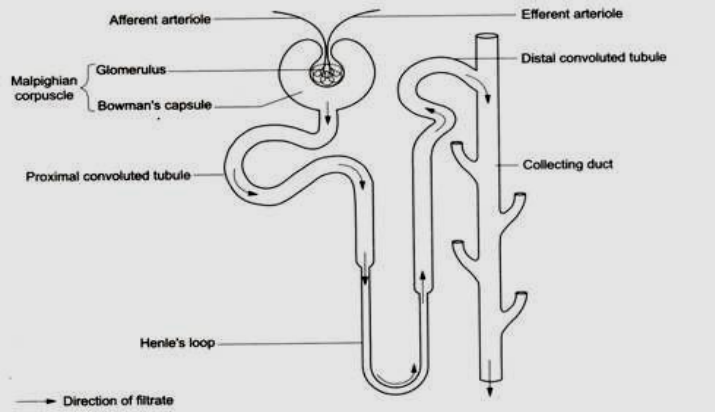
1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
3) The language errors such as grammatical spelling 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.

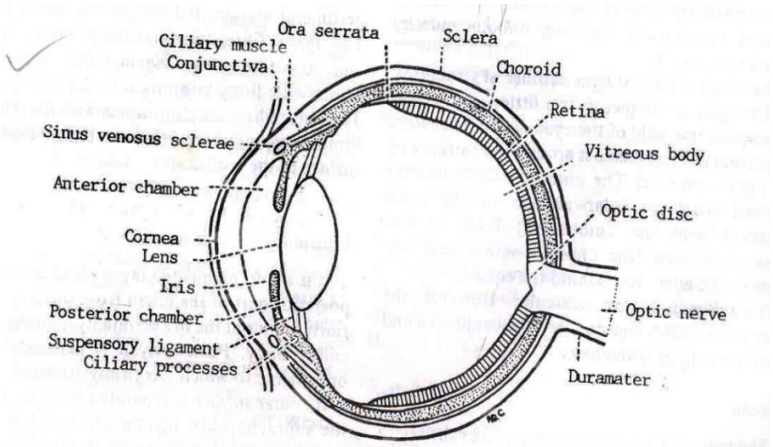
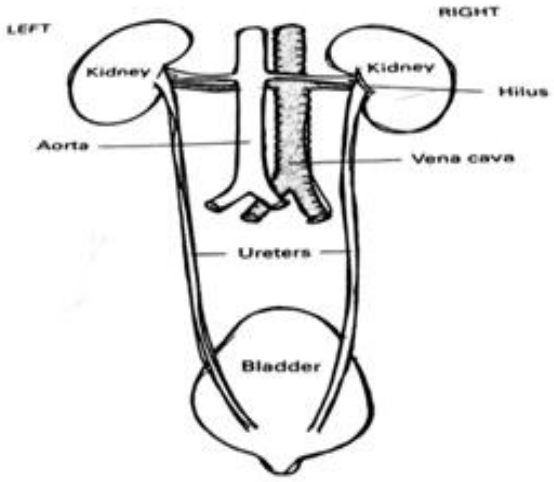
Q. No.	Sub Q.N.	Answer	Marking Scheme
Q.1		**Attempt Any FIVE of the following :**	**10**
	a)	**List different blood groups.** **Ans:** 1. Group A 2. Group B 3. Group AB 4. Group O	**02**
	b)	**Define : (i) Heart Rate (ii) Cardiac Output** **Ans: i) Heart rate:** Heart rate is the speed of the heartbeat 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.	**01** **01**
	c)	**List any two diseases related to respiratory system.** **Ans:** 1) Bronchitis 2) Asthma 3) Respiratory tract infection 4) Lung cancer 5) Bacterial pneumonia 6) Pulmonary embolism	**02**
	d)	**List the organs of digestive system.** **Ans: (any 2)** 1. Mouth 2.Pharynx. 3. Oesophagus. 4. Stomach. 5. Small intestine. 6. Large intestine. 7. Rectum 8. Anus.	**02**

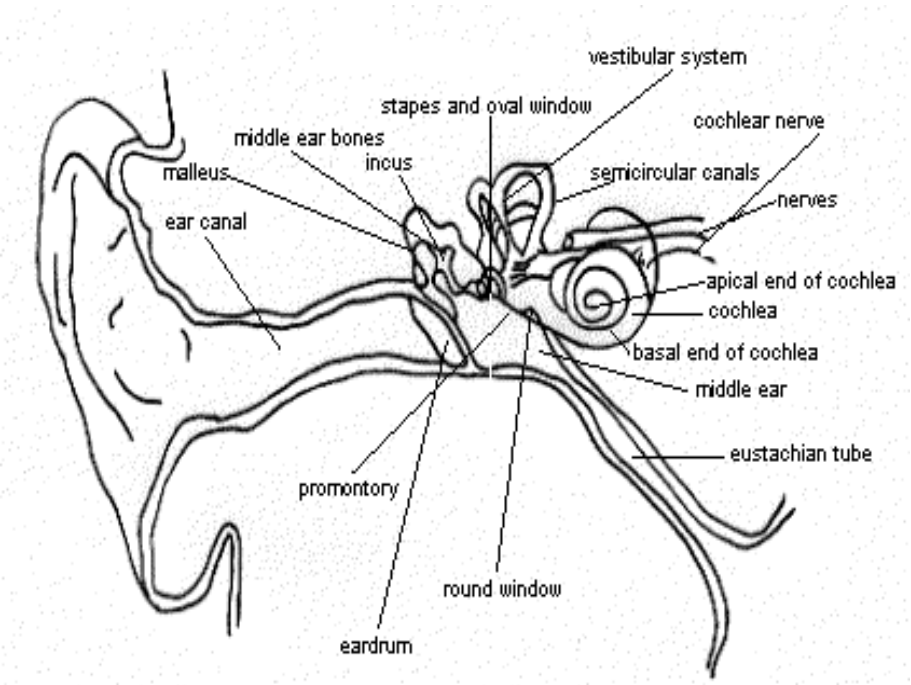
	e)	**Draw structure of thyroid gland.** **Ans:**  **Fig: Structure of thyroid gland.**	**02**
	f)	**List any two diseases related to nervous system.** **Ans:** 1.Trauma 2.Tumors 3.Stroke 4.Autism 5.Depression 6.Epilepsy 7.Migraine 8.Catalepsy 9.Degeneration 10.Meningitis 11.Bipolar disorder 12.Addiction	**02**
	g)	**Name the instruments related to urinary system.** **Ans: (any 2)** 1. Cystoscopy 2. Ureteroscopy 3. Uroflowmetery 4. Hemodialysis 5. Ultrasound 6. Urinary catheters	**02**
Q.2		**Attempt Any <u>THREE</u> of the following :**	**12**
	a)	**Give properties of cardiac muscles.** **Ans: (any 2)** **1)Excitability:** Ability of cell to respond by generation of action potential when adequately stimulated **2) Atomicity/Autorthymicity**: It refers to ability of cardiac muscle to initiate its own impulse at constant rthymical interval known as Autorthymicity. **3) Conductivity**: Transmission of impulse from one part to another part with help of specialized conducting tissue. **4) Contractivity:** Ability of cardiac muscles to actively generate force to shorten and thicken to do work when adequate stimulus is applied. **5) Long refractory period:** It is the interval of time during which a normal cardiac impulse can't excite the already excited area of muscle.	**04**
	b)	**State the function of following parts of respiratory system :** **(i) Nose** **(ii) Pharynx** **(iii) Larynx** **(iv) Trachea** **Ans: (1 mark each)** **(i) Nose:** It conducts respiration process mainly filtration of air, Temperature	**04**

		maintenance of inspired air (heating and cooling). **(ii) Pharynx:** Passageway for air and blood. The pharynx is an organ involved in both the respiratory and the digestive system. **(iii) Larynx:** It consists of vocal cord which helps for production of voice. **(iv) Trachea:** It helps to expand size of oesophagus during swallowing and deglutination of food.	
	c)	**Calculate the cardiac output, if a person has the resting heart rate of 72 beats/minute and resting stroke volume of 70 ml/beat. Judge whether person will need medication on the basis of provided data.** **Ans:** Cardiac output = Stroke volume X Heart rate. Stroke volume = 70 ml/beat Heart rate = 72 beats/minute So cardiac output = 5040 ml For normal human being the cardiac output is 5040 ml. So person does not need any medication.	**02** **02**
	d)	**Draw female reproductive system and state the function of each organ.** **Ans:**  **Fig :Female Reproductive system** Female reproductive system consist of internal and external genital organs a)Internal Organs:1) ovaries 2) uterine tube 3)vagina. b) External organs:1)mons pubis 2)labia majora and minora 3)clitoris4) vestibule of vagina 5)Greater vestibular gland. Females are born with a large number of potential ova (female sex cells, also called egg cells). However, it isn't until after the onset of puberty, typically around age 12, that these cells are mature enough to sustain life. The cells ripen on a regular basis, but only one is released each month until a woman reaches menopause. Menopause commonly begins between the ages of 45 and 55. The major organs of the female reproductive system include: **Vagina**: This muscular tube receives the penis during intercourse and through it a baby leaves the uterus during childbirth. **Uterus**: This organ holds and nourishes a developing fetus, if an egg was properly fertilized. **Ovaries**: The female gonads, the ovaries produce ova. When one matures, it is released down into a fallopian tube. **Fallopian tubes**: These small tubes transport ova from the ovaries to the uterus. This is where an egg waits to be fertilized.	**02** **02**

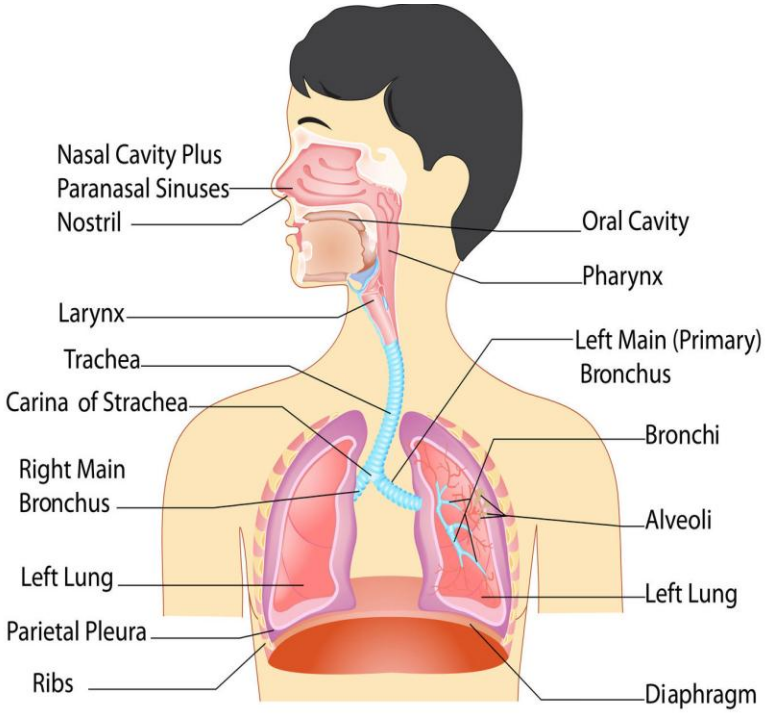
Q.3		Attempt Any THREE of the following :	12
	a)	**Choose blood group in case of medical emergency, where there is unavailability or shortage of patient's blood group. Justify the choice.** **Ans:** Type O negative blood is considered the universal blood type. People with type O negative blood are called universal donors because type O negative blood is compatible to any blood recipient's type. Ideally the donor's blood types should always be an exact match to the recipient's blood type. Universal donors should only be used in the case of medical emergency where there is an unavailability or shortage of the patient's blood type or when a blood transfusion needs to be performed immediately, not allowing the time to cross type the blood compatibility.	**04**
	b)	**Name any two hormones along with its functions secreted by the pituitary gland.** **Ans: (any 2)** **Growth hormone: -** it stimulates protein synthesis in growth and repairs all tissues. **TSH –thyroid stimulating hormone: -** when the blood level of thyroid hormone is more then secretion of TSH is reduced and vice versa. **Adrenocorticotropic: -** it controls secretion of adrenal cortex hormones. **Prolactin: -** this hormone affects directly on breast, immediately after parturition. **Gonadotropic hormone: - It** helps to promote the growth and development of ovaries, uterus, vagina and fallopian tubes by the secretion of follicle stimulating hormone and leutinising hormone. **Oxytocin:-** it promotes contraction of uterine muscles **Antidiuretic hormone: -** it increases permeability to water of distal and collecting tubules of nephron thereby increasing reabsorption of water.	**04**
	c)	**Draw neat labeled diagram of cell.** **Ans:**  	**04**
	d)	**Name the instruments related to cardiovascular system.** **Ans: (any 4)** 1. ECG machine. 2. Defibrillator. 3. Pacemaker. 4. Heart lung machine. 5. Heart rate meter. 6. Phonocardiograph. 7. Sphygmomanometer.	**04**

Q. 4		Attempt Any THREE of the following :	12
	a)	**Describe the process of gases exchange in the alveoli.** **Ans:** 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.	**04**
	b)	**A patient is found to have abnormally high concentration of glucose in his urine. Identify the portion of nephron that is most likely the cause of this excess concentration of glucose with justification. Also draw a labeled diagram showing structure of nephron.** **Ans:** The proximal convoluted tubule is the portion of nephron that is most likely the cause of this excess concentration of glucose because it is used for selective re-absorption of glucose, water, peptides and other nutrients from the tubule fluid back into the blood.  Different parts of a nephron	**02** **02**
	c)	**Higher proportions of people living in hilly region are suffered from goiter. Justify it.** **Ans:** The term goiter means the enlargement of thyroid gland. Thyroid disorder is the commonest endocrine disease. Its prevalence depends on various factors like geographical conditions, ethnic conditions and environmental conditions. People living on mountains are more prone to goiter, as most of them have iodine deficiency. Iodine is a key element in maintaining normal thyroid function, the deficiency of which leads to goiter. In the mountains, the soil and water have lower amounts of iodine. So people staying in hilly areas do not get adequate iodine through their diet. They are prescribed to increase the intake of table salt to get rid of the iodine deficiency. Thus people living in hilly region are suffered from goiter.	**04**
	d)	**Give the functions of bone.** **Ans : (any 4)** **Function of bones :** 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 chancellous bone. 4. They provide form joints which are essential for the movement of the body. 5. They 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**

	e)	**Draw neat labelled diagram of eye.** **Ans:**  Fig. 19.1. Sagittal section through the eyeball.	**04**
Q.5		**Attempt Any <u>TWO</u> of the following :**	**12**
	a)	**Explain urinary system with labelled 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 is 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.	**03** **03**

		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.	
	b)	**Explain anatomy of ear with neat sketch.** **Ans:**  **Fig : Internal Structure Of Ear** 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 completed by all parts of ear a) External ear – External acoustic meatus up to Tympanic membrane b) Middle ear – Ear ossicles – Incus, Malleus and Stapes c) Internal ear – Fenestra vestibule and Cochlea Hearing process is conducted by collection of sound waves which leads to the vibration of tympanic membrane when waves pass through external acoustic meatus Ear ossicles Incus, Malleus and Stapes carry the vibrations received by tympanic membrane to the internal ear Through fenestra vestibule. Vibration of ear ossicle (Stapes) causes vibration in perilymph leads to 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.	**03** **03**

	c)	**Describe ANS and PNS in detail.** **Ans:** **ANS** • Autonomous nervous system (ANS) regulates basic vital functions • ANS is composed of both your parasympathetic (rest and relax) system and your sympathetic (flight or fight) system. • It regulates the homeostasis of your entire body without much conscious effort. • Its "automatic" – hence the name. • Respiration particularly gaseous exchange conducts • Cardiac activity controlled by ANS • Bowel movements conducted by ANS • Action or movements happen typically without too much thought on your part by ANS **PNS** The peripheral Nervous system consists of 31 pairs of spinal nerves arising from spinal cord and twelve pairs of cranial arising from brain. 31 pairs of spinal nerves are distributed as 8pairs of cervical nerves in cervical region.12 pairs of thoracic nerves in the thorax. 5 pairs of lumbar nerves in lumbar region. 1 pair of coccygeal nerve Spinal nerve is formed by union of sensory and motor nerves. Branches of nerves unite to form a structure called plexuses. Nerves are made up of single neuron which carries nerve impulses or they are made up of chain of neurons. Types of nerves : a) Motor nerve - impulses from brain and spinal cord to other parts of body. b) Sensory nerve - impulses from periphery of body to spinal cord and then to brain. c) Mixed nerves: Afferent and Efferent nerves are enclosed within the same tube of connective tissue. They are called mixed nerves.	**03** **03**
Q.6		**Attempt Any <u>TWO</u> of the following :**	**12**
	a)	**Describe the functions of various digestive juices.** **Ans :** **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. **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. **Function of Pancreatic Juice-** Pancreatic fluid contains digestive enzymes that help to further break down the carbohydrates, proteins, and lipids in the chyme.	**06**

		2. It makes "enzymes to digest proteins, fats, and carbs in the intestines" and produces the hormones insulin and glucagon. **Function 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.	
	b)	**Define any four respiratory parameters with its sketch.** **Ans: (any 4)** 1. Tidal Volume: The volume of gas inspired or expired (exchanged with each breath) during normal quiet breathing is known as tidal volume 2. Expiratory Capacity: After normal inspiration the maximum amount of air that can be forced out is called expiratory capacity. 3. Vital Capacity: The greatest volume that can be inspired from the resting end expiratory position. 4. Expiratory reserve Volume: The volume of gas remaining after a normal expiration less the volume remaining after a forced expiration. 5. Residual volume: The volume of air remaining in the lungs after a maximal exhalation. 6. Inspiratory reserve volume: The maximal amount of additional air that can be drawn into the lungs by determined effort after normal inspiration. 7. Inspiratory capacity: This is amount of air that can be inspired with maximum effort. 8. Functional residual capacity: This is the amount of air passages in the air the end of quit expiration.  	**04** **02**

	c)	**A person after consuming alcohol walks clumsily. Justify it and describe main parts of brain in short.** **Ans :** - Alcohol consumption leads to the contraction of brain tissues causing a depression in the central nervous system. - Excessive alcohol consumption can also lead to brain cell damage. - Alcohol also affects the communication between nerve cells once it reaches the brain. Too much of alcohol suppresses the excitatory nerve pathway and increases the activity of restrictive nerve pathway. The 'cerebellum' is that part of the brain that helps one in coordinating muscle movements. Alcohol impinges on this contribution of the cerebellum and thus affects muscle movements. It is for this reason that a drunken person cannot speak or walk properly. **The brain has three main parts:** the cerebrum, cerebellum and brainstem. Cerebrum: is the largest part of the brain and is composed of right and left hemispheres. It performs higher functions like interpreting touch, vision and hearing, as well as speech, reasoning, emotions, learning, and fine control of movement. Cerebellum: is located under the cerebrum. Its function is to coordinate muscle movements, maintain posture, and balance. Brainstem: acts as a relay center connecting the cerebrum and cerebellum to the spinal cord. It performs many automatic functions such as breathing, heart rate, body temperature, wake and sleep cycles, digestion, sneezing, coughing, vomiting, and swallowing	**02** **04**