



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.

**MODEL ANSWER**

WINTER- 19 EXAMINATION

Subject Title: Human Anatomy & Physiology

Subject Code:

0809

Q. No	Sub Q. N.	Answer	Marking Scheme
1		Answer any Eight of the followings:	16M
1	a)	Define Anatomy & Physiology. (1 mark each definition) Anatomy -It is the study of structure of the body & its individual parts & their relation to one another. Physiology - It is the study of the functions of various parts and how they are integrated to produce a coordinated action of the whole body.	2M
1	b)	Name fundamental tissues of the body. (0.5 mark for each tissue) The four main types of tissues are- Epithelial tissue Connective tissue Muscle tissue Nervous tissue	2M
1	c)	What is serum? Serum is plasma without blood clotting factors. It is clear sticky fluid that consists of plasma from which clotting factors have been removed.	2M
1	d)	Explain true and false ribs. (1 mark each) True ribs – The first seven pairs of ribs anteriorly articulate directly through costal cartilages with the sternum and are known as true ribs. False ribs – The rest five of the ribs are false ribs. The 8th, 9th and 10th pair of ribs are indirectly attached to the sternum anteriorly i.e. cartilages of these ribs join immediately with costal cartilage of 7th pair of ribs. The eleventh & twelve ribs are not attached anteriorly. These are called false ribs.	2M
1	e)	Name the bones of shoulder joint. (1 mark for each bone) Scapula & humerus. The glenoid cavity of scapula & ball of the humerus form shoulder joint.	2M

**MODEL ANSWER****WINTER- 19 EXAMINATION****Subject Title: Human Anatomy & Physiology**Subject Code: **0809**

1	f)	Define the term Dyspnea. Ventilation of the lungs becomes severely impaired, causing breathlessness known as Dyspnea . PO ₂ quantity get reduces in blood and PCO ₂ increases in blood. OR Difficulty or shortness of breathing is known as dyspnea.	2M
1	g)	Define cell. Enlist its components. . (1M for definition & 1M for components) A cell is a smallest functional unit of an organism. It is the basic unit of all body tissues. The components are, Mitochondria, lysosomes, Nucleus, Microfilaments & Microtubules, Endoplasmic reticulum, Golgi apparatus, Centriole, Ribosomes.	2M
1	h)	Define erythropoiesis. It is the process of formation of red blood cells from stem cells. It takes about 7 days.	2M
1	i)	Give the names of four cranial nerves. (0.5 marks each) I- Olfactory II- Optic III - Oculomotor IV- Trochlear V- Trigeminal VI- Abducent VII - Facial VIII- Vestibulocochlear IX- Glossopharyngeal X -Vagus XI- Accessory XII- Hypoglossal	2M
1	j)	Explain the terms fossa and foramen (1 mark each) Fossa- A hollow or depression Foramen- A hole in a structure	2M
1	k)	Define Saliva? Enlist salivary glands. (1 mark for definition and 1 mark for glands) Saliva is the secretions of the salivary glands. There are three pairs of salivary glands - parotid, submandibular, sublingual.	2M
1	l)	Name the hormones secreted by Adrenal glands. (Each 1 mark) Adrenal cortex secretes 3 hormones: Mineralocorticoids (Aldosterone), Glucocorticoids (Cortisol) and Sex hormones	2M

		(Androgens). Adrenal medulla- It produces adrenaline & non adrenaline.	
2		Attempt any FOUR of the followings	12M
2	a)	<p>What is reflex action? (1M) Explain structure of Reflex arc. (Diagram with explanation 2M)</p> <p>A reflex action is an involuntary & immediate motor response to a sensory stimulus.</p> <p>Reflex arc:</p> <p>It consists of structures which are involved in the production of a reflex action. These structures are</p> <ul style="list-style-type: none"> A sensory organ like skin which receives the sensory impulses. A sensory nerve which transmits sensory impulses from sensory organ to posterior root of spinal cord. A connector neurone which receives sensory impulses, interprets it and generate motor impulses. A motor nerve which transmits motor impulses to motor organ. A motor organ like muscle which receives motor impulses, get excited and shows response to the impulses. 	3M



2	b)	<p>Enlist the hormones secreted by posterior pituitary gland (1M) and explain their effects (2M).</p> <p>Hormone secreted by Posterior lobe:</p> <ol style="list-style-type: none">1. Oxytocin2. Antidiuretic hormone (ADH) /Vasopressin <p>Oxytocin</p> <ul style="list-style-type: none">• It stimulates uterine smooth muscle during labour to bring childbirth (parturition)• It stimulates the muscle cells of the lactating breast for ejection of milk. <p>Anti-diuretic hormone (ADH) /Vasopressin</p> <ul style="list-style-type: none">• It decreases urine output by increasing tubular reabsorption of water in the kidney.• It increases blood pressure by constricting capillaries and arterioles.	3M
2	c)	<p>Draw & label diagram L.S. of Kidney.</p> <p><u>A longitudinal section of kidney</u></p>	3M

**MODEL ANSWER**

WINTER- 19 EXAMINATION

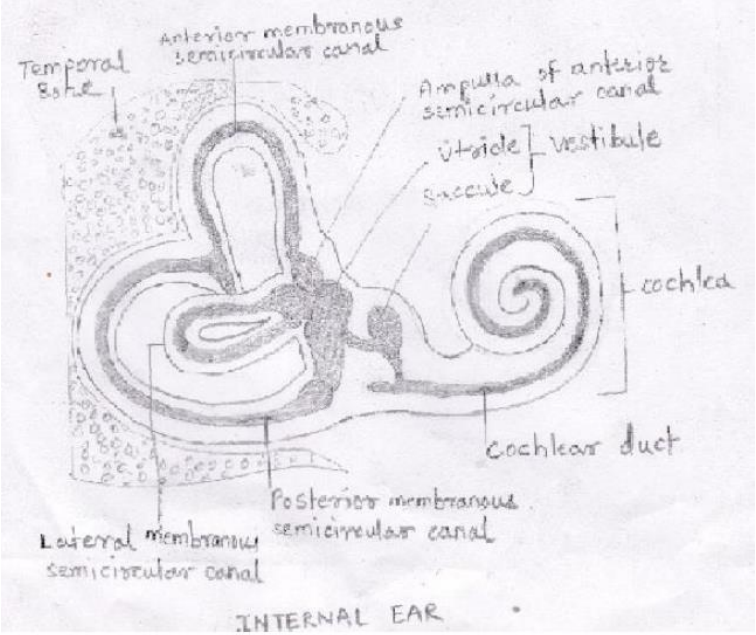
Subject Title: Human Anatomy & Physiology

Subject Code:

0809

2	d)	<p>Define lymph.(1M) Give functions of lymphatic system.(2M)</p> <p>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.</p> <p>Functions of Lymphatic System:</p> <ol style="list-style-type: none">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 defense mechanism by way of filtration of lymph & trapping microorganism.	3M
2	e)	<p>Explain the terms Atherosclerosis and Myocardial Infarction (1.5 mark each)</p> <p>Atherosclerosis:</p> <p>It refers to the deposition of fats, cholesterol and other substances (plaques), in the tunica intima of mid-size and large artery, which can restrict blood flow due to narrowing or complete blocking of artery.</p> <p>Myocardial Infarction</p> <p>Death of myocardial muscle due to lack of blood supply, due to complete blockage of coronary artery.</p>	3M
2	f)	<p>What will be the effect of sympathetic nervous stimulation on: -</p> <p>(i) Salivary gland (1Mark) (ii) Blood vessels (1 Mark) (iii) Bronchi (1 Mark)</p> <p>i) Salivary gland : Decreases the secretion of saliva, making the mouth dry and swallowing difficult.</p> <p>ii) Blood Vessels: Dilation of coronary artery, Dilation of skeletal blood vessels, Constriction of all other blood vessels.</p> <p>iii) Bronchi: Bronchodilation.</p>	3M



3		Attempt any FOUR of the followings	12M
3	a)	Draw well labelled diagram of internal Ear 	3M
3	b)	Explain the term Hypothalamus (1M) with its functions.(0.5 M for each function) Hypothalamus: The hypothalamus is composed of a members of groups of nerve cells. It is situated below and in front of the thalamus, immediately above the pituitary gland. Following are functions of hypothalamus: 1) It controls Autonomic nervous system. 2) It controls appetite & satiety. 3) Regulation of thirst. 4) Maintenance of emotional behaviour, personality and social behaviour. 5) Regulation of body temperature 6) It regulates and controls release of hormones from pituitary gland. 7) It regulates biological clock.	3M
3	c)	Define the term portal circulation? Give its significance The portal circulation(2 marks)	3M

**MODEL ANSWER**

WINTER– 19 EXAMINATION

Subject Title: Human Anatomy & Physiology

Subject Code:

0809

		<p>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 passes to the liver via the portal vein. The portal vein is formed by union of gastric vein, superior & inferior mesenteric veins, splenic vein & cystic vein. The blood passes through the second capillary bed, the hepatic sinusoid in the liver before entering the general circulation via the inferior vena cava.</p> <p>Importance of portal circulation (1 mark)</p> <p>Blood with the high concentration of nutrients absorbed from the stomach & intestine goes to liver first. In the liver certain modifications takes place including the blood nutrient level. The venous blood then leave sliver via hepatic vein & joins the inferior vena cava.</p>	
3	d)	<p>Explain Physiology of muscle contraction</p> <p>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.</p>	3M
3	e)	<p>Describe composition (1M)and function of Gastric juice (2M)</p> <p>Composition: water, mineral salts, mucus, hydrochloric acid, Enzymes such as pepsinogen, gastric renin and the intrinsic factor.</p> <p>Function:</p> <ol style="list-style-type: none">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.	3M

**MODEL ANSWER**

WINTER- 19 EXAMINATION

Subject Title: Human Anatomy & Physiology

Subject Code:

0809

		5. Intrinsic factor helps in absorption of vit. B12 from small intestine. 6. Mucus prevents mechanical injury to the stomach wall.	
3	f)	Explain role of kidney in maintenance of water balance of body. Kidney controls urine output & maintain water balance by 3 ways. 1. ANTI-DIURETIC HORMONE Increased blood osmotic pressure → Osmoreceptors in hypothalamus → Stimulation of post.Pituitary → Release of ADH → promotes Reabsorption of water → Reduces loss of water in urine (reduced blood osmotic pressure) 2. ALDOSTERONE Decrease in blood volume & pressure → Secretion of Renin by Kidneys → Angiotensinogen → Angiotensin I → Angiotensin II → Stimulation of Adrenal Cortex release of aldosterone → Promotes urinary reabsorption of Na ⁺ & Cl ⁻ → simultaneously increases water reabsorption via osmosis → Reduces loss of water in urine. 3. ATRIAL NATRIURETIC PEPTIDE Increased blood volume → Secretion of ANP by atria of heart → Reduces Reabsorption of Na ⁺ , Cl ⁻ by Kidneys → Promotes natriuresis, increased urinary → excretion of Na ⁺ , Cl ⁻ → Increases loss of water in urine via osmosis	3M
4		Attempt any FOUR of the followings	12M
4	a)	Explain the term anemia.(1M) Enlist its types (1M)and explain megaloblastic anemia (1M) Definition: In anaemia, there is not enough haemoglobin available to carry sufficient O ₂ from lungs to the tissues. i.e. a condition in which the oxygen carrying capacity of blood is reduced. <u>Classification based on the cause</u> 1 Impaired erythrocyte production –	3M

**MODEL ANSWER**

WINTER- 19 EXAMINATION

Subject Title: Human Anatomy & PhysiologySubject Code: **0809**

		<p>iron deficiency anaemia</p> <p>megaloblastic anaemia</p> <p>hypo plastic anaemia</p> <p>2 Increased erythrocyte loss-</p> <p>Haemolytic anaemia</p> <p>hemorrhagic anaemia</p> <p><u>megaloblastic anaemia (macrocytic)</u></p> <p>This is due to deficiency of folic acid or vit.B12. Abnormally large RBCs are found in the blood (megaloblasts) as maturation does not take place. The cells are immature, nucleated and fragile with life span of 40-50 days. Folic acid & vit.B₁₂ deficiency is due to less intake Or no absorption from jejunum.</p>	
4	b)	<p>Name the cartilages of larynx? (2M)Give functions of larynx(1M for any two fun))</p> <p>It is made up of following cartilages:</p> <p>1-thyroid cartilage.</p> <p>1- cricoid cartilage.(ring shaped)</p> <p>1-epiglottis.-elastic cartilage</p> <p>2-arytenoid cartilages(ladle shaped) 2-cuneiform cartilages (wedge shaped)& 2-corniculate cartilages (horn shaped)</p> <p>Functions:</p> <ol style="list-style-type: none">1) Production of sound2) Speech3) Protection of lower respiratory tract4) Passageway for air	3M



5) Humidifying, filtering and warming processes continue as inspired air travels through the larynx

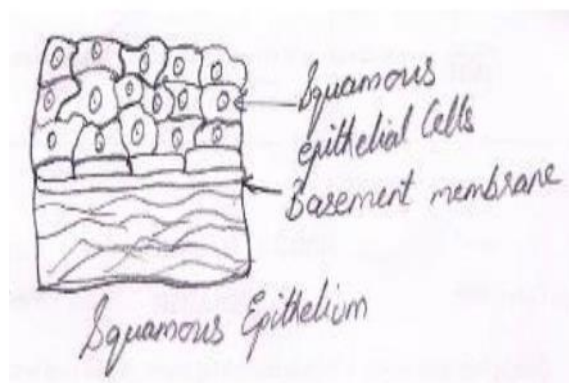
4**c)****Classify Epithelial tissues****3M**

Epithelial tissues can be classified in two type:-

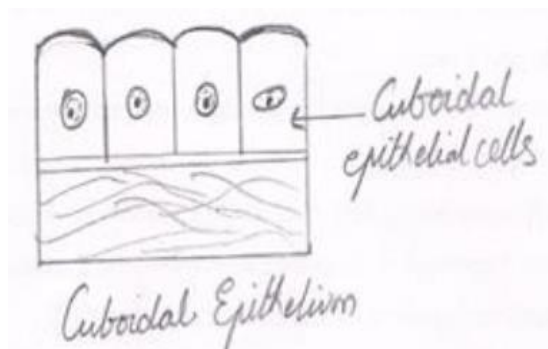
1) **Simple epithelium**-i) Squamous/pavement epithelium ii) Cuboidal epithelium, iii) Columnar epithelium, iv) Ciliated columnar epithelium.

2) **Compound epithelium**:- i) Stratified epithelium and ii) Transitional epithelium.

i) Squamous/pavement epithelium;- Composed of single layer of flattened cells, fit like flat stones and forms a smooth membrane. This tissue provides a thin smooth, inactive lining for heart, blood vessels, alveoli of lungs and lymph vessels.



ii) Cuboidal epithelium:- Composed of cube shaped cells and forms the basement membrane. Involved in secretion and absorption. Present in some simple secretive glands. Forms basement membrane in tubules of kidney.



**MODEL ANSWER**

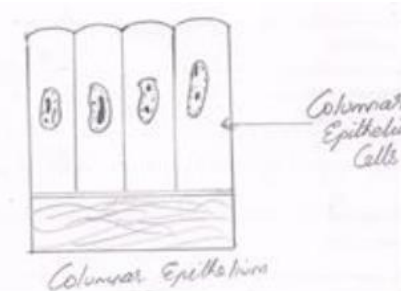
WINTER- 19 EXAMINATION

Subject Title: Human Anatomy & Physiology

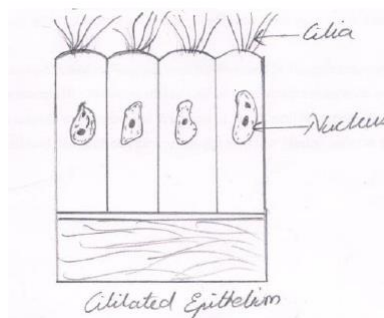
Subject Code:

0809

iii) Columnar epithelium:-Formed by single layer of tiny cylindrical columns and situated on a basement membrane .Found lining the organs of alimentary tract and special columnar cells called ‘goblet cells’, in GIT secretes sticky substances called mucous. Function-absorption



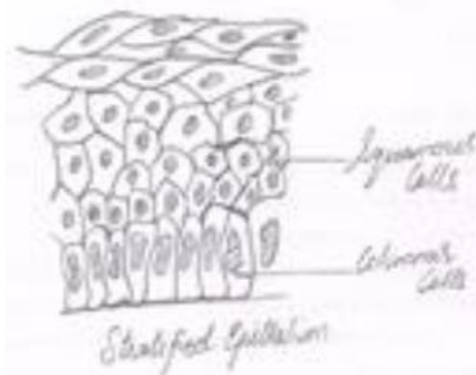
iv) Ciliated epithelium:-This is formed by columnar cells with fine hair like protoplasmic processes called cilia, capable of wave like movements. They move the contents in a particular direction. Found lining most of the respiratory passages and uterine tubes. In respiratory passages, it propels mucous towards throat and in the uterine tube, it propels ova towards the uterus



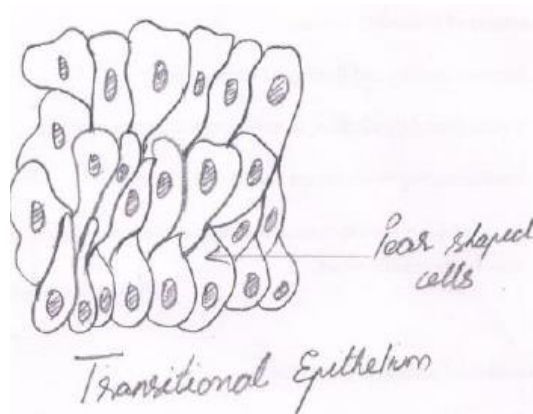
3) **Compound epithelium:-**Consists of number of layers of cells, protecting underlying layers of cells.

i) Stratified epithelium:-Deepest layer of columnar cells which becomes flattened at the surface due to constant migration of cells from deep layer to the surface. At the surface the cells die and lose their nuclei. Such cells form a hard substance called ‘keratin’. Such keratinized epithelium is found on dry surfaces like skin, hair and nails, whereas

nonkaeratinized epithelium is found on wet surfaces lining mouth, pharynx, esophagus and conjunctiva of eyes.



ii) Transitional epithelium:- Composed of several layers of pear shaped cells ,a stage between simple and stratified epithelium hence called transitional epithelium .Superficial layer of oval shaped cells held together by intercellular cement, slimy and allows the cells to slip on one another. Found lining accessory structures of ureters, urinary bladder and urethra.



4	d)	<p>Explain the term thrombosis (1.5M) and embolism (1.5M)</p> <p>Thrombosis: Thrombosis is the formation of a blood clot, known as a thrombus, within a blood vessel. It prevents blood from flowing normally through the circulatory system.</p> <p>The risk of thrombus developing within a blood vessel is increased by any condition that slows blood flow, damages the smooth lining of blood vessels or increases blood</p>	3M
---	----	---	----

**MODEL ANSWER**

WINTER- 19 EXAMINATION


Subject Title: Human Anatomy & Physiology

Subject Code:

0809

		coagulability. Embolism: Embolus is a mass of any material like blood clot, tumor fragment, pus or fragment of athermanous plaque carried in the blood. Embolism occurs when this material blocks the blood vessel	
4	e)	Explain properties of skeletal muscle tissue (any 3 properties,1M for each) Skeletal muscle possesses four essential properties: <ul style="list-style-type: none">• Excitability: this refers to muscle tissue being able to react to nervous stimulation.• Extensibility: this refers to the ability of muscle tissue to lengthen when contracting and provide the effort required to move the lever system (the bones and joints), producing coordinated movement.• Elasticity: this refers to the ability of muscle tissue to return to its normal resting length once it has been stretched.• Contractility: this refers to the capacity of a muscle to contract or shorten forcibly when stimulated by nerves and hormones (excitability).	3M
4	f)	Describe the mechanism of coagulation of blood When the blood vessel is damaged, loss of blood is stopped by the following way. <ol style="list-style-type: none">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) Coagulation- (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.	3M



		<p>Prothrombin+ Calcium+ Thromboplastin → Thrombin (inactive) (from damaged tissue) (active)</p> <p>Thrombin acts on ↓ Fibrinogen → Fibrin (soluble) (insoluble) Fibrin + Blood Cells → Clot</p> 	
5		Attempt any FOUR of the followings	12M
5	a)	<p>Define Glomerular filtration (1.5M) and Glomerular filtration rate. (1.5M)</p> <p>Glomerular filtration: It is a process of filtration through the semipermeable walls of the glomerulus & the glomerular capsule. The filtration takes place due to the difference in the pressure bet. the glomerulus & capsule. Water & other small molecule pass through it. Blood cells plasma protein & other larger molecules do not pass through it.</p> <p>Glomerular filtration rate: The volume of the filtrate formed by both kidneys each min. is called the glomerular filtration rate. (GFR). GFR – 125 ml / min in male and 105 ml / min in female.</p>	3M
5	b)	<p>Explain Physiology of Respiration.</p> <p>Physiology of respiration- (cycle of breathing)The normal human has 12-15 breath per min. Each breath consists of inspiration, expiration & pause.</p> <p>Inspiration When diaphragm contracts, then central tendon is pulled downwards. During inspiration, the simultaneous contraction of intercostal muscles & diaphragm increases the capacity of thoracic cavity. This reduces the pressure in the lungs. To equalise the pressure the air from atmosphere enters the lungs. The process of inspiration is active as it needs energy for muscle contraction.it lasts for 2 sec.</p>	3M

**MODEL ANSWER****WINTER- 19 EXAMINATION****Subject Title: Human Anatomy & Physiology**Subject Code: **0809**

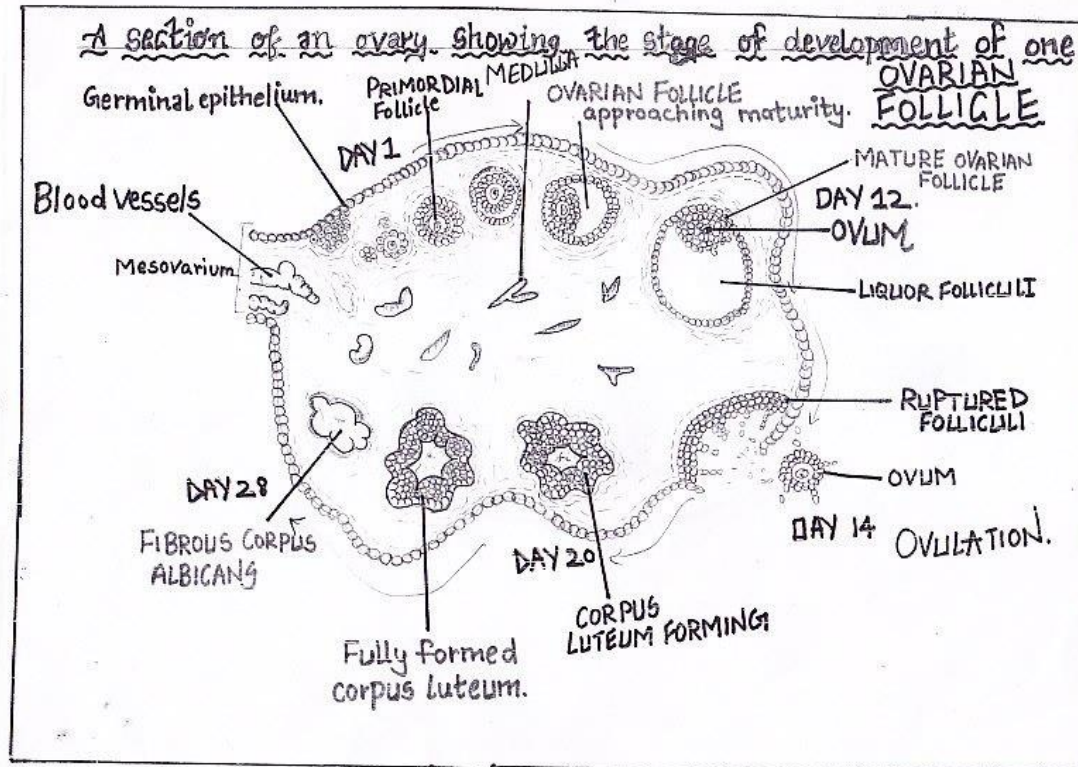
		<p>Expiration When diaphragm relaxes, then central tendon is pushed upwards. Relaxation of intercostal muscles & diaphragm results in decrease in the size of thoracic cavity. As a result, the pressure inside the lungs increases as compared to atmospheric pressure. The air from the lungs is expelled from the lungs. This process is passive as does not require energy. The expiration lasts for 3 sec.</p> <p>After expiration there is pause & then the next cycle begins.</p> <p>Internal respiration This is the exchange of gases bet blood & the body cells. The blood arriving at the tissues is saturated with O₂ & therefore has a higher PO₂ & lower PCO₂ than tissues. This creates concentration gradient bet capillary blood & the tissues& gaseous exchange takes place.O₂ diffuses from the blood into the tissues, & CO₂ diffuses from the cells into the venous end of the blood.</p>	
5	c)	<p>Explain the terms odema (1.5M) & Nephritis.(1.5M)</p> <p>Odema : Oedema is fluid retention. Oedema means abnormal accumulation of tissue fluid leading to swelling.</p> <p>Nephritis :(glomerulonephritis) is an inflammatory conditions of the glomerulus .The immune complexes formed by an antigen antibody complexes lodges on the glomeruli & cause inflammation of the glomeruli.</p>	3M
5	d)	<p>Define & give normal values of (i) Vital Capacity (ii) Tidal Volume (iii) Residual Volume</p> <p>(i) Vital Capacity This is the maximum volume of air which can be moved into & out of the lungs during forceful breathing. Normal value 3-5 liters.</p> <p>(ii) Tidal Volume This is the volume of air passing into & out of lungs during each cycle of quiet (normal) breathing. Normal value-500ml</p> <p>(iii) Residual Volume This is the volume of air remaining in the lungs after forceful expiration. Normal Value: male- 1.2 liters, female 1.1 liters</p>	3M



5	e)	<p>Compare Autonomic Nervous system (ANS) with Central nervous system. (CNS) (any 3 points)</p> <table border="1"> <thead> <tr> <th data-bbox="250 436 824 491">ANS</th> <th data-bbox="824 436 1401 491">CNS</th> </tr> </thead> <tbody> <tr> <td data-bbox="250 491 824 604">It consists of sympathetic & parasympathetic division.</td> <td data-bbox="824 491 1401 604">It Consists of brain & spinal cord</td> </tr> <tr> <td data-bbox="250 604 824 718">It involves only efferent pathway.</td> <td data-bbox="824 604 1401 718">It involves both afferent and efferent pathways.</td> </tr> <tr> <td data-bbox="250 718 824 936">Unconscious signals originates in hypothalamus, brain stem and spinal cord and activates target neurons.</td> <td data-bbox="824 718 1401 936">Efferent signals originate at the cerebral cortex as a conscious decision and activates neurons in the brain stem or spinal cord.</td> </tr> <tr> <td data-bbox="250 936 824 1045">It performs motor activities.</td> <td data-bbox="824 936 1401 1045">It performs mental, sensory and motor activities.</td> </tr> </tbody> </table>	ANS	CNS	It consists of sympathetic & parasympathetic division.	It Consists of brain & spinal cord	It involves only efferent pathway.	It involves both afferent and efferent pathways.	Unconscious signals originates in hypothalamus, brain stem and spinal cord and activates target neurons.	Efferent signals originate at the cerebral cortex as a conscious decision and activates neurons in the brain stem or spinal cord.	It performs motor activities.	It performs mental, sensory and motor activities.	3M
ANS	CNS												
It consists of sympathetic & parasympathetic division.	It Consists of brain & spinal cord												
It involves only efferent pathway.	It involves both afferent and efferent pathways.												
Unconscious signals originates in hypothalamus, brain stem and spinal cord and activates target neurons.	Efferent signals originate at the cerebral cortex as a conscious decision and activates neurons in the brain stem or spinal cord.												
It performs motor activities.	It performs mental, sensory and motor activities.												
5	f)	<p>State various types of Synovial Joints with examples.(0.5 for each)</p> <p>Types of synovial joints They are classified according to the types of movement possible or shape of the part of the bones involved.</p> <ol style="list-style-type: none"> Ball & socket joint The head of one bone is ball shaped which fits into cup shaped socket of another bone. This allows range of movement. E.g. shoulder joint, hip joint. Hinge joint The articulating ends form an arrangement similar to hinge on the door. The movement is restricted. e.g. elbow joint, knee joint, ankle joint . Gliding joint The articulating surfaces glide over each bet carpals (inter carpal bones), tarsal bones (inter tarsal bones). Pivot joint this joint allows the joint to rotate. e.g. the joint formed by axis & atlas allows the head to rotate & proximal & distal radio ulnar joint. Condyloid joint A condyle is a smooth projection of bone which fits on the depression of another bone. e.g. joint between Mandible & temporal bone, joint bet metatarsal & phalanges & joint between metacarpal & phalanges. Saddle joint The bones fit like man sitting on a saddle. e.g. the joint between first metacarpal and trapezium of wrist. 	3M										



6		Attempt any FOUR of the followings	16M
6	a)	<p>Explain the structure (2M) & function of ovaries. (2M)</p> <p>Ovaries- They are the female gonads. it is made of two layers of tissues- The cortex & the medulla</p> <p>Structure The germinal epithelium is a layer of simple epi. That covers the surface of the ovaries. The tunica albuginea is a whitish capsule of dense connective tissue located deep to the germinal epi.</p> <p>Cortex-it surrounds the medulla It contains ovarian follicles in various stages of maturity each contain an ovum. Before puberty, the ovaries are inactive but it contains immature follicles(primordial follicles), which the female has from birth.During the childbearing years, (after puberty), one ovarian follicle matures (Graafian follicle) & ruptures & releases ovum in to the peritoneal cavity. . This is called ovulation. & occurs during each menstrual cycle. The ruptured follicle develops into the corpus luteum which in turn will leave a small permanent scar of fibrous tissue called corpus albicans. The corpus leutium secretes oestrogen & progesterone.</p> <p>Medulla It lies in the center & consists of fibrous tissues, blood vessels & nerves.</p>	4M

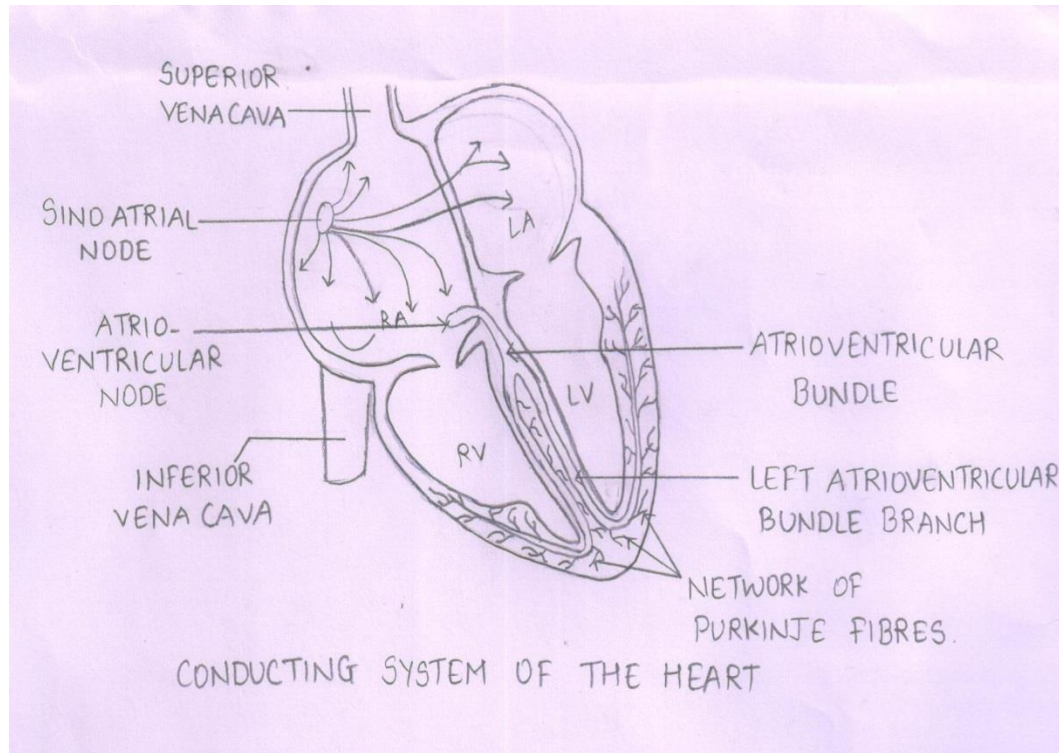


Functions of ovaries-

1. Maturation of the follicle is stimulated by FSH from anterior pituitary, and oestrogen is secreted by the follicle lining cells.
2. Ovulation is triggered by LH by anterior pituitary.
3. After ovulation the follicle lining cells develop into corpus luteum (yellow body) under the influence of LH.
4. The corpus luteum produces progesterone & some oestrogen.

6

b)

Draw diagram of conducting system of heart. (2M) Explain cardiac cycle. (2M)**4M****The cardiac cycle**

The series of events during one heart beat is known as cardiac cycle. It consists of atrial systole, ventricular systole & complete cardiac diastole.

During each beat or cardiac cycle, the heart contracts (systole) & relaxes (diastole).

Stages of cardiac cycle

Normally the no. of cardiac cycle is 60-80.

If we take 72, each cycle is of 0.8 sec. and consists of

Atrial systole (0.1 sec)

Ventricular systole (0.3 sec)

Complete cardiac diastole(0.4 sec)

The superior & inferior vena cava transport the deoxygenated blood into right atrium at the same time four pulmonary veins transport oxygenated blood into the left atrium during atrial diastole.

The impulses from the SA node spread over the atria, atria contracts, the AV



valves open and & blood flows to ventricles.(atrial systole-0.1 sec)

When the wave of contraction reaches AV node, it is stimulated & emits impulses which spreads over AV bundle, bundle branches & purkinje fibres resulting in contraction of ventricles pumping the blood into pulmonary artery & the aorta. (ventricular systole 0.3 sec).

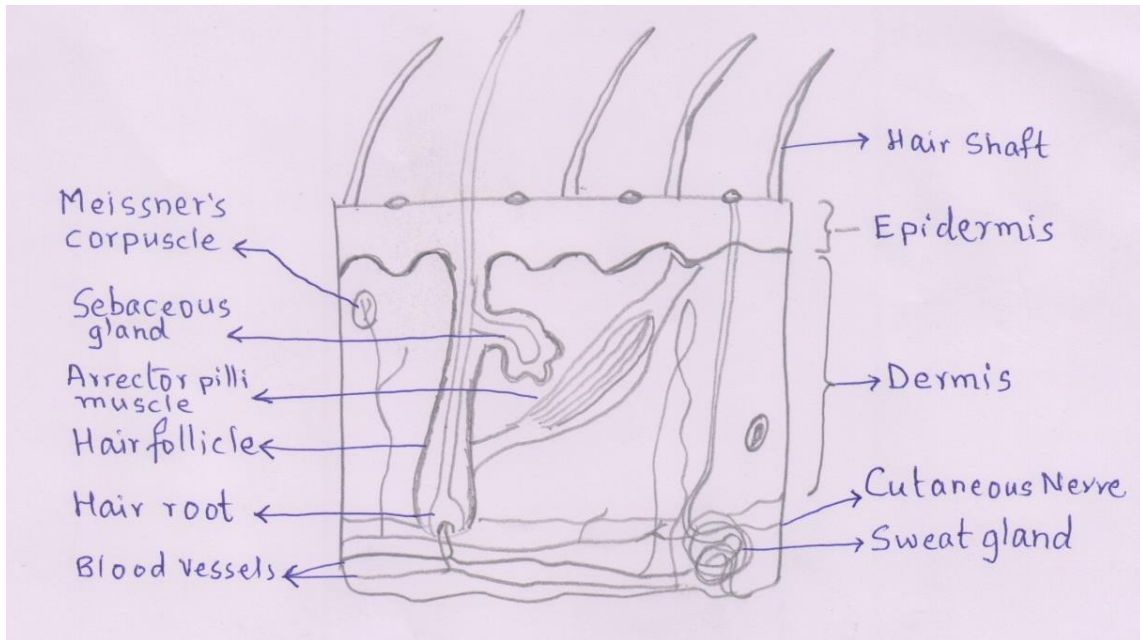
After the contraction of the ventricles there is complete cardiac diastole(0.4 sec) when both atria & ventricles relax. After this the next cycle begins.

6

c)

Draw V.S. of skin.(2M) Explain role of skin in maintenance of body temperature. (2M)

4M



The active tissues like muscles liver etc. produce heat.

Most of the heat loss from the body occurs through the skin by the process of evaporation of sweat, radiation & conduction.

The skin helps to maintain constant body temperature by the following way.

The center controlling temperature is situated in hypothalamus which is called heat regulating center. The vasomotor center in medulla oblongata also helps in regulating the body temperature.

The amount of heat loss from the skin depends on the blood in the vessels which lie in the dermis. As the amount of heat in body increases, the vasomotor center is stimulated



		<p>which causes vasodilatation of blood vessels in skin. Due to this, more amount of blood is passed through the skin which increases temperature of skin. As a result, sweat glands are stimulated by nerve impulses from the heat regulating center. Due to this more sweating occurs which gets evaporated to atmosphere, thus cooling the body.</p> <p>If the external temperature is low, or heat production is less, the vasomotor center causes vasoconstriction. Due to vasoconstriction, amount of blood flowing to the skin decreases which decreases the temperature of the skin and finally prevents heat loss from the body.</p>	
6	d)	<p>Explain the term menstruation. (1M) Describe in details the phases of Menstrual Cycle. (3M)</p> <p>Menstruation: This is the series of events occurring regularly in females every 26-30 days throughout the child bearing age.</p> <p>The cycle consists of</p> <p>menstrual phase, for 4 days</p> <p>proliferative phase for 10 days</p> <p>& secretory phase for 14 days.</p> <p>Menstrual phase- If the ovum is not fertilised corpus luteum degenerates, oestrogen & progesterone levels fall, the endometrium sheds.</p> <p>The menstrual flow consists of endometrial cells, secretion from endometrial glands & blood from broken capillaries.</p> <p>If pregnancy occurs high levels of oestrogen & progesterone prevents release of FSH & LH & this prevents the maturation & release of another ovum.</p> <p>Proliferative phase-FSH stimulates the ovarian follicle to mature, producing oestrogen which stimulates the proliferation of the endometrium. It thickens, becomes more vascular & rich in mucus secreting glands. LH triggers ovulation. This phase ends with ovulation & oestrogen production declines.</p> <p>Secretory phase- After ovulation, corpus luteum produces oestrogen & progesterone.</p> <p>Progesterone makes the endometrial walls thick & stimulates the endometrial glands to produce watery secretion to facilitate fertilisation. If the ovum is not fertilized, the corpus luteum degenerates, progesterone levels decline . functional lining of uterus sheds. & menstruation occurs & a new cycle begins.</p>	4M



6	e)	<p>Give the composition of bile (2M) and its functions. (2M)</p> <p>composition of bile-</p> <p>Water, mineral salts, mucus, bile pigments bilirubin, bile salts Cholesterol.</p> <p><u>Functions of bile</u></p> <ol style="list-style-type: none">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.	4M
6	f)	<p>Describe: (i) Hyperthyroidism (2M) (ii) Hypothyroidism (2M)</p> <p>(i) Hyperthyroidism</p> <p>This is also known as thyrotoxicosis. The most common form is Grave's disease (Exophthalmic goiter) which is auto immune disease where antibodies act like TSH hormone. This continuously stimulates the thyroid gland to grow & produce thyroid hormones. The patients have oedema behind the eyes which cause eyes to protrude. Hyperthyroidism leads to excitability, intolerance to heat, increased sweating, weight loss, muscle weakness, nervousness.</p> <p>(ii) Hypothyroidism</p> <p>This is due to deficiency of iodine.</p> <ol style="list-style-type: none">1-Cretinism in children- (congenital hypothyroidism) This causes severe mental retardation & stunted bone growth.2-Myxedema in adults The symptoms is oedema (because of accumulation of mucopolysaccharides) that causes the facial tissues to swell & look puffy.3 Hashimoto's disease- Autoimmune disease. Antibody react with thyroglobulin & prevent the release of thyroid hormone.	4M



MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION

(Autonomous)

(ISO/IEC - 27001 - 2005 Certified)

MODEL ANSWER

WINTER- 19 EXAMINATION

Subject Title: Human Anatomy & Physiology

Subject Code:

0809