B. Pharm, Second Semester, MSE-2019 (Batch-2018)
Model Answer Sub:- APHE-1

(1)

Time - 2 hrs Full Marks-20

All Questions carry equal Marks
Answer four Question.
Question No 1 is Compulsory.

Q1. Read the following statements carefully and tick (✓) the appropriate Column.

Sl. No	Statement	True	False
1	A gland is a single cell or group of cells ~~adapted~~ for secretion (Glands are specialized epithelial cells involved in secretion. Endocrine glands secrete hormones into circulation for example the thyroid gland secretes thyroxine into the blood. Exocrine glands secretes into duct or directly onto a free surface examples include sweat, mucous, digestive and oil gland)	~~True~~ ✓	
2.	The left side of the heart is more muscular than right (The left ventricle has a thicker muscular wall than the right ventricle because it needs to generate a higher pressure in the blood as it leaves the left side of the heart entering the aorta to be distributed throughout the systemic circulation. Therefore, the pressure of the muscle contraction is greater around the left ventricle than the other chambers.	✓	
3.	The cytoskeleton is a lattice structure made of calcium that gives shape to cells. (The cytoskeleton is a complex lattice structure of protein microtubules that maintains cell shape)		✓
4.	There are three classes of membrane in the human body (There are four classes of membranes mucous, Cutaneous, serous and synovial)		✓
5	Sweat removes certain organic compounds from the body. (Sweat removes a small quantity of urea and several organic compounds such as urea and lactic acid)	✓	

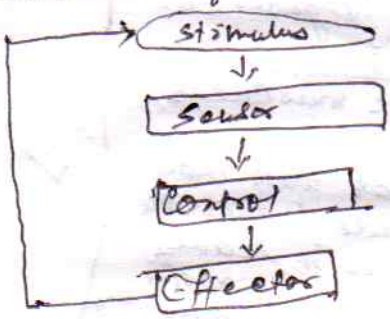
Q. 2.

(1) Homeostasis refers to the ability of the body or a cell to seek and maintain a condition of equilibrium or stability within its internal environment while dealing with external changes. In human homeostasis the happens when the body regulates body temperature in an effort to maintain an internal temperature around 98.6°F. For example we sweat to cool off during the hot Summer days and we shiver to produce heat during the cold winter season.

Many living things are not capable of living at all, yet the biological functions in them flawlessly. This is because many of these processes are regulated by way of feedback system in which the product of a process is back and influences a stimulus within the system either by reducing it or by further bolstering it. All feedback system occurs in a series of stages.

The first stage is a stimulus or a change in the system.
The second stage is the sensor where change is detected
The third stage is known as control which is where a response to change occurs
And finally the forth stage is the effector or the effect of the response.
And this cycle then repeats itself flawlessly.

~~Feed back System~~



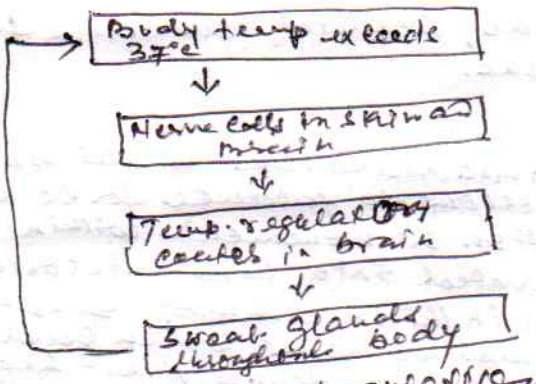
Feed back system are classified into two different type positive ~~feedback~~ and negative feedback.

Positive feedback :- In positive feedback system, the effector of a process bolsters the stimulus which increases the production of product. One common example of a positive feedback system in living things is blood clotting. When the skin is cut and a blood vessel experiences damage platelets in the blood stream collect at the site of the cut and begin releasing several different chemicals that signal more platelet secretions more platelets trigger more chemicals to be released which trigger more platelets which in turn trigger more chemical signals and so on, until the platelet and various associated proteins have plugged up the cut with a clot. Another example is the process of labour and childbirth in mammals. The effector is a hormone called oxytocin which stimulates uterine contractions, which then cause more oxytocin to be released and hence more contraction. The continues until the baby is born.

Negative feedback :- is a reaction that causes a decrease in function. It occurs in response to some kind of stimulus. Effect it causes the output of a system to be lessened, so that feedback tends to stabilize the system. Here are examples of negative feedback.

Human body temperature - The hypothalamus of a human responds to temperature fluctuations and responds accordingly. If temperature drops, the body shivers to bring up the temperature and if it is too warm, the body will sweat to cool down due to evaporation

Human bp :- When bp increases, signals are sent to the brain from the blood vessels. Signals are sent to the heart from the brain and heart rate slow down, thus helping bp to return to normal.



Body temp regulation

Q.2 (ii) Draw a neat labelled diagram of internal structure of the heart.

Ans:- Heart:- The importance of diagrams in biological sciences is well known. Hence students are asked to draw a neat labelled diagram of internal structure of the heart. Diagram should be properly illustrated and eye catching. Use of different colors and to show labelling of each components at proper place, is shall be differentiating. students are required to show following components:-

(1) Aorta (2) superior vena cava (3) Right pulmonary artery (4) Pulmonary trunk (5) Right pulmonary veins (6) Right atrium (7) Fossa ovalis. (8) Tricuspid valve (9) Right ventricle. (10) chordae tendineae (11) Trabeculae carneae (12) Moderator Band (13) Inferior vena cava (14) Left Pulmonary artery (15) Left atrium (16) Left Pulmonary Veins (17) Mitral (Bicuspid) valve (18) Aortic valve (19) Pulmonary valve (20) Left ventricle (21) Papillary muscle. (22) Interventricular septum (23) Epicardium (24) Myocardium (25) Endocardium.

Q.3 Identify the main tissue-type and describe the major function of each tissue.

Ans:- A tissue is an ensemble of similar cells and their extracellular matrix from the same origin that together carry out specific function. Tissues are grouped into four basic types such as epithelial, connective, muscle and nervous. Collections of tissues formed in a units to serve a common function Compose organs.

Epithelial tissue:- The epithelial tissue are formed by cells that covers the organ surfaces such as skin, the airways reproductive tract and inner lining of the digestive tract. The cells composing an epithelial layers are linked via a semipermeable tight function, hence this tissue provides a barrier between external environment and organ it covers. In addition to this protective function, epithelial tissue may also be specialized to function secretion, excretion and absorption it also help protect organs from microorganism, injury and fluid loss

Connective tissue:- Connective tissue are fibrous tissues made up of cells separated by non living material which is called an extracellular matrix. This matrix can be liquid or rigid. Connective tissue gives shapes to the organs and hold them in place. Blood, Bone, Tendons, Ligaments, adipose and areolar tissues are examples of connective tissue. One method of classifying connective tissues is to divide them into three types:

fibrous connective tissue, skeletal connective tissue and fluid connective tissue.

Muscular tissue:-

Muscle cells form the contractile tissue of the body known as muscle tissue. It functions to produce force and cause motion either locomotion or movement within internal organs. Muscle tissue is separated into three categories visceral or smooth muscle found in the innerlining of organs; skeletal muscle, typically attached to bones which generate gross movement and cardiac muscle found in the heart where it contracts to pump blood throughout an organism.

Nervous tissue:-

Cells comprising the central nervous system and peripheral nervous system are classified as nervous tissue. In the central nervous system, neutral tissues form brain and spinal cord. In PNS neural tissues form the cranial nerves and spinal nerves inclusive of the motor neurons.

Tissue	function	location	Distinguishing features
Epithelial	Protection, secretion, absorption, excretion	covers body surface covers and lines internal organs compose glands	Lack blood vessels.
Connective	Bind, support, protect fill spaces, store fat, produce blood cells	Widely distributed throughout the body.	Matrix between cells Good blood supply.
Muscle	Movement	Attached to bones in the walls of hollow internal organs and heart	Contractile
Nervous	Transmit impulses for coordination, regulation, integration and sensory reception	Brain, Spinal cord, Nerves	Cells connects to each other and other body parts.

Q.3.(ii) Identify the three types of muscle tissue. Compare and contrast the functions of each muscle tissue type.

Tissue	Histology	function	location
Skeletal Muscle Tissue	long cylindrical fiber striated, many peripherally located nuclei	voluntary movement produces heat protect organs	Attached to bones and around entrance points to body (eg mouth & anus.
Cardiac	short, branched, striated, single central nucleus	contracts to pump blood.	Heart
Smooth	short, spindle shaped no evident striation single nucleus in each fiber	Involuntary movement moves food, involuntary control of respiration moves secretions regulate flow of blood in arteries by contraction	walls of hollow organs and passageways.

8. 4) (i) Classify bones according to their shapes. Describe the function of each category of bones.

Ans:- A bone is a rigid organ that constitutes part of the vertebrate skeleton. Bones protect the various organs of the body, produces RBC & WBC, store minerals, provide structure and shape for the body and enable mobility. Bones come in a variety of shapes and sizes and have a complex internal and external structure. They are light weight yet strong and hard and serve multiple functions.-

classification:- There are five types of bones in the human body: long, short, flat, irregular, and sesamoid.

1. long bones:- long bones are characterized by a shaft. It is much longer than its width and with a rounded head at each end of the shaft. They are made up mostly of compact bone with lesser amounts of marrow located within the medullary cavity and the areas of spongy cancellous bone at the end of the bones. Most bones of the body including those of fingers and toes are long bones. The exception are eight carpal bones of the wrist, the seven articulating tarsal bones of the ankle and the sesamoid bone of the knee cap. Long bones such as clavicle, have differently shaped shafts or ends also called modified long bones
2. Short bone are roughly cube shaped and have only a thin layers of compact bone surrounding a spongy bone. The bones of wrist and ankle are short bones.
3. Flat bone are thin and generally curved with two parallel layers of compact bone. Most of the bones of skull are flat bones as is the sternum.
4. Sesamoid bones:- are bones embedded in tendons. Since they act to hold the tendons further away from the joint, the angle of the tendon is increased and thus the leverage of the muscle is increased. Examples are patella.
5. Irregular Bone:- As implied by the name their shapes of ossification or because they contain bony sinuses. The bones of spinal, pelvis, ethmoid, and sphenoid bones.

Bone classification	Features	Function	Examples
long	cylinder-like shape, longer than it is wide	Leverage	femur, tibia, fibula, metatarsals, humerus, ulna, Radius, metacarpals, phalanges
Short	cube like, approximately equal in length, width and thickness	Provide stability, support while allowing for some motion	carpals, tarsals
flat	thin & curved	Points of attachment for muscle protector of internal organs	sternum, ribs scapulae, cranial bone.
Irregular	Complex shape	Protect internal organs	Vertebrae, facial Bones
Sesamoid	small and round, embedded in tendons	protect tendons from compressive forces	Patellar.

Q.4 A (11) Describe structural features of cartilaginous joint. Distinguish between a synchondrosis and symphysis.?

Ans:- Joints are where two bones meet. They make the skeleton flexible - without them movement would be impossible.

Joints are classified by their range of movement such as immovable or fibrous joint, partially movable or cartilaginous joint, more freely movable or synovial.

Partially movable or cartilaginous joints move a little. They are linked by cartilage as in the spine. Each of the vertebrae in the spine moves in relation to the bone above and below it. There types of joint lack a joint cavity and involve bones that are joined together by cartilage or fibrocartilage. There are two types of cartilaginous joints. A synchondrosis is a cartilaginous joint where the bones are joined by hyaline cartilage. The second type of cartilaginous joint is a symphysis where, the bones are joined by fibrocartilage.

Synchondrosis:- In this subtype the bones are united by a plate of hyaline cartilage so that the joint is immovable and strong. These joints are temporary in nature because after a certain age the cartilaginous plate is replaced by the bone. Examples of this joints are joint between the epiphyses and diaphysis of a growing long bone, ~~the costochondral joint~~

Symphysis:- There are also known as fibro-cartilaginous joint. There articular surface is covered by a thin layer layer of hyaline cartilage and the bones are united by fibro cartilage. These joint are permanent and persist throughout the life. Examples of this type of joint are symphysis pubis, manubrio-sternal joint and intervertebral joints between the vertebral bodies.

Synchondrosis Primary cartilaginous joint	Symphysis Secondary cartilaginous joint
Bones connected by hyaline cartilage	Bones are covered by hyaline cartilage and connected by fibrocartilage
Immovable	Slightly immovable.
It disappears with age.	Joint disappears with age
Rarely occurs in midline.	Always occurs in midline.