99PRELIM ASSIGNMENT #1
PHYSIOLOGICAL & BIOLOGICAL PSYCHOLOGY

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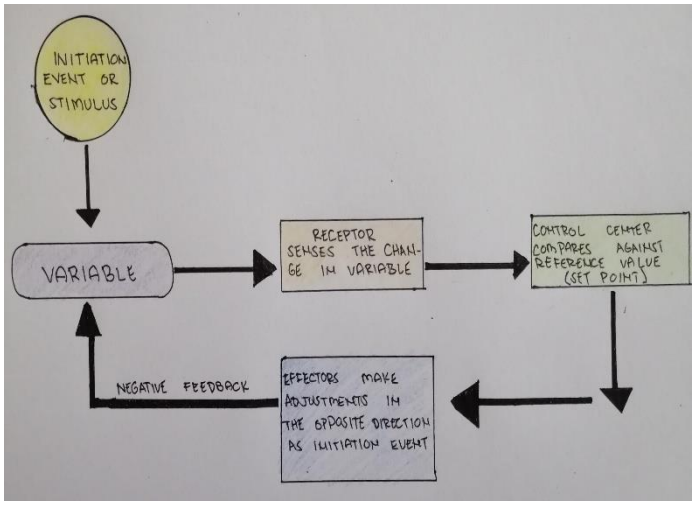
SUBJ CODE: PY48

1. Define homeostasis and describe how this concept can be used to explain physiological control mechanisms.
    - The ability of an organism to regulate various physiological processes in order to maintain stable and balanced internal states is referred to as homeostasis. These processes occur almost entirely outside of our conscious awareness. Both physiological and behavioral responses are involved in homeostasis. In terms of behavior, if you start to feel chilly, you may seek out warm clothing or a ray of sunlight. To keep the heat in, you could also curl your body inward and keep your arms tucked in close to your body. People, as endotherms, have a variety of internal systems that aid in temperature regulation. When your body temperature falls below normal, a variety of physiological reactions kick in to help restore balance. In order to prevent heat loss, blood vessels in the extremities constrict. Shivering also aids the body's ability to generate more heat.

2. Define negative feedback and explain how it contributes to homeostasis. Illustrate this concept by drawing and labeling a negative feedback loop.
    - Negative feedback occurs when the output of a system acts to reduce or dampen the processes that lead to that system's output, resulting in less output. Negative feedback loops, in general, allow systems to self-stabilize. Negative feedback is an important control mechanism for maintaining the body's homeostasis.



3. Describe positive feedback and explain how this process functions in the body.
    - The output of the system stimulates the system in such a way that the output is increased further in a positive feedback mechanism. Positive feedback loops or cycles are commonly described using terms such as “snowballing” and “chain reaction.” A positive feedback mechanism has the potential to produce a runaway process in the absence of a counter-balancing or “shut-down” reaction or process. As previously stated, some physiologic processes are commonly regarded as positive feedback, despite the fact that they may not all have identifiable components of a feedback loop. In these cases, the positive feedback loop is always terminated by counter-signaling, which suppresses the original stimulus.

4. Explain how the secretion of a hormone is controlled by negative feedback inhibition. Use the control of insulin secretion as an example.
    - Hormone levels are primarily regulated by negative feedback, which occurs when rising levels of a hormone inhibit its further release. Humoral stimuli, hormonal stimuli, and neural stimuli are the three mechanisms of hormonal release. The control of hormonal release in response to changes in extracellular fluid or ion levels is referred to as humoral stimuli. Hormonal stimuli are hormones released in response to hormones released by other endocrine glands. The release of hormones in response to neural stimulation is referred to as neural stimuli.

5. List the four primary tissues and describe the distinguishing features of each type.
    - There are 4 basic types of tissue
    1. Connective tissue, epithelial tissue, muscle tissue, and nervous tissue. Connective tissue supports other tissues and binds them together (bone, blood, and lymph tissues).
    2. Epithelial tissue provides a covering (skin, the linings of the various passages inside the body).
    3. Muscle tissue includes striated (also called voluntary) muscles that move the skeleton, and smooth muscle, such as the muscles that surround the stomach.
    4. Nerve tissue is made up of nerve cells (neurons) and is used to carry “messages” to and from various parts of the body.

6. Compare and contrast the three types of muscle tissue.

Skeletal	Long cylindrical fiber, striated, many peripherally located nuclei	Voluntary movement, produces heat, protects organs	Attached to bones and around entry & exit sites of body (e.g., 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, regulates flow of blood in arteries by contraction	Walls of major organs and passageways

7. Describe the different types of epithelial membranes and state their locations in the body.
    - An epithelial membrane is made up of an epithelial layer that is joined to a connective tissue layer. A mucous membrane, also known as a mucosa, is the lining of a body cavity or hollow passageway that is exposed to the outside world. This membrane is found lining the digestive, respiratory, excretory, and reproductive tracts.
    - A serous membrane lines the body's cavities that are not exposed to the outside world. The lubricant serous fluid secreted by epithelial cells lubricates the membrane and reduces abrasion and friction between organs.
    - A cutaneous membrane is a multilayer membrane made up of epithelial and connective tissues. The apical surface of this membrane is exposed to the outside environment and is covered with dead, keratinized cells that aid in the protection of the body from desiccation and pathogens. A cutaneous membrane is something like your skin.

8. Explain why exocrine and endocrine glands are considered epithelial tissues and distinguish between these two types of glands.
    - Glands are a well-organized grouping of secretory epithelial cells. During development, most glands are formed by the proliferation of epithelial cells, which project into the underlying connective tissue. Exocrine Glands are glands that maintain continuity with the surface via a duct.
    - Exocrine and endocrine glands are the two major types of glands. The main distinction between the two is that exocrine glands secrete substances into a ductal system to an epithelial surface, whereas endocrine glands secrete products directly into the bloodstream.

9. Describe the different types of connective tissues and explain how they differ from one another in their content of extracellular material.
10. State the location of each type of primary tissue in the skin.
    - Connective Tissue: Fat and other soft padding tissue, Bone, Tendon
    - Muscle Tissue: Cardiac muscle, Smooth muscle, Skeletal muscle
    - Nervous Tissue: Brain, Spinal Cord, Nerves
11. Describe the functions of nervous, muscle, and connective tissue in the skin.
    - Connective tissue is the tissue that lies beneath and supports other types of tissue.
    - Muscle tissue contracts in order to cause movement in the body.
    - Through the central and peripheral nervous systems, nerve tissue transmits and integrates information.

12. Describe the functions of the epidermis and explain why this tissue is called “dynamic.”
    - Hydration: The stratum corneum (the outermost layer of the epidermis) holds water and keeps your skin hydrated and healthy.
    - Creating new skin cells: As you get older, new skin cells form at the bottom layer of your epidermis (stratum basale) and move up through the other layers. After about a month, they reach the outermost layer of your epidermis, where skin cells shed from your body as new cells develop at the bottom layer.
    - Protection: The epidermis acts as armor to protect your body from UV radiation, pathogens (bacteria, viruses, fungi, and parasites), and chemicals.
    - Skin tone: Melanocytes, which are cells in the epidermis, produce melanin, which is a group of pigments in your skin that gives it color.
    - The epidermis is a dynamic structure that acts as a semi-permeable barrier, with a surface layer of flat anuclear cells (stratum corneum). The epidermis regenerates in an orderly manner through keratinocyte cell division in the basal layer, with maturing daughter cells becoming increasingly keratinised as they move to the skin surface. Immune cells in the epidermis identify and process small molecules that penetrate the skin’s surface. Melanocytes (basal layer pigment cells) protect the skin from ultraviolet radiation. The basement membrane zone serves as a link between the epidermis and the dermis.

13. Distinguish between the intracellular and extracellular compartments and explain their significance.
    - Body fluids can be discussed in terms of their specific fluid compartment, which is a location that is largely separated from another compartment by some type of physical barrier. The intracellular fluid compartment is the system that includes all fluid contained within cells by their plasma membranes. Extracellular fluid surrounds all cells in the body. Extracellular fluid is made up of two main components: plasma, the fluid component of blood, and interstitial fluid, which surrounds all cells that are not in the blood.
    - The ICF is found within cells and is the primary component of the cytosol/cytoplasm. The ICF accounts for approximately 60% of total water in the human body and accounts for approximately 25 liters of fluid in an average-size adult male. Because the amount of water in living cells is tightly regulated, this fluid volume is very stable. If the amount of water inside a cell becomes too low, the cytosol becomes too concentrated with solutes to carry out normal cellular activities; if too much water enters a cell, the cell may burst and be destroyed.
    - The ECF is responsible for the remaining one-third of the body’s water content. Plasma contains approximately 20% of the ECF. Plasma circulates through the body in blood vessels, transporting a variety of materials such as blood cells, proteins such as clotting factors and antibodies, electrolytes, nutrients, gases, and wastes. The IF transports gases, nutrients, and waste materials between capillaries and cells. A selectively permeable cell membrane

separates cells from the IF and helps regulate the passage of materials between the IF and the cell's interior.