MIDTERM ASSIGNMENT #2
PHYSIOLOGICAL & BIOLOGICAL PSYCHOLOGY

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SUBJ CODE: PY48

UNIT 3 TOPIC:

A. Sensory Physiology
B. Endocrine Glands
C. Muscles

SPECIFIC GUIDE QUESTIONS:

A. Sensory Physiology

1. Discuss the following:
    a. Characteristics of Sensory Receptors
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    b. Cutaneous Sensations
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    c. Taste & Smell
        - Detecting a taste (gustation) is similar to detecting an odor (olfaction) because both taste and smell rely on chemical receptors that are stimulated by specific molecules. The taste bud is the primary sensory organ. A taste bud is a cluster of gustatory receptors (taste cells) found in the papillae, which are bumps on the tongue (singular: papilla).
    d. Vestibular Apparatus and Equilibrium
        - The vestibular system is the inner ear sensory apparatus that assists the body in maintaining postural equilibrium. The vestibular system's information is also necessary for coordinating the position of the head and the movement of the eyes.
    e. The Ears and Hearing
        - The ear is the organ of hearing and balance. Hearing begins in the outer ear. Sound waves, or vibrations, travel down the external auditory canal and strike the eardrum when a sound is made outside the outer ear (tympanic membrane). The eardrum is vibrating. The vibrations are then transmitted to three tiny bones in the middle ear known as the ossicles. The sound is amplified by the ossicles. They direct sound waves to the inner ear and the fluid-filled hearing organ (cochlea).

        - Sound waves are converted into electrical impulses once they reach the inner ear. These impulses are sent to the brain by the auditory nerve. These electrical impulses are then translated into sound by the brain.

f. The Eyes and Vision
   - The eye is the primary visual organ and is highly specialized in photoreception. Light from an object is focused onto the light-sensitive retina. Changes in the retina's specialized neurons produce nerve action potentials, which are relayed to the brain via the optic nerve.

B. Endocrine Glands

1. Discuss the following:
   a. Endocrine Glands and Hormones
      - The endocrine system is made up of glands that produce hormones. Hormones are the body's chemical messengers. They transport information and instructions from one set of cells to the next.
   b. Mechanisms of Hormone Action
      - Mechanism of Fixed Membrane Receptors. Water-soluble hormones that are amines or proteins in composition, such as growth hormone, oxytocin, ADH, and others, exhibit this type of mechanism. These hormones cannot cross the lipid membrane. On the cell membrane, they have a target receptor to which the hormone binds.
      - Mobile Receptor Mechanism. This mechanism is demonstrated by lipid soluble hormones such as fatty acids and steroids, which can easily pass through the plasma membrane. They have intracellular receptors. Hormones bind to the target receptor, which activates the cell's enzymatic activity and causes biochemical changes.
   c. Pituitary Gland
      - The pituitary gland is a small, pea-sized endocrine gland located at the base of your brain, beneath the hypothalamus. It secretes several important hormones and regulates the function of many other endocrine system glands.
   d. Adrenal Glands
      - The adrenal glands, also known as suprarenal glands, are small, triangular-shaped glands that sit on top of both kidneys. Adrenal glands secrete hormones that aid in the regulation of your metabolism, immune system, blood pressure, stress response, and other vital functions.
   e. Thyroid and Parathyroid Glands
      - Iodine from food is used by the thyroid gland to produce two thyroid hormones, which regulate how the body uses energy. The parathyroid glands are four small glands found behind the thyroid. The parathyroid glands produce a substance (parathyroid hormone) that aids in the regulation of blood calcium levels.
   f. Pancreas and Other Endocrine Glands
      - Glands are organs in the body that produce and secrete substances. Exocrine function: Produces substances (enzymes) that aid in digestion. Endocrine function: Secretes hormones that regulate blood sugar levels.
   g. Paracrine & Autocrine Regulation

- While an autocrine signal acts as an amplifier or a brake on message transmission, a paracrine ligand serves as a tool for spreading the message from one cell type to the others. Many ligands have been found to be recognized by multiple GPCR subtypes expressed in different cell types.

C. Muscles

1. Discuss the following:
    a. Skeletal Muscles
        - Skeletal muscles allow humans to move and carry out daily tasks. They are important in respiratory mechanics and in maintaining posture and balance. They also protect the body's vital organs.
    b. Mechanisms of Contraction
        - When the thin actin filaments and thick myosin filaments slide past each other, muscle contraction occurs. This process is thought to be driven by cross-bridges that extend from myosin filaments and interact cyclically with actin filaments as ATP is hydrolyzed.
    c. Contractions of Skeletal Muscles
        - The neuromuscular junction, which is the synapse between a motoneuron and a muscle fiber, is where skeletal muscle contraction starts.
    d. Energy Requirements of Skeletal Muscles
        - The breakdown of ATP provides the energy required for muscle contraction, but the amount of ATP in muscle cells is only sufficient to power a brief contraction.
    e. Neural Control of Skeletal Muscles
        - Concentric, eccentric, and isometric muscle contractions, muscle fiber recruitment, and muscle tone are all regulated by neural control. The function of motor units is an important aspect of nervous system control of skeletal muscles.
    f. Cardiac & Smooth Muscles
        - Cardiac muscle cells are found in the heart's walls, are striped (striated), and are controlled involuntarily. Except for the heart, smooth muscle fibers are found in the walls of hollow visceral organs (such as the liver, pancreas, and intestines), are spindle-shaped, and are under involuntary control.