



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR**

FIRST YEAR, SECOND TRIMESTER EXAMINATIONS

**FOR THE DEGREE
OF
BACHELOR OF SCIENCE IN PHYSIOTHERAPY**

COURSE CODE: BSP 122

COURSE TITLE: FUNCTIONAL PHYSIOLOGY

DATE: -----

TIME: -----

INSTRUCTIONS TO CANDIDATES

This paper consists of three sections:

- i. Section A – Multiple Choice Questions
- ii. Section B – Short Answer Question
- iii. Section C – Long Answer Question.

Answer all questions

TIME: 3 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

*Moderated 8/12/2018
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**Section A: Multiple Choice Questions (20 marks)**

Choose the most suitable choice, only one choice is correct

1. Schwann cells are one of several types of _____ cells in the nervous system.
 - a. Motor
 - b. Sensory
 - c. Association
 - d. Neuroglia
2. Gaps in the myelin sheath are called
 - a. nodes of Ranvier
 - b. the synapse
 - c. axonal interstices
 - d. myelinoids
3. The region on the retina that produces the sharpest vision is called the _____.
 - a. Sclera
 - b. aqueous humor
 - c. fovea centralis
 - d. optic disk
4. The brain and spinal cord are protected by membranes known as the _____.
 - a. nodes of Ranvier
 - b. meninges
 - c. axomembranes
 - d. myelin sheath
5. The _____ contains centers for heartbeat, breathing, and blood pressure.
 - a. Cerebellum
 - b. Cerebrum
 - c. Spinal cord
 - d. Medulla oblongata
6. The hormone responsible for stimulating contractions of the uterus is known as:
 - a. Insulin
 - b. UCH
 - c. Glucagon
 - d. oxytocin
7. The target tissue of ACTH is the:
 - a. thymus gland
 - b. medulla of the adrenal gland
 - c. cortex of the adrenal gland
 - d. beta cells of the pancreas
8. Calcitonin and the parathyroid hormone both control the level of:
 - a. pituitary hormones in the blood
 - b. glucose in the blood
 - c. thymosins in the blood
 - d. calcium in the blood
9. Melatonin is secreted by the:
 - a. Pancreas
 - b. thymus gland
 - c. pineal gland

- d. pituitary gland
10. Most of the respiratory passage surface is lined with _____.
a. Simple squamous epithelium
b. pseudostratified epithelium
c. Simple columnar epithelium
d. Stratified squamous epithelium
11. The carina separates the _____ from each other.
a. Primary bronchi
b. Lungs
c. Trachea and bronchi
d. Secondary bronchi
12. There are _____ secondary bronchi?
a. 2
b. 3
c. 4
d. 5
13. The following are true of the tongue except which one?
a. Contains skeletal muscles
b. Contain papillae
c. Attaches on to hyoid bone
d. Attaches to temporal bone
14. The portion of a tooth which lies within the mandible socket is called the _____.
a. Dentin
b. Crown
c. Root
d. Cementum
15. The shortest section of the intestines is the _____.
a. Colon
b. Duodenum
c. Jejunum
d. Ileum
16. The ampulla of Vater is the area that joins the common bile duct to the _____ duct
a. Hepatic
b. Pancreatic
c. Common hepatic
d. Cystic
17. The ureter connects which part of the kidney to the bladder?
a. Urethra
b. Renal cortex
c. Renal medulla
d. Renal pelvis
18. All of the following are special sensory receptors except the receptors for _____.
a. Taste
b. Smell
c. Pain

d. Equilibrium

19. What is the tuft of capillaries that brings blood to the kidney for filtration?
 - a. Glomerular capsule
 - b. Bowman space
 - c. Proximal arteriole
 - d. Glomerulus
20. What structure in the nephron is responsible for monitoring blood pressure?
 - a. Glomerulus
 - b. juxtaglomerular apparatus
 - c. proximal convoluted tubule
 - d. glomerular capsule

Section B: Short Answer questions (40 marks).

1. Explain the function of Kidney hormones (8marks).
2. *Describe* Outline the general functions of cerebellum (8 Marks).
3. Describe the pain nerve pathway (8 marks).
4. Describe the anatomical organization of the spinal nerves in the peripheral nervous system (8Marks).
5. Explain the role of renal system in the body (8marks)

Section C: Long Answer Questions (40 marks).

1. Using a well labeled diagram describe the structural parts of a typical tooth (20 marks).
2. Discuss the structural organization of bronchial tree in respiratory System (20 Marks)

BSP 122 FUNCTIONAL PHYSIOLOGY (3 UNITS)

Purpose of the Course

This course is designed to enable the students acquire deeper knowledge of the functional organization of the human body.

Expected Learning Outcomes

The course is designed to give the student an in-depth knowledge of fundamental reactions and responses of the human body and will enable the student to:

Understand the morphology of the cells.

The functioning and interaction of body organs and systems.

The relationship between anatomy and function of body parts.

The practical application of physiology to physiotherapy.

Course Content:

Endocrine System: Introduction: Major endocrine glands. Hormone: Classification, mechanism of action. Functions of hormone. Pituitary Gland, Pituitary – Hypothalamic Relationship; Thyroid gland; Parathyroid gland; Adrenal gland.

Special Senses: Vision: Introduction: functional anatomy of eye ball. Functions of cornea, iris, pupil, aqueous humor – glaucoma, lens – cataract, vitreous humour, rods and cones. Photopic vision.

Scotopic vision. Visual pathway and the effects of lesions. Refractive errors: myopia, hypermetropia and astigmatism. Visual Reflexes: Accommodation, Papillary and Light. Visual acuity and visual field. Light adaptation. Dark adaptation. Colour vision – blindness. Nyctalopia. Audition:

Physiological anatomy of the ear (1) . Functions of external ear, middle ear and inner ear(2). Structure of Cochlea and organ of corti. Auditory pathway. Types of deafness (3). Tests for hearing. Audiometry(4).

Taste: taste buds. Primary tastes. Gustatory pathway.

Smell: Olfactory membrane. Olfactory pathway. Vestibular Apparatus: Crista ampullaris and macula. Functions Disorders.

Nervous System: Introduction: Organization of CNS – central and peripheral nervous system. Functions of the nervous system. Synapse: Anatomy, classification, synaptic transmission. Properties. Sensory mechanism: Sensory receptors: functions, classification and properties. Sensory pathway: The ascending tracts – Posterior column tracts, Lateral spinothalamic and the anterior spinothalamic tract – theirs origin, course, termination and functions. The trigeminal pathway.

Sensory cortex. Somatic sensation: crude touch. Fine touch, tactile localization, tactile discrimination, stereognosis, vibration sense, kinaesthetic sensations: Pain sensation: mechanism of pain. Cutaneous pain – slow and fast pain, hyperalgesia. Deep pain, Visceral pain – referral pain. Gate control theory of pain, tabes dorsalis, sensory ataxia.

Motor Mechanism: Motor cortex, Motor pathway. The descending tracts – pyramidal tracts, extrapyramidal tracts – origin, course, termination and functions. Upper motor neuron and lower motor neuron. Paralysis, monoplegia, paraplegia, hemiplegia and quadriplegia. Reflex action: components, Bell-Magendie law, classification and Properties. Monosynaptic and polysynaptic reflexes, superficial reflexes, deep reflexes, Stretch reflex – structure of muscle spindle, pathway, higher control and hypertonia, UMNI and LMNI. Spinal cord Lesions: Complete transection and hemisection of the spinal cord.

Cerebellum: Functions. Cerebellar ataxia. Posture and equilibrium: Postural reflexes – spinal, medullary, midbrain and cerebral reflexes. Thalamus and Hypothalamus: Nuclei. Functions. Thalamic syndrome. Reticular Formation and Limbic System. Components and Functions. Basal Ganglia: Structures and functions. Parkinson's disease. Cerebral cortex: Lobes. Brodmann's area and their functions. Higher functions of cerebral cortex – learning, memory and speech. EEG. Waves and features. Sleep: REM and NREM sleep. CSF: Formation and actions of parasympathetic and sympathetic nervous systems.

Applied Physiology and practical applications of the following selected topics should help in understanding the nature and treatment of common clinical situations of interest in Physiotherapy. Muscles and Nervous System Functions: Peripheral nervous system, Neuromuscular transmission. Types of nerve fibres. Action potential, Strength...duration curve, ECG, EMG, VEP, NCV. Degeneration and regeneration of nerve, Reactions of denervations. Synaptic transmission, Stretch reflex – Mechanism and factors affecting it. Posture, Balance, Equilibrium of voluntary movement. Voluntary motor action, clonus, rigidity Discordination. Special senses – Vision, taste, hearing, vestibula, Olfaction. Sympathetic and parasympathetic regulation. Thermoregulation

Practical

- i) Amphibian Experiments – Demonstration and Dry charts
Instruments used for frog experiments. Kymograph, heart liver, m trough, stimulator.
Simple muscle curve; Effect increasing the strength of the stimuli; Effect of temperature on muscle contraction. Effect of two successful stimuli; Effects of fatigue; Effects of load on muscle contraction.
Genesis of tetanus and clonus; Velocity of impulse transmission. Normal cardiogram of amphibian.
- ii) Recommended Demonstration; Spirometry; Artificial Respiration; ECG

Mode of Delivery

Lectures

Demonstration

Hands on practical in laboratory

Seminars / Tutorials

Instructional Material

Wall Charts

Audio-visual Aids

Chalkboards.

Course Assessment

Continuous Assessment Tests

Written Assessment

Oral Examination

Core Reading Materials

Text book of medical physiology – Guyton Arthur

Review of Medical Physiology – Ganong William F.

Recommendation Reference Materials

Text book of practical physiology – Ranade

Physiological basis of Medical practice – Best and Taylor

