

TRIPURA UNIVERSITY (A Central University) Suryamaninagar

SYLLABUS

OF

Human Physiology (Hons.)

Semester- V

UNDERGRADUATE

HUMAN PHYSIOLOGY (HONOURS)

Semester 05

Paper 05 (H5)

Total Marks — 100

UNIT – XI: Nervous System (25 marks)

- 1. Structural organization of different parts of brain and spinal cord.
- Cerebrum: Histology, area and centers in the central cortex and their functions, method of localization of function; Thalamus and Hypothalamus – their nuclei, connections and functions.
- 3. Cerebellum: Histology, nuclei, connections and functions.
- 4. Concepts of ANS- Classification, structural and functional organization.
- 5. Basal ganglia: Structure, connection and functions.
- 6. Electrical activities of cerebral cortex, physiological basis of EEG, waves of EEG with their significances; epilepsy, physiology of sleep, types of sleep, effect of sleep deprivation.
- 7. Brain ventricles- basic concepts; CSF composition, formation, circulation and functions.
- 8. Ascending tracts carrying touch, pain, pressure, temperature, kinesthetic sensation; descending tracts- corticospinal, corticobulbar, extra pyramidal, rubrospinal, reticulospinal tracts. Upper and lower motor neurons and their lesions.
- 9. Cerebral circulation- course, factors affecting.
- 10. Limbic system- structure, connection and function.
- 11. Maintenance and regulation of posture and equilibrium
- 12. Neurophysiology of learning and memory
- 13. Macromolecular neurochemistry: carbohydrate utilization in the brain, role of proteins and lipids in the brain.
- 14. Neurotransmitter chemistry: acetylcholine, catecholamine, serotonin, amino acids and peptides.

UNIT - XII: Excretory System, Skin and Thermoregulation (25 marks)

- 1. Anatomy of kidney, Histology of nephron and function in relation to structure.
- 2. Course, peculiarities and regulation of renal circulation.
- 3. GFR- factors affecting and regulation.
- 4. Juxta glomerular apparatus structure and function.

- 5. Hypo and hypertonic urine formation with reference to counter-current exchanger and multiplier mechanism.
- Non-excretory functions of kidney i) water balance, ii) blood volume, iii) blood pressure,
 iv) acid base balance, v) erythropoiesis.
- 7. Renal function tests Plasma clearance concept, inulin and creatinine clearance test.
- Composition of normal urine, composition and significance of abnormal constituents of urine. Diabetes insipidus- causes.
- 9. Physiology of urinary bladder, micturition process and reflexes.
- 10. Diuretics, mode of action of osmotic diuretics.
- 11. Chronic renal failure causes and renal hypertension
- 12. Cutaneous circulation and its significance
- 13. Structure of sweat glands, structure of sebaceous gland and its significance. Mechanism and regulation of sweat secretion.
- Concept of homeothermy and poikilothermy, processes of heat loss and heat gain. Mechanism of temperature regulation.
- 15. Heat stress, pyrexia, hypothermia and physiology of hibernation.

UNIT - XIII: Endocrinology & Chronobiology (25 marks)

- Concept on autocrine, paracrine and endocrine system. Anatomical organization of endocrine glands in the body. Chemical classification of hormones. Different types of hormone receptors.
- 2. Mode of actions of hormones with examples; signal transduction, second messengers.
- 3. Pituitary glands anatomy, histology and function of anterior and posterior pituitary hormones.
- 4. Hypothalamo- hypophyseal portal system and tracts and their significance.
- 5. Thyroid, parathyroid and adrenal glands anatomy, biosynthesis and physiological functions of their hormones.
- 6. Endocrine pancreas: Hormones of Islets of Langerhans, chemistry and functions of insulin and glucagon.
- Blood sugar regulation Role of different hormones. Diabetes mellitus Type- I and Type
 II, their causes and symptoms, glucose tolerance test and its significance, role of GLUT transporters.

- 8. Hormones related to hunger and satiety leptin and ghrelin and adiponectin.
- 9. Hypo and hyper functions of endocrine glands.
- 10. Regulation of hormones feedback mechanism.
- 11. Biological clock- concept, role of pineal glands, pituitary and hypothalamus
- 12. Different biological rhythms: circadian, infradian, ultradian, tidal and linear rhythms. Gene oscillations.

UNIT-XIV: Reproductive Physiology & Development Biology (25 marks)

- 1. Anatomical organization of male and female reproductive system: primary and secondary sex organs. Puberty.
- 2. Testis- Histology, hormones of testis & their functions.
- 3. Ovary- Histology, hormones of Ovary their functions; Menstrual cycle ovarian and uterine changes & its hormonal regulation.
- Embryogenesis: Gametogenesis- Spermatogenesis, Oogenesis, role of hormones in gametogenesis; Fertilization process; Cleavage (blastulation) process; Implantation – hormonal control; Gastrulation (formation of endoderm – its fate, formation of embryonic disc, formation of mesoderm, and ectoderm – their fates, formation of embryonic cavity);
- 5. Placenta placental hormones and their function.
- 6. Physiological changes during pregnancy. Pregnancy tests (Immunological).
- 7. Physiology of parturition.
- 8. Development of mammary gland, physiology of lactation, its control. Mechanism of milk ejection. Importance of colostrums.
- 9. Physiology of menopause.
- 10. Fertility control- hormonal.

Add on topics:

- i. Bioinformatics- general concept
- ii. Blotting techniques basic idea
- iii. Endocrine disrupters
- iv. Polycystic ovary syndrome, anovulation.
- v. Male sterility, androgen deficiency syndrome

Suggested readings:

- Guyton and Hall text book of Medical Physiology John E. Hall; Michael E Hall. Concise text book of physiology Indu Khurana; Arushi Khurana. Text book of Physiology- A.K.Jain. i.
- ii.
- iii.