



TRIPURA UNIVERSITY

**(A Central University)
Suryamaninagar-799022**

Syllabus

OF

**HUMAN PHYSIOLOGY
(General & Major)**

Semester – V

2014



TRIPURA UNIVERSITY

(A CENTRAL UNIVERSITY)

SURYAMANINAGAR, 799022

Syllabus for

B. Sc. TDPH

HUMAN PHYSIOLOGY

SEMESTER-V (Major)

YEAR 2016

HUMAN PHYSIOLOGY HONOURS (TDPH)

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.
2. 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, extrapyramidal, rubrospinal, reticulospinal tracts. Upper and lower motor neurones 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, catecholamines, 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.
6. 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.
8. 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, 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.
14. 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)

1. Concept of 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 action 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, 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.
7. 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, 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 lunar rhythms. Gene oscillations.

UNIT IV: Reproductive physiology & Development Biology (25 marks)

1. Anatomical organization of male & female reproductive system: primary & 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.
4. 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 & 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.

HUMAN PHYSIOLOGY HONOURS (TDPH), 5th SEMESTER

PRACTICAL

PAPER-H6

MARKS-100

Histology and models:

1. Histological slides and models on brain and endocrine system: study of anatomical position, structure and function
2. Models of excretory system: study of kidney, ureter, urinary bladder and urethra: Their anatomical positions, structures and functions.
3. Identification of histological slides in relation to skin and excretory system.
4. Models of male and female reproductive systems: Their anatomical position, structure and function.
5. Histological slides on Ovary, Uterus and Testis; study of primary, secondary, tertiary Graafian follicles, corpus luteum, oocyte and sperm.
6. Staining (Eosin and Hematoxylin) of tissue sections and microscopical observations.

BIO-CHEMICAL ANALYSIS:

1. Identification of abnormal constituents of urine: albumin, ketone, sugar (glucose), bile salt and blood.
2. Estimation of creatinine, urea and uric acid concentrations in blood.
3. **Glucose tolerance test using glucometer**

REFLEXES:

1. Human reflexes: superficial (plantar/abdominal reflexes), deep (knee-jerk/ Biceps & Triceps jerk reflexes).
2. Romberg sign- vestibular function

EXPERIMENTAL PHYSIOLOGY:

Study of effects of ions, drugs and hypoxia on intestinal movement and activity of heart:

Study of effects of Ca^{2+} , Mg^{2+} , hypoxia, adrenaline and nicotine, acetyl choline on intestinal movements and activity of heart from supplied curves or by using computer software.

Marks Distribution

TOTAL- 100 marks

INTERNAL Assessment -20 marks

TERM-END Exam – 80 marks

Time-6 hrs

1. Identification of histological slides (5 slides)- $2 \times 5 = 10$
2. Tissue staining=10 (deparaffinization, staining and cleaning- 3, mounting and proper focusing under microscope-3, correct identification with at least two identifying characters- 2, drawing and labelling-2)
3. Two Models (name, anatomical position & function)- $2 \times 5 = 10$
4. Biochemical analysis –Urine analysis (one sample): 10
 Quantitative analysis (one sample): 10
 (For Urine analysis- Procedures, observations and interpretations of the tests performed – 5 , result-3, significance of the result-2;
 For Quantitative analysis: Principle and Procedure -2, Tabular presentation of data of observations & calculation -2, interpretation-1, correctness of result-5
 [Error upto 5%: 05, upto-8%: 04;
 upto-10% 03
 upto 12% 02
 upto 14% 01
 Above 14% 00]
5. Human reflexes (two reflexes) -10 (For each reflex-Significance of the test-1, drawing and labeling the reflex path-2 , demonstration-2,
6. Experimental Physiology-Interpretation of graph OR software based experiments -5
7. PNB- 5
8. VIVA-10



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Syllabus for

B. Sc. TDPG

HUMAN PHYSIOLOGY

SEMESTER-V (GENERAL)

YEAR 201~~6~~

HUMAN PHYSIOLOGY ELECTIVE (TDPG)

Semester-05 PAPER-05 (PSA) Total Marks: 50

UNIT-11: NUTRITION AND DIETETICS

1. Role of carbohydrates, fats, protein, vitamins and minerals in nutrition
2. Nutritional requirements and formulation of balanced diet for adolescents and college students, workers with sedentary, moderate and heavy physical activity, pregnant and lactating women.
3. BMR - definition and determination, controlling factors affecting and its significance.
4. Biological value of protein, RQ, SDA and RDA. Protein calorie malnutrition- definition, symptoms, classifications, major causative factors and remedial measure.
5. Vitamins-source, requirements, deficiency symptoms and functions.
6. Minerals and trace elements- iron, calcium and iodine: source, requirements, deficiency symptoms and physiological functions.
7. Diet survey- principle, significance
8. Diets in diarrhea, diabetes, goitre, obesity, hypertension.

UNIT-XII: MOLECULAR BIOLOGY AND IMMUNOLOGY

1. Chemical nature of DNA and RNA.
2. DNA- the genetic material experimental evidences.
3. Semi conservative model of DNA replication – Meselson and Stahl's experiment.
Concept of gene.
4. DNA replication in prokaryotes. Okazaki fragments.
5. DNA transcription in prokaryotes.
6. Protein synthesis in prokaryotes, activation of amino acids, initiation, elongation, termination, role of A site, P site.
7. Cloning of DNA into cloning vectors.
8. Immune system, Innate and Acquired Immunity, their components.
9. Primary & secondary lymphoid organs, their functions
10. Antigen, immunogen, epitope, hapten, paratope. MHC molecules, CDr, CD markers- general idea.
11. Humoral immunity- (a) General structure of IgG antibodies, physiological function of each class of antibody molecules. (b) complement system- classical pathway.
12. Primary and secondary immune responses, vaccination.
13. Clonal selection hypothesis of antibody production. Activation of B cells by T cells, Basic concepts of polyclonal and monoclonal antibodies.
14. Cell mediated immunity- Role of cytotoxic T cell in cell mediated immunity, role of T-helper cell in activation of T- cytotoxic cell.
15. Basic principles of Enzyme linked immunosorbent assay (ELISA), radioimmunoassay (RIA)

HUMAN PHYSIOLOGY ELECTIVE (TDPG), 5th SEMESTER

PRACTICAL

PAPER-P5B

MARKS-50

A. Biochemistry & Nutrition:

- 1. Estimation of lactose content of milk
- 2. Estimation of percentage quantity of carbohydrate in food.
- 3. Quantitative estimation of glucose and sucrose
- 4. Ouster long double diffusion test (Ag- Ab reaction)
- 5. DNA electrophoresis- Demonstration

**B. Assessment of Nutritional Status by Anthropometric and Diet Survey method
(Attendance in survey programme conducted by the department and submission of Diet survey report are compulsory pre-requisites for appearing Term-End Examination)**

Marks distribution

Total marks-50

Internal assessment-10

Term End Exam-40

- A. Biochemical/Nutritional experiment (any one experiment) :15 [Mark distribution for estimation: Principle-2, Procedure-2, Calculation-3, Result-8 (Error: upto 5%: 08, upto-8%: 06, upto-10%: 04; upto 12%: 02 upto 14%: 01, Above 14%: 00)]
- B. Diet survey report -10 (Attendance-4, report-6)
Anthropometric measurements & interpretation of results- 5
- C. PNB- 5
- D. VIVA VOCE-5