

पाटन स्वास्थ्य विज्ञान प्रतिष्ठान, सेवाआयोग  
प्राज्ञिक सेवा, ईन्टर्नल मेडिसिन समूह, Endocrinology उपसमूह, सहायक प्राध्यापक पद,  
(९ख) तहको खुला र आन्तरिक प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

**Paper II: Technical Subject**

**Section (A) - 45 Marks**

( 1 critical analysis Q -15 mark + 3 long Q- 30 marks)

**INTERNAL MEDICINE**

**1. Anatomy**

**1.1 Neuro-Anatomy**

- 1.1.1 Neuron and its structure
- 1.1.2 Supportive cell type structure, cellular and myelin sheaths
- 1.1.3 Synapsis, neuro-effective junctions and receptors
- 1.1.4 Cerebrum: morphology, cerebral cortex, cortical neurons, cortical layers
- 1.1.5 Motorsystem: structure, corticospinal, rubrospinal, vestibulospinal and reticulospinal tracts
- 1.1.6 Basalganglia: structure
- 1.1.7 Cerebellum: morphology, cellular structure and organization
- 1.1.8 Brainstem: general organization
- 1.1.9 Spinal cord and ganglia: morphology, motor and sensory organization in the spinal cord

**1.2 Anatomy of neuro-muscular system**

- 1.2.1 LMN, structuring of voluntary muscles, motor units, types of muscle fibres
- 1.2.2 Muscle spindles and other muscles & tendon receptors
- 1.2.3 Sensory system
- 1.2.4 Reflex pathways: involving cranial nerves, and limb and trunk
- 1.2.5 Cranial nerves and special senses: pathways and structure of special sense organs
- 1.2.6 Anatomy of ventricular system and CSF production
- 1.2.7 Anatomy of meninges
- 1.2.8 Autonomic nervous system
- 1.2.9 Arterial and venous cerebral circulation
- 1.2.10 Blood brain barrier

**1.3 Pulmonology**

- 1.3.1 Gross anatomy of upper and lower respiratory tracts, lungs with lobes and fissures with surface marking
- 1.3.2 Concept of bronchopulmonary segments and lobule or acinus aerated by a terminal bronchiole
- 1.3.3 Histology of alveolar lining cells
- 1.3.4 Pulmonary vascular bed
- 1.3.5 Pleura and pleural space, functions and histology
- 1.3.6 Media stinum and their structures
- 1.3.7 Thoracic cage and primary and secondary muscles of respiration
- 1.3.8 The diaphragm its attachments, nerve supply and function
- 1.3.9 Lymphatic drainage of lungs and pleura
- 1.3.10 Innervation of the lungs
- 1.3.11 Thoracic receptors

**1.4 Cardiovascular system**

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- 1.4.1 Gross anatomy of the heart and circulatory system
  - 1.4.2 Histology of the cardiac muscles
  - 1.4.3 Embryology of the heart and circulation
  - 1.4.4 Coronary and pulmonary circulation
  - 1.5 **Gastrointestinal tract**
    - 1.5.1 Gross anatomy of the gastrointestinal tract at different levels
    - 1.5.2 Gross anatomy of the hepatobiliary system and pancreas
    - 1.5.3 Histological aspects of GI tract at different levels
    - 1.5.4 Blood supply and development aspects of GI tract and hepatobiliary system
  - 1.6 **Kidney and urinary tract**
    - 1.6.1 Gross anatomy of the kidney and urinary tract
    - 1.6.2 Structure of nephron and function at different level
    - 1.6.3 Development of kidney and urinary tract
    - 1.6.4 Renal circulation
  - 1.7 **Endocrinal organs**
    - 1.7.1 Gross anatomy of different endocrinal organs and their development
    - 1.7.2 Histology of different endocrinal organs
2. **Physiology**
- 2.1 Homeostatic behaviors of different fluid compartment in the body and implications during common clinical situations of burn, blood loss, diarrhea, vomiting, etc.
  - 2.2 Role of pH in normal and in abnormal conditions e.g., diarrhea, vomiting, airway obstruction, medication, etc
  - 2.3 Functions of micro/macro molecular, organelles and other structures of the cell
  - 2.4 Nutritional requirements of normal people (different ages, male, female) and ill patients of all categories with their modality of supplement
  - 2.5 Mechanisms of metabolic response to trauma and infection
  - 2.6 Function of hemopoietic /R.E.system
  - 2.7 Blood groups, methods of transfusion of blood & blood products & their hazards
  - 2.8 Mechanism of haemostais, fibrinolysis & methods to control haemorrhage
  - 2.9 Types of excitable tissues and methods of recording their activity e.g., EMG, EEG, ECG, etc
  - 2.10 Cellular communication, chemical/neuronal/ electrical/synaptic transmission
  - 2.11 Autonomic nervous system
  - 2.12 Neuro transmitters, their synthesis and metabolism
  - 2.13 Drugs affecting neurotransmitter activity
  - 2.14 Cardiac and smooth muscles
  - 2.15 Calcium metabolism
  - 2.16 Pain and the mechanism of pain
  - 2.17 Physiology of consciousness and sleep mechanism
  - 2.18 Effect of injury to neurons
  - 2.19 Different methods of monitoring of the heart functions
  - 2.20 Drugs used for inotropic & chronotropic effects
  - 2.21 Mechanism of blood pressure regulation
  - 2.22 Physiology of circulation of different organ in the body
  - 2.23 Pathophysiology of shock and principle of their management
  - 2.24 Capillary exchange

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- 2.25 Assess vascular functions
- 2.26 Respiration & cause of breathlessness
- 2.27 Measure blood flow
- 2.28 Measure/ assess blood gas
- 2.29 Mechanism of respiratory control
- 2.30 Mechanism of transport
- 2.31 Use of oxygen as therapy
- 2.32 Mechanism of absorption from gut and physiology of gastrointestinal motility
- 2.33 Composition of GI and hepatobiliary secretions and methods for their assessment
- 2.34 Normal functions of the liver
- 2.35 Formation of urine
- 2.36 Mechanism of osmoregulation
- 2.37 Normal thermoregulation
- 2.38 Mechanism of hormone synthesis, secretion, metabolism

3. **Pathology**

- 3.1 Concept of cell injury, different types of degeneration & trauma
- 3.2 Principles of inflammation and the results of various types of inflammation
- 3.3 Acute and chronic inflammation
- 3.4 Tissue regeneration, wound healing and healing process
- 3.5 Various types of disorder of growth
- 3.6 Principles of neoplasia
- 3.7 Benign and malignant tumor
- 3.8 Mechanism of thrombosis, and embolism and their effects
- 3.9 Ischemia & infarction
- 3.10 Mechanism of blood clotting and different types of bleeding disorders
- 3.11 Principle of blood grouping system & complications of blood transfusion
- 3.12 Principle of shock
- 3.13 Principle of genetics and apply its concept in hereditary diseases
- 3.14 Principle of immune response
- 3.15 Humoral and cell mediated immunity
- 3.16 Principle of organ transplantation and causes of its rejection
- 3.17 Principle of Host Parasite relationship
- 3.18 Different types of micro-organism (Bacteria, Fungus, Parasite, and Virus)
- 3.19 Pathogenic and non-pathogenic micro-organisms
- 3.20 Principle of asepsis & antisepsis, sterilization and disinfection
- 3.21 Principle of antibiotic and chemotherapy
- 3.22 Microbes that cause wound infection
- 3.23 Principle of Hospital infection (Nosocomial infection)

4. **Clinical Pharmacology**

- 4.1 **General clinical pharmacology**
  - 4.1.1 Pharmacokinetics, pharmacodynamics, adverse drug reactions, drug interactions, drug use in childhood, pregnancy, lactation, and old age
  - 4.1.2 Clinical trials

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- 4.1.3 Rational drug use
- 4.2 **Neurosensory and musculoskeletal systems**
  - 4.2.1 Parasympathomimetics and parasympatholytics, adrenergic and antiadrenergic drugs, narcotic and non-narcotic analgesics, non-steroidal anti-inflammatory drugs, alcohol, sedative/hypnotics, anti-parkinsonism drugs, anesthetics (general and local), appetite suppressants
  - 4.2.2 Drugs for psychiatric disorder, gout and rheumatoid arthritis, vertigo, and eye, ENT, and skin diseases
- 4.3 **Cardiovascular system**
  - 4.3.1 Drugs for the treatment of heart failure, cardiac arrhythmias, angina pectoris, hypertension, shock, thromboembolic disorders, myocardial infarction, anemia
  - 4.3.2 Hemostatics, anti-coagulants, and lipid-lowering drugs
- 4.4 **Gastrointestinal system**
  - 4.4.1 Drugs for peptic ulcer, diarrhoea, constipation
  - 4.4.2 Antispasmodics, antiemetics
- 4.5 **Respiratory system**
  - 4.5.1 Drugs for bronchial asthma
  - 4.5.2 Antihistamines and other antiallergic agents
  - 4.5.3 Cough preparation, nasal decongestants, and respiratory stimulants
- 4.6 **Reproductive/Endocrine systems**
  - 4.6.1 Anti-diabetics, thyroid and anti-thyroid drugs, corticosteroids, sex hormones and antagonists, hypothalamic and pituitary hormones
  - 4.6.2 Drugs used in labor and puerperium
- 4.7 **Renal/Electrolyte system**
  - 4.7.1 Drugs for edema, and fluid/electrolyte and acid/base disturbances
- 4.8 **Infections**
  - 4.8.1 General principle of chemotherapy
  - 4.8.2 Antibacterial, antiprotozoal, anthelmintic, antifungal, and antiviral drugs
- 4.9 **Miscellaneous drugs**
  - 4.9.1 Drugs for malignant diseases and immunosuppression
  - 4.9.2 Vaccines
  - 4.9.3 Vitamins and minerals
  - 4.9.4 Antidotes
5. **Recent Advances in Internal Medicine and Emergencies**
  - 5.1 Recent advances in all disciplines of Internal Medicine
  - 5.2 Cardiovascular emergencies: Cardiac arrest, Acute MI, Cardiogenic shock, Cardiac arrhythmias, Pulmonary edema, Hypertensive crisis, Acute cardiac tamponade, DVT & pulmonary embolism
  - 5.3 Respiratory emergencies: Hemoptysis, Acute respiratory failure, Pneumothorax, Status asthmaticus, ARDS
  - 5.4 Gastrointestinal emergencies: G.I. bleeding, Acute gastroenteritis and food poisoning, Acute pancreatitis, Hepatic failure, Acute abdomen
  - 5.5 Neurological emergencies: CVA including SAH, Hypertensive encephalopathy, Meningitis, Encephalitis, Unconscious patient, Status epilepticus, Myasthenia gravis
  - 5.6 Endocrine and metabolic emergencies: DKA and coma, Hypoglycemia, Hyperosmolar non ketotic diabetic coma, Thyroid crisis, Myxoedema coma, Pheochromocytoma, Acute adrenocortical crisis, Hypopituitarism
  - 5.7 Hematological emergencies: Aplastic anaemia, Agranulocytosis,

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Acutethromocythpenicpurpur, Leukemia, Hemophiliaandallieiddisorders
- 5.8 Renal emergencies: Renalcolic, Renalfailure, Hematuria
- 5.9 Miscellaneous emergencies:
- 5.9.1 Emergencies in fluid and electrolyte balance
- 5.9.2 Acute emergencies in infectious and tropicaldisease
- 5.9.3 Malaria
- 5.9.4 Septicemia
- 5.9.5 Tetanus
- 5.9.6 Snakebite
- 5.9.7 Dog bite & rabies
- 5.9.8 Poisonings
- 5.9.9 Drowning
- 5.9.10 Electrocution
- 5.9.11 High altitude sickness

**Section (B) - 55 Marks**  
(1 critical analysis Q -15 marks + 4 long Q -40 marks)  
**Endocrinology**

1. Principles of Endocrinology
2. Genetic control of peptide hormone formation
3. Mechanism of Hormones
4. Laboratory techniques for recognition of endocrine disorders
5. Hypothalamus and pituitary
  - a. Neuroendocrinology
  - b. Pituitary physiology and diagnostic evaluation
  - c. Pituitary masses and tumors
  - d. Posterior pituitary
6. Thyroid
  - a. Thyroid physiology and diagnostic evaluation of patients with thyroid disorders
  - b. Thyrotoxicosis
  - c. Hypothyroidism and thyroiditis
  - d. Nontoxic diffuse and nodular goiter and thyroid neoplasia
7. Adrenal cortex and endocrine hypertension
8. Reproduction
  - a. Physiology and pathology of the female reproductive axis
  - b. Hormonal contraception
  - c. Testicular disorders
  - d. Sexual dysfunction in male and female
9. Endocrinology and lifespan
  - a. Endocrine changes in pregnancy
  - b. Endocrinology of foetal development
  - c. Disorders of sex development
  - d. Normal and aberrant growth
  - e. Puberty: ontology, neuroendocrinology, physiology, and disorders
  - f. Hormones and athletic performance
  - g. Endocrinology of aging
10. Mineral metabolism
  - a. Hormones and disorders of mineral metabolism
  - b. Metabolic bone disease
  - c. Kidney stones

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11. Disorders of carbohydrate metabolism
  - a. Type 2 diabetes mellitus
  - b. Type 1 diabetes mellitus
  - c. Complications of diabetes mellitus
  - d. Hypoglycaemia
12. Body fat and lipid metabolism
  - a. Neuroendocrine control of energy stores
  - b. Obesity
  - c. Disorders of lipid metabolism
  - d. Endocrinology of HIV/AIDS
  - e. Gastrointestinal hormones and gut endocrine tumors
13. Polyendocrine and neoplastic disorders
  - a. Pathogenesis of endocrine tumors
  - b. Multiple endocrine neoplasia
  - c. Immunoendocrinopathy syndromes
  - d. Endocrine management of cancer survivor
  - e. Neuroendocrine gastrointestinal and lung tumors, carcinoid syndrome, and related disorders
14. Endocrine Emergencies

Following pattern will be used for formation of paper I & II as far as possible.

<b>Paper I</b>				
Part	Section	Weightage	No. Questions & Weightage	
			Objective Multiple Choice	Subjective
I	A	20		2 Questions X 10 Mark = 20
	B	30		3 Questions X 10 Mark = 30
II	C	25	25 Questions X 1 Mark = 25	
	D	25	25 Questions X 1 Mark = 25	
<b>Paper II</b>				
Section	Weightage	No. Questions & Weightage		
		Long answer	Critical Analysis	
A	45	3 Questions X 10 Mark = 30	1 Questions X 15 Mark = 15	
B	55	4 Questions X 10 Mark = 40	1 Questions X 15 Mark = 15	

\*\*\*\* The end \*\*\*\*