# TOPICS FOR FINAL EXAMINATION FROM PATHOLOGICAL PHYSIOLOGY FOR GENERAL MEDICINE

## GENERAL PATHOLOGICAL PHYSIOLOGY

### 1.NOSOLOGY

1. Health & disease, pathological states, findings, processes, manifestations; Stages and outcomes of diseases
2. Etiopathogenesis (external, internal & multifactor causes); Risk factors concept; Evidence - based medicine
3. Aging – terminology, epidemiology, theories; cellular & organ physiological and pathological changes during aging
4. Terminal states and illness – stages, forms; clinical, biologic death; Brain death criteria; Vegetative state
5. Cardiopulmonary-cerebral resuscitation; Post-resuscitation disease; Reperfusion sy., Post-comatose states

### 2. ETIOLOGY

**A. Physical factors**

1. Pathological effects of mechanical energy (injury, blast crush sy.), gravity, weightlessness, acce-/deceleration, kinetosis
2. Hypobaria - high altitude syndromes; Hyperbaria - high-pressure nervous sy, diver's disease; Decompression prevention
3. Pathological effects of electromagnetic field & electrical current (in. high power, lightening); therapeutical use
4. Effects of ionizing radiation; cellular alterations & organ sensitivity; Acute & chronic radiation disease
5. Hypothermia -forms, symptoms; medical use; Chilblains (stages; cure); tissue effects of cold (cryotherapy)
6. Hyperthermia - forms, symptoms; Sunstroke; Malignant hyperthermia; Burns (staging; maniestation, therap. principles)

**B. Chemical factors**

1. General description of intoxications (classes, accumulation, detoxication); Biological venoms, toxins; Drugs (teratogens)
2. Environmental intoxications (heavy metals, solvents, pollutants, CO etc.); Carcinogens
3. The biological effects of nicotine and smoking; Drug abuse (common drugs), mechanism of the addiction & withdrawal
4. Acute and chronic effects alcohol in the body; Alcohol abuse & withdrawal; Methanol intoxication

**C. Nutritional factors and metabolic disorders**

1. Metabolic effects of acute and absolute starvation; Anorexia nervosa; Neuro-humoral regulation of metabolism
2. Chronic undernutrition (incl. kwashiorkor, marasmus, cachexia); Qualitative undernutrition
3. Obesity – measures, types, etiology, pathogenesis, manifestations; Insulin resistance & metabolic X syndrome
4. Trace element metabolism and its disorders (non-metals and metals except iron)
5. Iron - metabolism; deficiency and overload (incl. hereditary haemochromatosis)
6. Disorders of water soluble vitamin metabolism
7. Disorders of lipid soluble vitamin metabolism
8. Inborn defects of metabolism of saccharides (incl. glycogensoses, muccopolysacharidoses)
9. Hyperglycemic and hypoglycemic states; neuro-humoral regulation of glucose homeostasis
10. Inborn defects of metabolism of aminoacids (vr. phenylketonuria, alcaptonuria. albinism)
11. Disorders of lipid metabolism – dyslipoproteinemias; inborn enzymopathies (e.g. gangliosidpses, sphingolipidoses)
12. Disorders of protein metabolism (incl. plasmatic proteins), urea and uric acid (incl. arthritis urica)
13. Disorders of hem metabolism - porphyrias and hyperbilirubinemias

**D. Genetic factors**

1. Types and mechanisms of mutations (somatic, gametic); genetic, epigenetic, hereditary, congenital, familial diseases
2. Monogenic diseases, autosomal dominant trait - principles and examples; exceptions, codominance
3. Monogenic diseases, autosomal recessive trait - principles and examples;
4. Monogenic diseases, gonosomal (incl. X –linked) trait- principles and examples (incl. hemophilias)
5. Monogenic diseases with non-Mendelian inheritance (imprinting, triplet repeat mutations, mitochondrial diseases)
6. Genetic background of complex diseases (polygenic heredity, polymorphism, epigenetic mechanisms etc.)
7. Chromosomal aberrations structural (forms, examples) & numeric of autosomes (in.. Down sy. and others)
8. Chromosomal aberrations structural (forms, examples) & numeric of gonosomes (in. Turner sy. and others)

### 3. PATHOGENESIS

**E. Typical pathological processes and manifestations**

1. Pain – nociception, neurophysiology, endogenous analgestic system; hyperalgesia, pain asymbolia, referred pain
2. Acute and chronic forms of pain; Special pain: neuralgia, headache, central pain, phantom limb pain, causalgia
3. Disorders of consciousness, classifications; Quatitative & qualitative forms (incl. confusion, delirium, black-out)

4. Coma and pre-comatose states – etiology, manifestations, staging, grading; neurol. evaluation; Post-comatose states
5. Coma - focal neural and diffuse brain damage (metabolic, intoxication); comparisons - neurological evaluation
6. Stress – etiology; neurogenic and humoral afferent and efferent mechanisms; cortical - visceral concepts
7. Stress – concepts; clinical forms; general adaptation sy., maladaptation, stress - related disorder
8. Edemas, transudates and exudates – etiopathogenesis, forms, tissue findings
9. Microcirculatory failure – principles; centralisation of circulation, tissue & organ effects; shock organs, MODS
10. Microcirculatory failure – clinical forms of shock (septic, anaphylactic, hypovolemic, cardiac etc.)

**F. Inflammation and healing**

1. Inflammation – general features, clinical forms, vascular reactions; systemic manifest. (in. acute phase proteins)
2. Acute inflammation – humoral factors (classes, functions), incl. chemotaxia, blood systems, cytokines etc.
3. Acute inflammation – cellular response (types, action time-scale), incl. diapedesis, killing, APC,
4. Systemic inflammation – SIRS (systemic inflammatory response sy.) ; Multi-organ failure (MODS), Sepsis
5. Chronic inflammation – etiopathogenesis, forms, characteristics, chronic inflammation and tumors
6. Inflammation – healing process; mechanisms timing, tissue, and cellular processes
7. Fever – types, mechanism, characteristics; examples of diseases

**G. Disorders of immunity**

1. Autoimmunity – pathogenesis; classification; Organ/system related (in. endocrine, nervous, skin, GIT, liver)
2. Autoimmunity - pathogenesis; classification; Polysystemic disorders (in. systemic lupus spectrum, vasculitis)
3. Hypersensitivity – classification; mechanisms; type I. and II. (examples, etiopathogenesis, manifestation)
4. Hypersensitivity – classification; mechanisms; type III. and IV. (examples, etiopathogenesis, manifestation)
5. Immunodeficiency – classification, mechanisms; Inborn humoral, cellular, combined and leukocyte defects
6. Immunodeficiency – classification, mechanisms; Acquired immunodeficiencies – AIDS and other conditions

**H. Hypoxia and ischemia**

1. Systemic hypoxia - definition, classification, symptoms and compensatory mechanisms
2. Hypoxic hypoxia – causes, mechanisms; Cyanosis – forms; Histotoxic hypoxia – causes, mechanisms (in. cyanide)
3. Circulatory hypoxia – causes, manifestations; Hemic hypoxia (anemia, CO intoxications) – causes, manifestations
4. Cellular pathomechanisms of ischemia and hypoxia; Ischemic-reperfusion injury

**I. Disorders of inner milieu**

1. Disorders of water and sodium metabolism (hypo/hypernatraemia, hypo/hypervolemia)
2. Disorders of potassium metabolism (hypo/hyperkaliemia)
3. Disorders of calcium and phosphate metabolism
4. Acid-base balance – general principles, classification, compensatory mechanisms
5. Respiratory acidosis and alkalosis – etiopathogenesis; lab. findings; compensation
6. Metabolic acidosis and alkalosis – etiopathogenesis; lab. findings;

**J. Oncology**

1. Tumors - typology; epidemiology; tumor markers; immunology; TNM, paraneoplastic syndromes
2. Benign & malignant tumors – morphologic, functional & metabolic differences; precancerosis; invasive growth
3. Tumor etiopathogenesis (physical, chemical, biological factors; hereditary forms of tumours)
4. Tumor transformation (inc. oncogens, tumor suppressor genes; Multi-hit theory; Clonal evolvement)
5. Molecular carcinogenesis (inc. metastasis – forms, mechanisms; metastasis suppressor genes, angiogenesis; survival)

**K. Celullar pathophysiology**

1. Intercellular signaling - apocrine, paracrine, endocrine; Receptor types; Intracellular cascades overview
2. Signaling through G proteins, tyrosine - kinase receptors and intracellular receptors – principles and examples
3. Intracellular function of calcium; calcium homeostasis, signaling role of nitric oxide
4. Cell damage – dystrophy, apoptosis, necrosis; Cell stress; stress cascades, stress proteins, oxidative stress
5. The bioreactive forms of oxygen (ROS) - formation, damage of biological macromolecules; Antioxidant defense

## SPECIAL (SYSTEMIC) PATHOLOGICAL PHYSIOLOGY

### A. CARDIOVASCULAR SYSTEM

1. Heart failure - definition, classification and stages; mechanisms of systolic and diastolic cardiac dysfunction
2. Compensatory mechanisms in chronic volume and pressure overload; Compensated & uncompensated failure
3. Pathogenesis and symptoms of left heart failure; Mechanisms of low - and high output failure
4. Pathogenesis and symptoms of right heart failure; mechanisms of left to right mixed heart failure
5. General description of acquired valve disorders - etiology, forms and hemodynamics
6. Mitral stenosis and mitral insufficiency, mitral valve prolapse - etiopathogenesis; endocarditis
7. Aortic stenosis and aortic insufficiency; Coarctation of the aorta – etiopathogenesis
8. Congenital heart diseases with cyanosis - a general description, classification; hemodynamic consequences
9. Congenital heart defects without cyanosis - a general description, classification; hemodynamic consequences
10. Cardiomyopathies - types; etiopathogenesis, classification; Inborn and acquired forms
11. Primary arterial hypertension – classification, types, mechanisms; principles of regulation blood pressure, values
12. Secondary arterial hypertension - classification; mechanisms; principles of regulation of blood pressure, values
13. Hypotensive states - etiopathogenesis; classification (incl. the collapse, orthostatic syncope)
14. Dysrhythmia – classifications, causes, mechanisms, electrophysiology; interpretation of ECG
15. Supraventricular dysrhythmias - tachycardia, extra beats, flutter, fibrillation (in. sy. of pre-excitation)
16. Ventricular arrhythmias – tachycardias, idioventricular rhythm, extrasystoles, fibrillation, flutter
17. Nomotopic disorders and bradyarrhythmias (incl. conductive disorders, AV block, bundle branch block)
18. ECG in ischemic heart disease and myocardial infarction; atrium and ventricle hypertrophy
19. Atherosclerosis - complex pathogenesis and genetic background; endothelial dysfunction
20. Coronary heart disease - etiology, risk factors and clinical classification (acute and chronic forms)
21. Angina pectoris - forms, pathogenesis, symptoms, diagnosis) (incl. stable, unstable, variant, silent forms)
22. Acute coronary syndrome - myocardial infarction (pathogenesis, types, symptoms, ECG and labor. diagnosis)
23. Myocardial infarction - acute and chronic complications; ischemic reperfusion syndrome; treatment principles
24. Sudden cardiac death (definition, etiology pathogenesis); SIDS (sudden infant death syndrome)

### B. RESPIRATION

1. Pathological pattern of breathing; Dyspnoe; Symptoms (incl. auscult. sounds, cough, hemoptysis); Ventilometry findings
2. Dysregulation of breathing; Central depression - etiology; Sleep apnea syndromes; SIDS
3. Disorders of ventilation and air distribution (incl. alvolar hypoventilation); Ventilation-perfusion disturbances
4. Disorders of lung gas diffusion and perfusion (in. pulmonary thromboembolism); Ventilation-perfusion disturbances
5. Respiratory insufficiency - type I and II (global and partial); causes, symptoms; principles of treatment
6. Pulmonary edema - interstitial and alveolar; Respiratory distress syndrome in adults (ARDS) and children (IRDS)
7. Pulmonary hypertension - classification, etiopathogenesis, symptoms; Cor pulmonale
8. Obstructive and restrictive lung diseases – forms, general pathogenesis; ventilometric differences; typical findings
9. Bronchial asthma - etiopathogenesis, forms of expression; Status asthmaticus; principles of treatment
10. Chronic obstructive pulmonary disease - etiopathogenesis, types and manifestations
11. Cystic fibrosis (incl. inheritance and extrapulmonary manifestations)
12. Restriction disorders - classification, examples (incl. pneumonia, pneumoconiosis, interstitial fibrosis, etc.).

### C. HEMATOLOGY

1. Anemia – etiopathogenetic/morphological classification; Laboratory findings; Anemic sy.; Compensatory mechanisms
2. Sideropenic and sideroblastic anemia; Anaemia in chronic diseases
3. Anemia from blood losses – posthemorrhagic; extracorpuscular hemolytic anemia - labor. findings, manifestations
4. Hemolytic anemia – intracorpuscular (incl. membrane, cytoskeletal defects, hemoglobinopathies)
5. Megaloblastic anemia; anemia due to defective DNA synthesis
6. Polyglobulia, polycythemia
7. Bone marrow suppression; Hypoplastic anemia, aplasias of multiple blood lineages - causes and symptoms
8. Deficit and excess of granulocytes and agranulocytes - overview (incl. agranulocytosis)
9. General characteristics and classification of lymphoproliferative and myeloproliferative diseases
10. Acute and chronic myeloid leukemia
11. Acute and chronic lymphoid leukemia
12. Hodgkin's disease and non-Hodgkin's lymphomas
13. General description and classification of hemorrhagic diathesis (in. Petechiae, ecchymosis, purpura, hematoma)
14. Thrombocytopenia, thrombocytopathy and vasculopathy - classification, etiopathogenesis; examples of diseases
15. Thromboembolic disease and inherited thrombophilia (incl. venous thrombosis, embolism)

16. Coagulation disorders (incl. hemophilias and von Willebrand disease)
17. Disseminated intravascular coagulation - causes, mechanisms and manifestations

**D. NERVOUS SYSTEM AND SENSES**

1. Motor disorders - general neuropathophysiology; terminology, symptomatology
2. Paralysis, palsy - Upper and lower motor neuron sy. - etiopathogenesis; manifestations
3. Extrapyramidal disorders - hyperkinetic: classification, characteristics (incl. Huntington's disease)
4. Extrapyramidal disorders - hypertonic: dystonia; parkinsonism (incl. Parkinson's disease)
5. Cerebellar syndrome; Pathophysiology of cerebellum and brainstem in motor activity
6. Musculopathies – classification, symptoms (incl. Duchenne's dis.); Neuromuscular plate disorders (in. Myasthenia gravis)
7. Somatosensitive disorders – neurophysiology; lesion and irritation sy.; dissociative syndromes; sensory neuropathies
8. Demyelinating disorders - classification, etiopathogenesis; Multiple sclerosis - forms, manifestations
9. Neurodegenerative diseases - classification; genetic basis; inclusions diseases (taopaties, amyloidosis, and the like.)
10. Lesions of the spinal cord - transverse lesion (incl. spinal shock); Brown - Séquard hemisection syndrome
11. Spinal cord lesions – lateral and posterior columns sy.; Dissociation sy.; Amyotrophic lateral sclerosis;
12. Epilepsy and other neurological conditions associated with seizures (generalized, focal) – etiopathogenesis
13. Dementia syndrome - causes, classification (in. vascular dementia; Alzheimer's disease)
14. Vegetative dysfunctions - general symptomatology, vegetative dystonias, postural/orthostatic and regional disorders
15. Disorders of higher nervous functions - memory disturbances, speech disorders
16. Disorders of higher neural functions - dyspraxia, agnosia, impaired intellect
17. Intracranial pressure and herniation syndromes; Subdural and subarachnoidal bleeding
18. Cerebrovascular stroke - classification, etiopathogenesis; Manifestation: a. cerebri anterior, media, posterior syn.
19. Sleep disorders - classification; dyssomnia, parasomnia disorders; motor behavior during sleep
20. Visual disturbances – overview: refractory disorders, defects of visual field; glaucoma, cataract
21. Auditory disorders – overview: perceptive and conductive disorders, tinnitus

**E. KIDNEY AND URINARY TRACT**)

1. Manifestations of renal disease (incl. hematuria, proteinuria, abnor. sediment, a dilution and concentration dysfunct)
2. Glomerulopathies - morphological classification; etiopathogenesis; immunopathology mechanisms
3. Glomerulopathies - clinical manifestations and forms; incl. nephritic and nephrotic syndrome
4. Tubulointerstitial diseases (incl. congenital and acquired tubulopathies); Acute and chronic pyelonephritis
5. Urolithiasis, hydronephrosis; Obstructive and other disorders of the urinary tract
6. Renovascular diseases; kidney in blood pressure regulation; Hepatorenal syndrome
7. Acute renal failure - etiology, pathogenesis and symptoms; Acute tubular necrosis – stages, manifestations
8. Chronic renal failure - etiology, pathogenesis and symptoms; staging, Uremic syndrome,

**F. ENDOCRINOLOGY AND DIABETES MELLITUS**

1. General endocrinology- etiology of hormonal excess and deficit, regulation feedback; resistance to hormones
2. Hypothalamic- pituitary syndromes – selective, combined defects; Hypopituitarisms - causes, symptoms
3. Posterior pituitary sy. – incl. vasopressin and oxytocin pathophysiology
4. Anterior pituitary sy. - growth hormone and prolactin pathophysiology
5. Hyperthyroidism - etiopathogenesis, forms, manifestations; thyrotoxicosis; hyperfunctional goiter
6. Hypothyroidism - etiopathogenesis, forms, manifestations; Hypo- /normofunctional goiter
7. Adrenocortical hypofunction (Addison's disease) incl. fulminant adrenalitis
8. Hypercortisolism - etiopathogenesis, forms, manifestations (Cushing's disease and syndrome)
9. Hyperaldosteronism - etiopathogenesis, forms, manifestations (incl. Conn's syndrome)
10. Congenital adrenal hyperplasia; Hyperfunction of adrenal medulla
11. Hypoparathyroidism – etiopathogenesis, forms, manifestations; Calcitonin pathophysiology
12. Hyperparathyroidism - primary and secondary; etiopathogenesis manifestations
13. Definition, classification and symptomatology of diabetic syndrome; MODY type diabetes mellitus
14. Type 1 diabetes mellitus (etiopathogenesis, genetic background, epidemiology. manifestations)
15. Type 2 diabetes mellitus (etiopatogenesis; genetic background, epidemiology. manifestations, insulin resistance)
16. Acute complications of diabetes mellitus; glycemic control; hypoglycemia / hyperglycemia in diabetes
17. Chronic complications of diabetes mellitus - classification; manifestations; principles of therapy and prevention

**G. GASTROINTESTINAL SYSTEM, LIVER, PANCREAS AND GALL BLADDER**

1. Manifestations of GIT disorders (incl. diarrhea, constipation, nausea, enterorrhagia, intestinal ischemia)
2. Disorders of pharynx and esophagus; Dysphagia, Gastroesophageal reflux disease (GERD)

3. Peptic ulcer of stomach and duodenum - etiopathogenesis, symptoms, complications
4. Intestinal motility disorders - constipation, forms; Ileus - causes, forms (incl. Diverticulosis, megacolon)
5. Intestinal motility disorders - diarrhea, forms; Irritable bowel Syndrome – causes, symptoms
6. Malabsorption and maldigestion - Causes and symptoms (incl. Specif. Disorders of secretion and absorption of nutrients; Celiac disease)
7. Acute and chronic pancreatopathy (incl. Pancreatic insufficiency)
8. Inflammatory bowel disease - etiopathogenesis and symptoms (Crohn's disease & ulcerative colitis)
9. Acute and chronic viral hepatitis
10. Hepatic insufficiency - etiopathogenesis, symptoms; laboratory findings; hepatic encephalopathy and coma
11. Liver cirrhosis, ascites, portal hypertension
12. Disorders of the gallbladder and bile ducts; gallstones – etiopathogenesis
13. Jaundice - classification; etiopathogenesis, symptoms

**H. DISORDERS OF BONES, JOINTS AND CONNECTIVE TISSUE**

1. Hormonal regulation of bone tissue formation; rickets
2. Osteoporosis, osteomalatia – etiopathogenesis, manifestations
3. Degenerative disorders of joints; rheumatic arthritis

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