2nd SEMESTER GENERAL MEDICINE

BIOCHEMISTRY PRACTICAL TOPIC LIST for Final Exam

1. Photometry
- principle of the photometric method
- photometric assay in practice, possibilities for the calculation of results

2. Determination of total protein in serum
- commonly used methods
- normal serum total protein concentration, conditions with increased and decreased serum total protein value

3. Determination of albumin in serum
- functions of albumin
- normal serum albumin concentration, conditions with increased and decreased serum albumin value
- principle of the assay

4. Conditions of optimal enzyme activity
- modelling of substrate specificity
- investigation on the influence of temperature on catalytic activity

5. Characterize the hydrolysis of starch
- enzymatic hydrolysis
- acidic hydrolysis

6. Characterization of non-specific phosphatases
- types, substrates and functions of phosphatases
- conditions with increased and decreased serum alkaline phosphatase activity

7. Assay on the dependence of enzyme activity on substrate concentration
- how can we make a bisecting dilution series?
- interpretation of the plot (Michaelis-Menten)

8. Linearization method of the Michaelis -Menten equation and the direct linearization
- linearization of the results of the alkaline phosphatase enzyme assay

9. Determination of glucose-6-phosphatase activity
- function of the enzyme, its role in the metabolism, consequences of related enzyme deficiency
- principle of turbidimetry, principle of the assay
- protocol of glucose-6-phosphatase assay, evaluation of the results

10. Determination of uric acid concentration in serum
- synthesis of uric acid
- conditions with hyperuricemia, gout
- principle of the assay, diagnostic role of uric acid assay

11. Investigation on the functioning of the respiratory chain by methylene blue reduction
- characterization of mitochondrial respiration, uncoupling agents and inhibitors
- principle of the assay

12. Determination of serum bilirubin
- synthesis and metabolism of bilirubin
- normal serum bilirubin concentration, conditions with increased concentration
- principle of the van den Bergh reaction

13. Separation of serum proteins
- albumin, $\alpha 1$, $\alpha 2$, β, γ globulin fractions
- characterization of the electrophoretic method
- protocol for the native electrophoresis

14. Principles of serum ion assays and blood-gas analysis
- characterization of electrolyte balance of the body (importance of Na^+, K^+, Ca^{++})
- principles of serum ion assays (colorimetry, dry chemistry, ion selective electrodes / Deep Picture system)
- characterization of modern blood-gas analysis

15. Laboratory tests of the liver
- diagnostic importance of the enzymes
- enzyme reaction catalysed by ASAT (GOT)
- enzyme reaction catalysed by ALAT (GPT)
- liver laboratory panel, conditions with increased serum enzyme activities

16. Dry chemistry (Point of Care Testing)
- principles of dry and wet chemistry, comparison of the methods
- characterization of the Reflotron system
- bedside laboratory parameters with clinical importance (most frequently measured parameters by Point of Care Testing)

17. Diagnostics of heart attack
- laboratory diagnosis of heart attack
- lipid parameters as cardovascular risk factors

18. Diagnostics of heart attack risk factors
- principle of the triglyceride assay, possible reasons for increased triglyceride level
- principle of the cholesterol assay, possible reasons for increased cholesterol level
- lipid panel, determination of lipoproteins

19. Biochemistry of cholinergic neurotransmission
- characterization of cholinergic neurotransmission
- theoretical background and practice of serum cholinesterase assay

20. RT-PCR
- application of PCR in clinical practice
- principle of the PCR reaction, necessary components
- characterization of Ca ATP-ase mRNA isoforms, and model for muscle regeneration
- separation of the amplified fragments by electrophoresis, evaluation of the results

21. Determination of blood glucose
- normal serum glucose concentration
- background of hypo- and hyperglycemia
- possible methods for determination, glucose tolerance test (OGTT)

22. Determination of glycated haemoglobin (HbA1c)
- characterization of HbA1c, its diagnostic importance
- possible methods for determination