**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU -27**

**B.Sc (BIOCHEMISTRY)– VI SEMESTER**

**SEMESTER EXAMINATION: APRIL 2023**

**(Examination conducted in May 2023)**

**BCH 6122 – Bioenergetics and biological oxidation, metabolism and diseases of metabolism**

Time: 2.5 Hours Max Marks: 70

This paper contains **3** printed pages and **4** parts

(Chemical reactions and structures are to be given wherever necessary)

**PART-A**

**Answer any 16 out of 18 questions. Each question carries ONE mark: (16 x 1=16)**

1. Name the final electron acceptor in the electron transport chain.
2. Name an enzyme involved in the conversion of pyruvate to phosphoenolpyruvate.
3. Terrestrial animals are generally either ureotelic or uricotelic, not ammonotelic. why?
4. Where is urea produced in the body?
5. What is the end product of anaerobic glycolysis?
6. Name the blood cell produced in response to the hormone erythropoietin.
7. List two tests that could be included under a lipid profile panel.
8. Give an example of an enzyme that can be used as a therapeutic agent.
9. What is the significance of an ultrasensitive C Reactive protein test?
10. Mention any two major functions of the liver.
11. What causes congenital hyperbilirubinemias?
12. Name a marker, whose levels are increased during prostate cancer.
13. Why is it necessary to perform a kidney function test?
14. Name a clinical condition that indicates the presence of ketone bodies in the urine.
15. What is the color of the urine of a healthy person?
16. What is the role of albumin in transport?
17. List any two early symptoms of kidney failure.
18. Why are cancer cells immortal?

**PART-B**

**Answer any 10 out of 12 questions. Each question carries TWO marks: (10 x 2= 20)**

1. How do hormones regulate fructose-2,6 bisphosphate levels in the cell?
2. What is the role of kidney in erythropoiesis.
3. Give the committed step of cholesterol biosynthesis?
4. Give the reaction catalyzed by pyruvate dehydrogenase.
5. Represent by an equation the transportation of fattyacyl CoA from the cytosol to the matrix of the mitochondria.
6. Give any two forms of nitrogen found in the aquatic environment.
7. What are carcinogens? Name any two most common carcinogens.
8. Suggest a test to detect the presence of bile salts in urine. Give the clinical significance of this test?
9. Explain briefly the role of any two markers in obstructive liver disorders.
10. Differentiate between a normal cell and a tumor cell.
11. What are mutagens? Give an example.
12. Give a reaction where ATP is formed via substrate level phosphorylation.

**PART-C**

**Answer any 8 out of 10 questions. Each question carries THREE marks: (8 x 3 = 24)**

31. Represent diagrammatically the arrangement of the different electron carriers of the ETC.

32.Give the reactions catalyzed by the following enzymes

 (i) triose phosphate isomerase

 (ii) α-ketoglutarate dehydrogenase

33.Give two reactions of the urea cycle in which non protein amino acids are synthesized.

34.How can an α - amino acid be enzymatically converted to an α – keto acid? Give an example.

35.What happens when an amino acid undergoes decarboxylation? Give the significance of this reaction.

36. What is Type I Hypercholesterolemia? How can it be managed? Which lipoprotein fractions is elevated in such a condition?

37. If the specific gravity of urine is greater than 1.025, what does it indicate?

38. What is microalbuminuria? How are the normal values of this test expressed? Give the clinical significance of this test?

39.What is the role of methotrexate as an anticancer drug?

40.What is creatinine? Indicate its normal blood levels. How are creatinine levels estimated?

**PART-D**

**Answer any 2 out of 3 questions. Each question carries 5 marks: (5 x 2 = 10)**

41.a) What is the yield of ATP when pyruvate is completely oxidized by a cell homogenate (assume that glycolysis, TCA cycle and oxidative phosphorylation are fully active)?

 b) Glucose labelled with 14C at C-1 is incubated with the glycolytic enzymes and necessary cofactors. Where will the label appear in the pyruvate that is formed. Justify.(Assume that the interconversion of glyceraldehyde -3-phosphate and dihydroxyacetone phosphate is rapid). (3+2)

42. a)Calculate ΔG⁰ for the following interconversion, which occurs in glycolysis:

Fructose - 6 - phosphate ↔ Glucose - 6 -phosphate

(K’eq= 1.97, measured at 25⁰C and R =8.314kJ/mol)

b) Identify the following:

 (i) The enzyme which is a sensitive marker of acute pancreatitis.

 (ii) The metabolic marker whose levels are increased in cases prostate cancer.

 (iii) The test to evaluate the time taken for the plasma in blood to clot. (2+3)

43. A patient presented with acute chest pain of half hour duration. The biochemical analysis report are as follows: Blood glucose – 350%, Serum cholesterol – 288%, SGOT – 55U/L, SGPT – 15U/L. CPK and LDH were elevated. Give your diagnosis, and what other markers can be estimated in this case? Which iso-enzyme of LDH was increased and why?

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