TERM END EXAM

BT 203 Biochemistry

Time limit: 3 hours **Marks: 40**

Note: This paper consists of two sections, Section I (20 marks) contains single select type and numerical answer type, and Section II (20 marks) contains multiple select and writing based questions.

Please read the questions carefully and answer. Kindly send your answers in the form of pdf at iitgexamabk@gmail.com.

SECTION- I (20 marks)

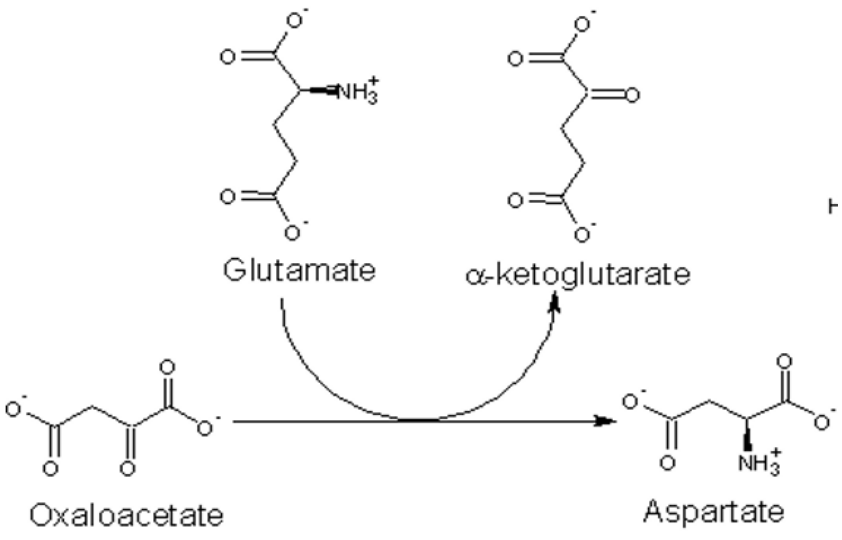
Q. 1. Which of the following lipoprotein consist of highest amount of protein?

a) Chylomicrone
b) LDL
c) VLDL
d) HDL

Q. 2. β-oxidation enzymes are present in?

a) Nucleus
b) Cytosol
c) Mitochondria
d) Golgi apparatus

Q. 3. Name the enzyme involved in the pathway.



Q. 4. Acetyl-CoA Carboxylase is used in the conversion of?

a) acetyl-CoA to malonyl-CoA
b) acetyl-CoA to palmitate-CoA
c) acetyl-CoA to propionyl-CoA
d) acetyl-CoA to carnitine acetyl-CoA

Q. 5. How many NADP+ are generated in process of cholesterol synthesis?

a) 3
b) 4
c) 5
d) 6

Q. 6. "Propionic aciduria" is categorized as which type of disorder?

a) Carbohydrate disorder
b) Protein disorder
c) Fatty acid disorder
d) None of the above

Q. 7. Name the amino acid synthesized from ribose-5-phosphate?

a) Histidine
b) Proline
c) Alanine
d) Glutamate

Q. 8. β-oxidation of Stearic acid will result in

a) 8 cycles of β-oxidation and 9 Acetyl-CoA
b) 9 cycles of β-oxidation and 9 Acetyl CoA
c) 7 cycles of β-oxidation and 8 Acetyl CoA
d) 8 cycles of β-oxidation and 8 Acetyl CoA

Q. 9. Select the feed forward activator of nucleotide biosynthesis

a) ATP
b) GTP
c) IMP
d) PRPP

Q. 10. How many "high energy" (~) bonds are utilized in activating the fatty acid, by esterifying it to coenzyme A? _____

Q. 11. Which amino acid metabolism disorder causes the “Homocystinuria”?

a) Leucine
b) Phenylalanine
c) Cysteine
d) Methionine

Q. 12. Synthesis of nucleotide from free nitrogen bases or nucleotides is called as

a) De novo biosynthesis
b) Ex vivo biosynthesis
c) In vivo biosynthesis
d) Salvage pathway

Q. 13. How does fatty acids reach the inner mitochondrial membrane?

a) as acyl-CoA derivative
b) freely
c) as carnitine derivative
d) require sodium-dependent carrier

Q.14. How many ATP molecules are required for the conversion of glutamine to UMP?

a) 2
b) 6
c) 5
d) 4

Q. 15. Which of the following is used as potential cholesterol lowering medication?

a) HMG-CoA Oxidase
b) HMG-CoA inhibitor
c) HMG-CoA reductase
d) HMG-CoA reductase inhibitor

Q. 16. Select the amino acid synthesized from the 3-phosphoglycerate

a) Serine
b) Valine
c) Methionine
d) Arginine

Q. 17. Ketone bodies are produced in?

a) Brain
b) Muscles
c) Liver
d) Adipose tissues

Q. 18. How many ATP molecules are required for the conversion of ribose-5-phosphate to IMP?

a) 2
b) 6
c) 5
d) 4

Q. 19. Which of the following is not caused by defects in Urea cycle?

a) CPS Deficiency
b) Citrillinemia
c) Tyrosinemia
d) Argininemia

Q. 20. How many each of NADH_____, and FADH2_____ are produced, per 12-carbon fatty acid, in the b-oxidation pathway?

SECTION- II (20 marks)

Q. 21. If there is a mutation in the mitochondrial CoA enzyme, what would happen to the fatty acid oxidation?

a) Fatty acid won't enter the mitochondria.
b) Fatty acid will enter the mitochondria, but will not proceed to oxidation cycle.
c) There won't be a conversion of fatty acid to fatty acyl CoA.
d) Fatty acid will be transported to the mitochondria and gets converted to fatty acid CoA.

Q. 22. In which of the following disorder/s Vitamin B12 is prescribed for effective treatment?

a) Methylmelonic acidemia
b) Propionic acidemia
c) Homocystinuria
d) Maple syrup urine disease

Q. 23. Match the following and select the correct answer

1.	Carbamoyl synthase I	i. De novo synthesis
2.	Carbamoyl synthase II	ii. Uric acid cycle
3.	oxaloacetate	iii. Salvage pathway
4.	Thymidine kinase	iv. Transamination

a) 1-iii; 2-ii; 3-iv; 4-i
b) 1-ii; 2-iii; 3-iv; 4-i
c) 1-ii; 2-i; 3-iv; 4-iii
d) 1-i; 2-iii; 3-iv; 4-ii

Q. 24. What will be the correct order of following steps in the cholesterol synthesis process?

P. Cyclization of squalene
Q. Formation of mevalonate
R. Polymerization of isoprene

a) P→R→Q
b) R→P→Q
c) Q→R→P
d) Q→P→R

Q. 25. Select the amino acids which contribute majorly to the synthesis of nucleotides.

a) Purines – Valine Pyrimidines- Glycine
b) Purines- Glycine Pyrimidines- Aspartate
c) Purines- Glutamine Pyrimidines-Tyrosine
d) Purines- Aspartate Pyrimidines- Glycine

Q. 26. Which of the following amino acid/s metabolism disorder cause the “Maple syrup Urine Disease”?

a) Valine
b) Leucine
c) Tyrosine
d) Isoleucine

Q. 27. Match the following

1.	α-ketoglutarate	i. Proline
2.	3-phosphoglycerate	ii. Arginine
3.	Phosphoenol pyruvate	iii. Tyrosine
4.	Pyruvate	iv. Alanine
		v. Cysteine

Q. 28. What are the different mechanisms to regulate the fatty acid synthesis?

a) Insulin production
b) Transcriptional activity of SREBPs
c) Expression of leptin
d) Use of polyunsaturated fatty acids

Answer in one line

Q. 29. An individual developed a condition characterized by progressive muscular weakness and aching muscle cramps. The symptoms were aggravated by fasting, exercise, and a high-fat diet. The homogenate of a skeletal muscle specimen from the patient oxidized added oleate more slowly than did control homogenates, consisting of muscle specimens from healthy individuals. When carnitine was added to the patient's muscle homogenate, the rate of oleate oxidation equalled that in the control homogenates. The patient was diagnosed as having a carnitine deficiency.

(a) Why did added carnitine increase the rate of oleate oxidation in the patient's muscle homogenate? (1 marks)

(b) Why were the patient's symptoms aggravated by fasting, exercise, and a high-fat diet? (1 marks)

(c) Suggest two possible reasons for the deficiency of muscle carnitine in this individual. (2 marks)