

B.FTBE 1st YEAR 2nd SEM EXAM -2017
Biochemistry & Nutrition- I

Time: 3 hrs.

Full Marks: 100

(Use separate answer script for each part)

Part-I (35 Marks)

Answer **any seven** questions:

7 x 5 = 35

- i a) Define epimer. Give two examples.
b) What are the significances of HMP pathway? (2+1+2)
- ii a) Name of the enzymes of preparatory phase of Embden –Meyerhof-Parnas pathway.
b) What are the functions of glycogen?
c) Draw the structures of one hexoaldose and one ketopentose sugar. (2+1+2)
- iii) Calculate the net number of ATP molecules synthesized in glycolysis. (5)
- iv a) Who proposed chemiosmotic theory?
b) Describe the theory in details. (1+ 4)
- v) Describe Cori cycle. (5)
- vi) Describe the process of glycogenesis. (5)
- vii) Diagrammatically illustrate the overview of blood glucose homeostasis. (5)
- viii a) Name the enzymes of pyruvate dehydrogenase complex.
b) Name the enzyme that catalyzes the reaction of TCA cycle leading to formation of FADH₂. (3+2)
- ix) Give the reactions of Non oxidative Phase of HMP pathway. (5)
- x a) Mention the three sites in electron transport chain that results in synthesis of ATP.
b) What is the normal range of blood glucose level? (3+2)
- xi) Write the structures of the following:
a) α-D-glucopyranose
b) β- D-glucopyranose
c) α-D-fructofuranose
d) O-α-D-glucopyranosyl-(1→2)-β-D-fructofuranoside. (1+1+1+2)

B.E. FTBE 1st YEAR 2nd SEM EXAM -2017

Biochemistry & Nutrition- I

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Part-II (35 Marks)

1. Answer any six questions: (2×6=12)

- What is the difference between ketonuria and ketoacidosis?
- Define the term 'Iodine Value'.
- Give the structure of: Acyl adenylate, β -hydroxybutyrate.
- Name one oil-in-water emulsion and one hydrogenated fat.
- Write the full form of: FAD, IDL.
- Define esterification with its application in food industry.
- Fill in the blanks:

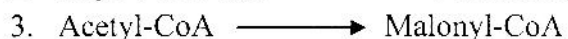
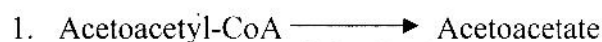


h. What is the importance of emulsification in fat digestion?

2. Answer any two short notes: (4×2=8)

- Fatty liver
- Rancidity of fat
- Carnitine-acylcarnitine antiport
- Absorption of lipids

3. A. Write the mechanisms involved in the following conversions:



(5×3=15)

OR

B. 1. What are the differences between β -oxidation of monounsaturated fatty acid and polyunsaturated fatty acid?

2. Write the name of the domain 1 of Fatty acid synthase and associated enzymes with it.

3. How many ATP molecules are produced during β -oxidation of palmitic acid?

4. Name the enzymes involved in following conversions:



(4+4+4+[1×3]=15)

Biochemistry and Nutrition -I

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Part-III [Answer any three questions, Marks 3x10= 30]

1. (a) Write the name and chemical formula of one amino acid of each of the following type:
 - (i) having non-polar -R group
 - (ii) having polar but uncharged -R group
 - (iii) having negatively charged -R group
 - (iv) having positively charged -R group
- (b) Name one optically inactive amino acid.
- (c) Write the difference between Cysteine and Cystine
- (d) What do you mean by 'Zwitterionic structure' of amino acid ?
- (e) What is the Isoelectric pH (pI) of Alanine (pK_1 is 2.34 & pK_2 is 9.69) (4+1+2+2+1)

2. Explain the following:
 - (a) When crystalline Alanine is dissolved in water, it can act as acid as well as base
 - (b) In fully protonated form Alanine acts as diprotic acid
 - (c) Carboxyl group of Alanine dissociates more strongly than that of Acetic acid
 - (d) Heating with excess Ninhydrin yields a purple product with all amino acids having free α -amino group (Show the reactions) (2+2+2+4)

3. (a) Mono amino mono carboxylic amino acids show two regions of buffering capacity- Explain.
- (b) Hemoglobin contains high content of Histidine – State the significance of it.
- (c) What do you mean by 'C-terminus' and 'N-terminus' of a polypeptide chain ? (6+2+2)

4. (a) A drop of solution of a mixture of Lysine, Alanine and Aspartic Acid is placed on a filter paper strip moistened with buffer of pH 6.0 and placed between poles of anode and cathode. If a high voltage is applied then find the positions of different amino acids relative to the poles. Justify your answer
- (b) If an acid solution (initial pH 3.0) of a mixture of Arginine , Leucine and Glutamic Acid is passed through a column packed with cation exchange resin particles and washed gradually with higher and higher pH buffer, then show the pattern of elute with time and explain. (5+5)

5. (a) In a di-peptide show the other bonds which remain on the same plane along with the peptide bond
- (b) What do you mean by 'primary structure' and 'quaternary structure' of protein ?
- (c) Mention the forces which help protein to assume stable quaternary structure from the primary one
- (d) State the number of amino acid residues per turn of a α -helical structure of protein
- (e) Name one globular protein. (3+3+2+1+1)