Ref. No. : Ex/FTBE/T/122/2018

B.E. FOOD TECHNOLOGY AND BIO-CHEMICAL ENGINEERING

FIRST YEAR SECOND SEMESTER EXAM 2018

Biochemistry and Nutrition I

Time: 3 hrs. Use a separate Answer-Script for each Part Full Marks : 100

Part – I (Marks 60)

[1] ***Answer any one from the following questions (a) and (b):***

(a) (i) What is ion exchange chromatography?
(ii) What is gel's exclusion limit?
(iii) What is isoelectric focusing?
(iv) What is protein denaturation? (3+2+3+2)

(b) (i) Describe electron transport chain.
(ii) Explain chemiosmotic hypothesis.
(iii) What is P:O ratio? (4+4+2)

[2] ***Answer any three(3) from the following questions (a), (b), (c) and (d):***

(a) (i) Name the constituent enzymes and coenzymes of pyruvate dehydrogenase complex.
(ii) What are the two roles of debranching enzyme?
(iii) Name the enzyme of TCA cycle that produces $FADH_2$. (4+4+2)

(b) (i) Name the three irreversible enzymes of glycolysis.
(ii) How many molecules of pyruvate are produced from one molecule of glucose in glycolysis?
(iii) Where does gluconeogenesis take place? (6+2+2)

(c) (i) What is glycogen?
(ii) What are the functions of glycogen?
(iii) Describe glycogenesis in brief. (1+4+5)

(d) (i) What are the significances of Pentose Phosphate Pathway?
(ii) Name the two enzymes acting on the same substrate ribulose-5-phosphate?
(iii) How does insulin control the blood sugar level? (4+2+4)

[3] ***Answer any two(2) from the following questions (a), (b)and (c):***

(a) (i) What is quaternary structure of a protein?
(ii) Do all proteins have quaternary structure?
(iii) Define protein efficiency ratio.
(iv) Name any two enzymes that help in protein digestion. (3+3+2+2)

(b) (i) Name the sources of two nitrogen atoms of urea in urea cycle.
(ii) Name the enzymes of urea cycle.
(iii) What is transamination reaction? (2+5+3)

(c) (i) What do you understand by Ramachandran plot?
(ii) What is the difference between essential and non essential amino acids?
(iii) Explain the contribution of hydrogen bonding to the structure of alpha helices.
(iv) Define chemical score. (4+2+2+2)

[Turn over]

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B.E. FOOD TECHNOLOGY AND BIO-CHEMICAL ENGINEERING FIRST YEAR
SECOND SEMESTER – 2018

Subject: BIOCHEMISTRY & NUTRITION – I Time: 3 hours Full Marks: 100

Part – II (40 marks)

Use Separate Answer scripts for each Part

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1. Answer any five questions: **(2×5=10)**

i. Define esterification with example.

ii. What is ketonuria?

iii. Fill in the blanks: ATP + _____ + acetyl-CoA $\xrightarrow{\text{acetyl CoA carboxylase}}$ ADP + Pi + _____

iv. Why 'Iodine Number' considered as a quality characteristic of fat?

v. Give the structure and name of the following fatty acid: $\Delta^{5,8,11,14}$–cis–Eicosatetraenoic acid.

vi. Hydrogenated fat: mention both positive and negative side.

vii. Write the role of methionine as a lipotropic agent.

viii. Give the full form of VLDL and FAD.

2. Answer any five questions: **(4×5=20)**

i. What is rancidity of fat?

ii. How many ATP molecules are generated during complete β-oxidation of one molecule palmitic acid?

iii. Draw the tentative model of the dimer form of multienzyme fatty acid synthase.

iv. Mention the enzyme involved in following conversions: Δ^2 – trans-Enoyl-enzyme ⟶ Acyl-enzyme, Pyruvate ⟶ Acetyl CoA, Fatty acid ⟶ Acyl CoA.

v. Compare the beta-oxidation cycle of monounsaturated and polyunsaturated fatty acids.

vi. Why HDL called good cholesterol but LDL as bad cholesterol?

vii. Give the structure of the following compounds: Acyl adenylate, carnitine

3. i. Write the mechanism involved in the following conversions: **(5+5=10)**
Acyl CoA (C_{16}) ⟶ 3-ketoacyl-CoA, Acetoacetyl-CoA ⟶ 3-hydroxy butyrate

Or

ii. Carnitine-acyl carnitine antiport: explain the pathway. Write in short about fatty liver.

(5+5=10)