2015

BIOTECHNOLOGY

Paper : 101 (Old Course)

BIOCHEMISTRY

Full Marks : 80

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Find out the correct answer from the following (any eight) $1 \times 8 = 8$

A) In a DNA strand, the nitrogenous base remain bonded with the pentose sugar by its.....carbon.

i) 1st ii) 3rd

iii) 4th iv) 5th

B) Which of the following amino acid is unique in its structure

i) Alanine ii) Valine

iii) Leucine iv) Tryptophan

C) SDS separates protein by

i) Mass ii) Polarity

iii) Solubility iv) None of these

D) 2,4-Dinitrophenol, an uncoupler of oxidative phosphorylation, was used as a weight- loss agent in the 1930s. Reports of fetal overdoses led to its discontinuation in 1939. Which

of the following would most likely be true concerning individuals taking 2,4-Dinitrophenol?

i) ATP levels in the mitochondria are greater than normal.

ii) Body temperature is elevated as a result of hypermetabolism.

iii) Cyanide has no effect on electron flow.

iv) The proton gradient across the inner mitochondrial membrane is greater than normal.

E) Which of the following has the strongest tendency to gain electrons?

i) Coenzyme Q ii) Cytochrome c

iii) NAD iv) Oxygen.

F) Compared with the resting state, vigorously contracting skeletal muscle shows:

i) Decreased AMP/ATP ratio,
ii) Decreased NADH/NAD+ ratio
iii) Increased oxygen availability
iv) Increased reduction of pyruvate to lactate

G) Which one of the following conditions decreases the oxidations of acetyl coenzyme A by the citric acid cycle?

i) A high availability of calcium

ii) A high acetyl CoA/CoA ratio

iii) A low ATP/ADP ratio

iv) A low NAD+/NADH ratio

H) Pyruvate carboxylase is an important enzyme in gluconeogenesis. It requires a coenzyme to covalently bound with lysine residue. The coenzyme is

i) Biotin ii) Pantothenic Acid

iii) Niacin iv) None of these

I) Which of the following reactions is unique to gluconeogenesis?

i) 1,3-Biphosphoglycerate to 3-phosphoglycerate

ii) Lactate to pyruvate

iii) Oxaloacetate to phosphoenolpyruvate

iv) phosphoenolpyruvate to pyruvate

2. Write short notes on- (any six)- 2×6=12

A) Abzyme

B) RNA Splicing

C) Pre-Pro-Protein

D) Sigma subunit of RNA polymerase

E) Eicosanoids

F) Importance of Metal ions in life processes

G) Ubiquinone

H) Allosteric enzyme

3. Distinguish between- (any four) 4×5=20

A) Functions of Enzyme and Coenzyme

B) Essential and Nonessential amino acids

C) Role of Insulin and Glucagon in metabolism

D) De-amination and Trans-amination

E) Competitive Inhibition and Non competitive Inhibition

4. Answer the following questions briefly- (any two) 8×2=16

A) What are the important considerations to draw a Ramachandran Plot? Discuss.

B) Derive the Michalis-Menten equation for enzyme catalysis.

C) Draw the intermediary metabolic pathways of metabolism with comments.

D) Describe function of different classes of enzymes with examples.

5. Answer any two questions from the following- 12×2=24

A) Describe the cholesterol biosynthesis mechanism in tissues with illustrations. 12

B) What do you mean by Photophosphorylation? Differentiate the C_3 and C_4 pathways of CO_2 fixation. 2+10=12

C) Describe the pentose phosphate pathway of hexose metabolism. What are the important functions of the pathway? 10+2=12

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