2015

# BIOTECHNOLOGY

Paper : 101

## 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) 1×8=8

A) Which amino acid is achiral-

i) Serine ii) Tyrosine
iii) Glycine iv) Asparagine

B) An acid is a ..... donor.

i) Electron ii) proton
iii) neutron iv) none of these

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

i) 1st ii) 3rd
iii) 4th iv) 5th

D) Salting out separates protein by their

i) Ion exchange ii) Polarity

iii) Solubility iv) None of these

E) A particular point mutation results in disruption of the á-helical structure in a segment of the mutant protein. The most likely change in the primary structure of the protein is-

i) Glutamate to aspartate ii) Lysine to arginine

iii) Methionine to proline iv) Valine to alanine

F) The effect of a competitive inhibitor on the reaction velocity versus substrate shows-

i) $K_m$ apparently is increased in the presence of a competitive inhibitor

ii) $K_m$ apparently is decreased in the presence of a competitive inhibitor

iii) $K_m$ apparently is not changed in the presence of competitive inhibitor

iv) $V_{max}$ is the same in the presence of a competitive inhibitor.

G) ADH requires oxidized nicotinamide adenine dinucleotide (NAD+) for catalytic activity. In the reaction catalyzed by ADH, an alcohol is oxidized to an aldehyde as NAD+ reduced to NADH and dissociates from the enzyme. The NAD+ is functioning as a (an):

i) Apoenzyme ii) Coenzyme-cosubstrate

iii) Cofactor iv) Coenzyme-prosthetic group

H) In conversion of one ATP to AMP and Pi, the standard free energy is

i) -6.3 kcal/mol ii) +6.3 kcal/mol

iii) -7.3 kcal/mol iv) +7.3 kcal/mol

I) 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

J) 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

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

A) Ribozyme

B) Pre-Pro-Protein

C) Sigma subunit of RNA polymerase

D) Okazaki fragments

E) Prostaglandin

F) Van-Dar-Walls force

G) Standard Free Energy

H) Importance of Metal ions in life processes

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

A) Lineweaver Burk Plot and Eddie Hofstee Plot

B) Competitive Inhibition and Non competitive Inhibition

C) $\alpha$-oxidation and $\omega$-oxidation of fatty acids

D) Functions of Enzyme and Coenzyme

E) Essential and Nonessential amino acids

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

A) Discuss the stabilizing interactions found in protein.

B) Discuss the structural differences among A-, B- and Z-DNA.

C) Discuss the structure-function relationship of a protein.

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

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

A) Write briefly about the electron transport chain leading to Oxidative Phosphorylation with appropriate illustrations. 8+4=12

B) Describe the degradation process of long chain fatty acids to release Acetyl-CoA. 12

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

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