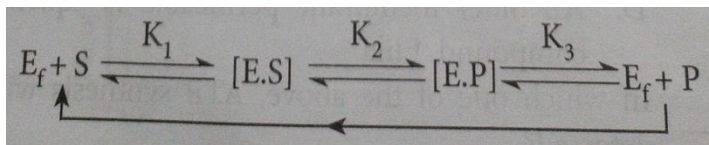


CSIR NET 2016 JUNE

239. The solubility of gasses in water depends on their interaction with water molecules. Four gasses, i.e. carbon dioxide, oxygen, sulfur dioxide and ammonia are dissolved in water. In terms of their solubility, which of the following statements is correct?

- (a) Ammonia > Oxygen > Sulfur dioxide > Carbon dioxide
- (b) Oxygen > Carbon dioxide > Sulfur dioxide > Ammonia
- (c) Sulfur dioxide > Oxygen > Ammonia > Carbon dioxide
- (d) Ammonia > Sulfur dioxide > Carbon dioxide > Oxygen

240. Penicillin acts as a suicide substrate. Which one of the following steps of catalysis does a suicide inhibitor affect?



- (a) K_1
- (b) K_2
- (c) K_3
- (d) K_4

241. Which of the following is NOT true for cholesterol metabolism?

- (a) HMG-CoA reductase is the key regulator of cholesterol biosynthesis
- (b) Biosynthesis takes place in the cytoplasm
- (c) Reduction reactions use NADH as cofactor
- (d) Cholesterol is transported by LDL in plasma

242. Predominant interactions between phospholipids that stabilize a biological membrane include:

- (a) Hydrogen bonds and covalent interactions
- (c) Hydrophobic interactions and hydrogen bonding

- (b) Van der Waals and ionic interactions
- (d) Covalent and hydrophobic interactions

243. The -COOH group of cellular amino acids can form which of the following bonds inside the cell?

- (a) Ether and ester bonds
- (b) Ester and amide bonds
- (c) Amide and ether bonds
- (d) Amide and carboxylic anhydride bonds

244. The standard free energy change (ΔG°) per mole for the reaction $A \rightarrow B$ at 30°C in an open system is 1000 cal/mole. What is the approximate free energy change (ΔG) when the concentrations of A and B are 100 micromolar and 100 millimolar respectively?

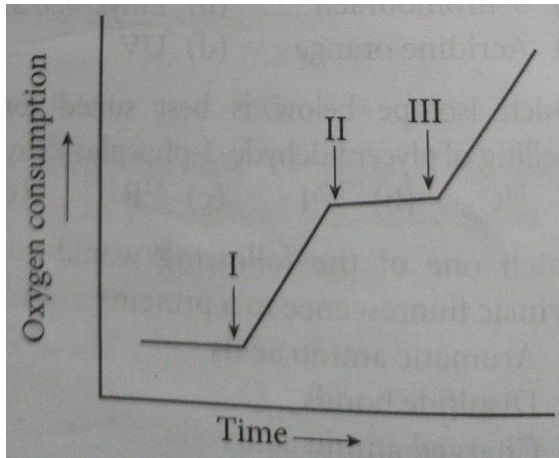
- (a) 3160
- (b) 316
- (c) 31610
- (d) 1580

245. Indicate which one of the following statements about nucleic acids and protein structures is correct?

- (a) Hydrogen bonding between bases in the major and minor grooves of DNA is absent
- (b) Both uracil and thymine have a methyl group but at different positions
- (c) The backbone dihedral angles of α -helices and β -sheets are very similar. Only the hydrogen bonding pattern is different
- (d) A β -turn is formed by four amino acids, The type of β -turn is determined by the dihedral angles of the second and third amino acid

246. In a mitochondrial respiration experiment, a researcher observed the following profile of oxygen consumption upon addition of following compounds at times I, II and III:

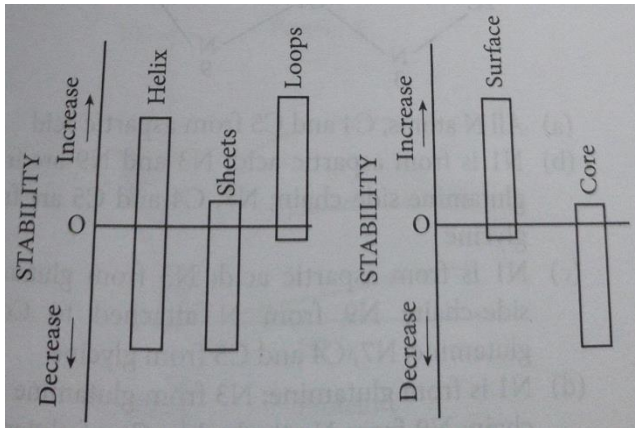
- (a) ADP + Pi
- (b) Dinitrophenol, an uncoupler
- (c) Oligomycin, an ATPase inhibitor
- (d) Cyanide
- (e) Succinate



Which of the following describes the profile appropriately?

- (a) I-b; II-d; III-e
- (b) I-a; II-d; III-c
- (c) I-a; II-e; III-c
- (d) I-a; II-c; III-b

247. A researcher has developed a programme to evaluate the stability of a protein by substituting each amino acid at a time by the other 19 amino acids. For a protein, a researcher has observed the following changes in stability upon substitution of amino acids in loops, helices, sheets, protein core and on the protein surface.



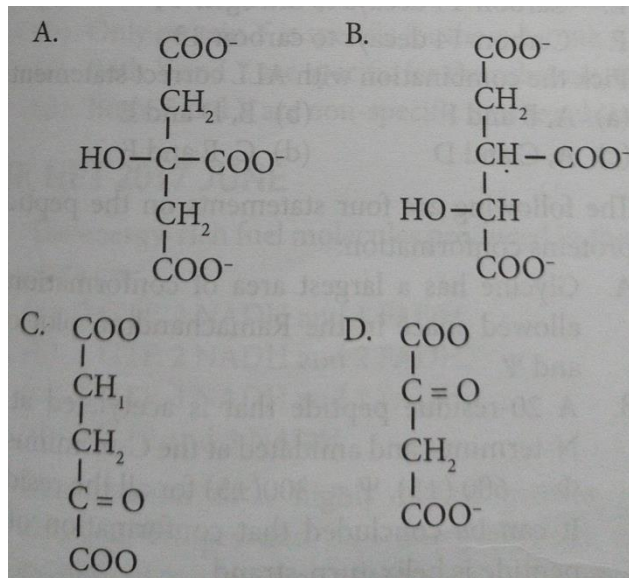
Substitutions in:

- A. Loops are more tolerant
- B. Sheets are more tolerant
- C. Core is less tolerant.
- D. Helices are less tolerant
- E. Which of the above statements are correct?

Surface is more tolerant

- (a) A and C
- (b) C and D
- (c) B and E
- (d) A and B

248. Indicate the names of the following molecules:



- (a) A = isocitrate, B - α -ketoglutarate,
 C = oxaloacetate, D = citrate
- (b) A = citrate, B = isocitrate,
 C = α -ketoglutarate, D = oxaloacetate
- (c) A = isocitrate, B = citrate,
 C = α -ketoglutarate, D = oxaloacetate
- (d) A = citrate, B = isocitrate,
 C = oxaloacetate, D = α -ketoglutarate

249. The turnover number and specific activity of an enzyme (molecular weight 40,000 D) in a reaction (V_{\max} μmol of substrate reacted/min, enzyme amount - $2\mu\text{g}$) are:

- (a) 80,000/min, $2 \times 10^3 \mu\text{mol}$ substrate/min
- (b) 80,000/min, $2 \times 10^3 \mu\text{mol}$ substrate/second
- (c) 40,000/min, $1 \times 10^3 \mu\text{mol}$ substrate/min
- (d) 40,000/min, $2 \times 10^3 \mu\text{mol}$ substrate/min

250. Both sphingomyelin and phosphoglycerides are phospholipids. Which one of the following statements is NOT correct?

- (a) While one has a fatty acid tail attached via an ester bond, in another, the fatty acid tail is attached via an amide bond
- (b) The hydrophilicity of both is dependent on the phosphate group and other head groups attached to the phosphate group
- (c) Only one of them may contain a carbon-carbon double bond (C=C)