

CSIR NET 2016 DECEMBER

251. Consider a short double-stranded linear DNA molecule of 10 complete turns with 10.5 bp/turn. The ends of the DNA molecule are sealed together to make a relaxed circle. This relaxed circle will have a linking number of:

- (a) 105
- (b) 20.5
- (c) 10.0
- (d) 10.5

252. Choose the correct statement about peptides in Ramachandran plot.

- (a) Peptides that are unstructured will have all the backbone dihedral angles in the disallowed regions
- (b) It is not possible to conclude whether two peptides adopt entirely helix or entirely beta sheet conformation
- (c) The occurrence of beta turn conformation formation in a peptide can be deduced
- (d) The sequence of a peptide can be deduced

253. Equilibrium constant (K_{eq}) of reaction is a ratio of product to substrate concentration. The reaction between (K_{eq}) and free energy change in a reaction ($\Delta G'$) is follows:

$\Delta G' = -RT \ln K_{eq}$. Reaction A and reaction B have K_{eq} values of 10 and 100, respectively. Which of the following statements is correct with respect to $\Delta G'$?

- (a) ΔG of A = $\Delta G'$ of B
- (b) $\Delta G'$ of A > $\Delta G'$ of B
- (c) ΔG of B > $\Delta G'$ of A
- (d) ΔG of A \approx $\Delta G'$ of B

254. The gel to liquid crystalline phase transition temperature in phosphatidylcholine (PC) lipids composed of distearoyl (DO) dipalmitoyl (DS) and palmitoyl oleoyl (PO) fatty acids in increasing order will be:

- (a) DOPC > DPPC > POPC > DSPC
- (b) DSPC > DPPC > POPC > DOPC
- (c) DPPC > DSPC > DOPC > POPC
- (d) POPC > DPPC > DOPC > DSPC

255. From the following statements

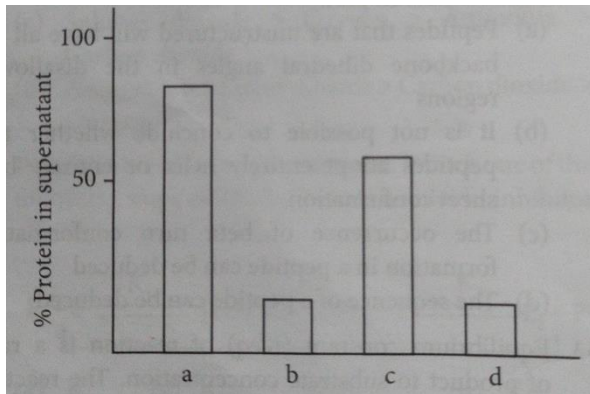
- A. For a reaction to occur spontaneously the free energy change must be negative
- B. The interaction between two nitrogen molecules in the gaseous state is predominantly electrostatic
- C. By knowing the bond energies, it is possible to deduce whether the bond is covalent or hydrogen bond
- D. Hydrophobic interactions are not important in a folded globular protein

Pick the combination with ALL WRONG statements.

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

256. A researcher investigated a set of conditions for a protein with an isoelectric point of 6.5 and also binds to calcium. This protein was subjected to four independent treatments (i) pH 6.4. (ii) 10% glycerol, (iii) 10 mM CaCl₂, (iv) 40% ammonium sulfate.

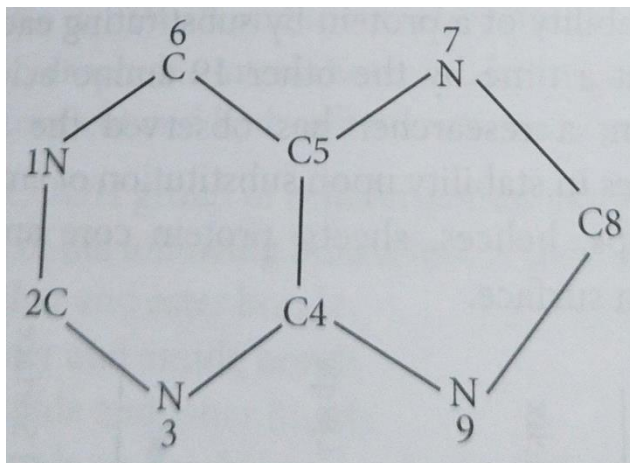
This was followed by centrifugation and estimation of protein in supernatant. The results are depicted in the graph below:



Which of the following treatments best represent the results shown in the graph?

- (a) a = ammonium sulfate, b = glycerol, C = pH 6.4. d = CaCl₂
- (b) a = CaCl₂, b = glycerol, c - ammonium sulfate, d =pH6.4
- (c) a = pH 6.4, b = CaCl₂, c = ammonium sulfate,d = glycerol
- (d) a = CaCl₂ b = pH 6.4. c = glycerol, d = ammonium sulfate

257. In the biosynthesis of purine:



- (a) All N atoms, C4 and C5 from aspartic acid
- (b) N1 is from aspartic acid; N3 and N9 are from glutamine side-chain; N7, C4 and C5 are from glycine
- (c) N1 is from aspartic acid; N3 from glutamine side-chain; N9 from N attached to C α of glutamine; N7, C4 and C5 from glycine

(d) N1 is from glutamine: N3 from glutamine side-chain; N9 from N attached to C α of glutamine; N7, C4 and C5 from glycine

258. From the following statements

- A. Hydrogen, deuterium and tritium differ in the number of protons
- B. Hydrogen, deuterium and tritium differ in the number of neutrons
- C. Both deuterium and tritium are radioactive and decay to hydrogen and deuterium, respectively.
- D. Tritium is radioactive and decays to helium
- E. Carbon-14 decays to nitrogen-14
- F. Carbon-14 decays to carbon-13

Pick the combination with ALL correct statements.

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

259. The following are four statements on the peptides/ proteins conformation:

- A. Glycine has a largest area of conformationally allowed space in the Ramachandran plot of Φ and Ψ
- B. A 20-residue peptide that is acetylated at the N-terminus and amidated at the C-terminus has $\Phi = -60^\circ (\pm 5^\circ)$, $\Psi = -30^\circ (\pm 5^\circ)$ for all the residues.

It can be concluded that conformation of the peptide is helix-turn-strand

- C. The allowed values of Φ , Ψ for amino acids in a protein are not valid for short peptide
- D. A peptide Acetyl-A1-A2-A3-A4-CONH₂ (A-A4 are amino acids) adopts well defined

β -turn. The dihedral angles of A2 and A3 determined the type of β -turn

Choose the combination of correct statements.

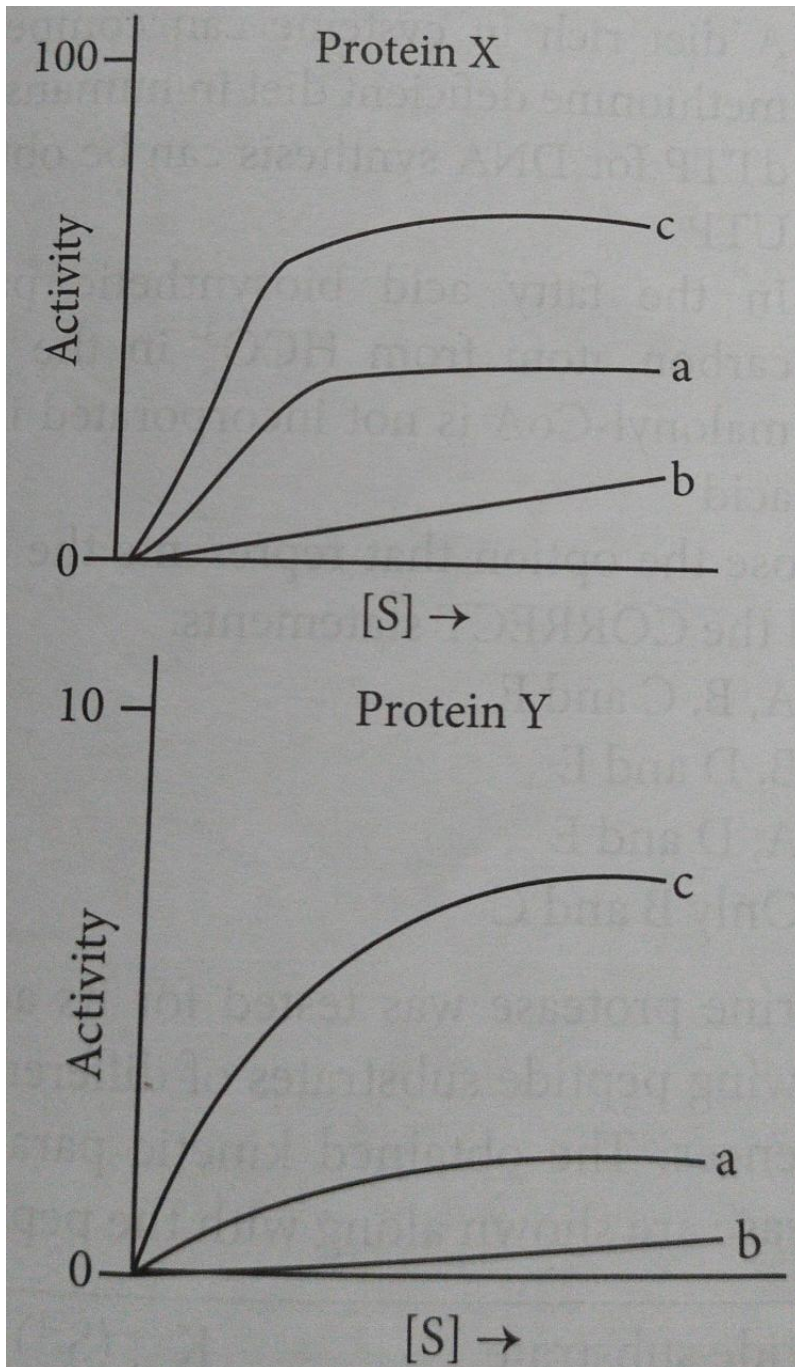
(a) A and B

(b) B and C

(c) A and D

(d) C and D

260. A researcher was investigating the substrate specificity of two different enzymes, X and Y. on the same substrate. Both the enzymes were subjected to treatment with either heat or an inhibitor which inhibits the enzyme activity. Following are the results obtained where, a = inhibitor treatment, b = heat treatment, c = control.



Which of the following statements is correct?

- (a) Only protein X is specific for the substrate, S
- (b) Only protein Y is specific for the substrate, S
- (c) Both X and Y are specific for the substrate, S
- (d) Both x and Y are non-specific for the substrate, S

