

CSIR NET 2015 DECEMBER

225. Enzymes accelerate a reaction by which one of the following strategies?

- (a) Decreasing energy required to form the transition state
- (b) Increasing kinetic energy of the substrate
- (c) Increasing the free energy difference between substrate and the product
- (d) Increasing the turnover number of enzymes

226. The genome of a bacterium is composed of a single DNA molecule which is 10% bp long. How many moles of genomic DNA are present in the bacterium?

[Consider Avogadro No. = 6×10^{23}]

- (a) $1/6 \times 10^{-23}$
- (b) $1/6 \times 10^{14}$
- (c) 6×10^{14}
- (d) 6×10^{23}

227. The ionic strength of a 0.2M Na_2HPO_4 solution will be:

- (a) 0.2 M
- (b) 0.4 M
- (c) 0.6M
- (d) 0.8 M

228. Glycophorin having one highly hydrophobic domain is able to span a phospholipid bilayer membrane only:

- (a) Once
- (b) Twice
- (c) Thrice

(d) Four times

229. An antibiotic that resembles the 3' end of a charged tRNA molecule is

(a) Streptomycin

(b) Sparsomycin

(c) Puromycin

(d) Tetracycline

230. Coupling of the reaction centers of oxidative phosphorylation is achieved by which one of the following?

(a) Making a complex of all four reaction centers

(b) Locating all four complexes in the inner membrane

(c) Ubiquinones and cytochrome C

(d) Pumping of protons

231. Which one of the following chemicals is a DNA intercalator?

(a) 5-Bromouracil

(b) Ethyl methanesulfonate

(c) Acridine orange

(d) UV

232. Which isotope below is best suited for metabolic labeling of glyceraldehyde-3-phosphate-dehydrogenase

(a) ^{14}C (b) ^{125}I (c) ^{32}P (d) ^{131}I

233. Which one of the following would contribute to intrinsic fluorescence to a protein?

(a) Aromatic amino acids

(b) Disulfide bonds

(c) Charged amino acids

(d) Branched chain amino acids

234. The exact backbone dihedral angles in a folded protein can be obtained by:

A. Deconvolution of its circular dichroism spectra obtained at different pH and temperature

B. Estimating the number of protons that exchange with deuterium on treating the protein with D₂O

C. Forming fibers of the protein and analyzing the fiber diffraction pattern

D. Analysis of the crystal structure of the protein obtained by X-ray diffraction at high resolutions

Which one of the following statements is correct?

(a) In all L-amino acids, only the C α carbon atom is chiral

(b) Deoxyribose is optically inactive

(c) The specific rotation of sucrose will be the sum of the specific rotations of D. -glucose and D-fructose

(d) Phosphatidylcholine isolated from biological membranes is optically active

235. The following are the statements about Pyruvate kinase (PK):

A. ATP is an allosteric inhibitor of PK

B. Fructose 1,6-bisphosphate is an activator of PK

C. ADP is an allosteric inhibitor of PK

D. Alanine is an allosteric modulator of PK

Which of the above statement(s) are true?

(a) A, B, C

(b) A, B, D

(c) B, C, D

(d) Only A

236. A practical class was going on where the students were demonstrating ATP synthesis in vitro using active mitochondria. Some students added one of the following to their tubes

- A. Dinitrophenol (DNP), an uncoupler
- B. Mild acidification of the medium
- C. Glutiferone that permeabilizes both the membranes
- D. An outer membrane permeable H^{*} quencher compound, Elila

In which one of the above, ATP synthesis will be detected?

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

237. Lipid rafts are rich in both sphingolipids and cholesterol. Cholesterol plays a central role in raft formation since lipid rafts apparently do not form in its absence. Why do you think cholesterol is essential for the formation of lipid rafts?

- (a) Cholesterol decreases the mobility of sphingolipids in the lipid bilayer
- (b) Large head groups of sphingolipids repel each other in presence of cholesterol
- (c) Cholesterol interacts with fatty acid tails in the
- (d) membrane The planar cholesterol molecules are postulated to fill the voids that form underneath the large head groups of the sphingolipids

238. The frequency of cells in a population that are undergoing mitosis (the mitotic index) is a convenient way to estimate the length of the cell cycle. In order to measure the cell cycle in the liver of the adult mouse by measuring the mitotic index liver slices are prepared and stained to easily identify cells undergoing mitosis. It was observed that only 3 out of 25,000 cells are found to be undergoing mitosis.

Assuming that M phase lasts 30 minutes, calculate the approximate length of the cell cycle in the liver of an adult mouse?

- (a) 76 hours
- (b) 50 hours
- (c) 42 hours
- (d) 21 hours