

1 Mark Questions

- Which pair of amino acid residues can interact in the interior of a protein only through van der Waals forces?
(a) Arg, thr (b) Ser, thr
(c) Glu, his (d) Val, leu
- Okazaki fragments are joined by the enzyme
(a) RNA polymerase (b) DNA polymerase
(c) DNA ligase (d) Reverse transcriptase
- The biosynthetic reactions in a cell mainly take place in
(a) mitochondria
(b) lysosomes
(c) smooth endoplasmic reticulum
(d) Golgi apparatus
- Colchicine inhibits
(a) DNA replication
(b) formation of spindle fibres
(c) condensation of chromosomes
(d) cytokinesis
- The active form of testosterone is
(a) dihydrotestosterone
(b) dehydrotestosterone
(c) dihydroxytestosterone
(d) dehydroepiandrosterone
- The sensitivity of a radioimmunoassay depends primarily on
(a) titer of the antibody
(b) specificity of the antibody
(c) specific activity of the ligand
(d) purity of the antigen
- In eukaryotes, introns can be found in transcripts which are precursors of
(a) mRNA (b) rRNA
(c) tRNA (d) All of these

- Homologous recombination can be employed to generate
(a) transgenic animals
(b) gene knock-out animals
(c) site specific mutagenesis
(d) specific promoter sequences
- The mode of action of widely used anticancer drug methotrexate is to inhibit
(a) dihydrofolate reductase
(b) dihydroorotate dehydrogenase
(c) carbamoyl phosphate synthase-2
(d) ribonucleotide reductase
- For a double stranded DNA which one of the following base-ratios will always be equal to 1?
(a) $(A+T)/(G+C)$ (b) $(A+G)/(C+T)$
(c) C/T (d) A/G

2 Marks Questions

- Activated fatty acyl groups are transported into the mitochondria by
(a) coenzyme-A
(b) oxaloacetate
(c) carnitine
(d) citrate
- A mixture of cytochrome-c (MW 11.7 KD) and myoglobin (MW 17.2 KD) are to be separated by polyacrylamide gel electrophoresis. Their isoelectric pH (pI) value are 9.6 and 7.2 respectively. In which direction will each protein migrate at pH 8.5?
(a) Myoglobin will migrate to anode and cytochrome-c will migrate to cathode
(b) Myoglobin will migrate to cathode and cytochrome-c will migrate to anode
(c) Both will migrate to anode
(d) Both will migrate to cathode

13. Which one of the following fatty acids will have melting point higher than that of palmitic acid (16 : 0)?
 (a) Myristic acid (14 : 0)
 (b) Palmitoleic acid (16 : 1)
 (c) Oleic acid (18 : 1)
 (d) Stearic acid (18 : 0)
14. A diabetes mellitus patient excretes glucose in urine even when kept on a carbohydrate free diet. This is because
 (a) Fats are catabolised in liver to form glucose
 (b) Amino acids are catabolised in liver to form glucose
 (c) Increased production of amino acids
 (d) Increased breakdown of glycogen
15. According to the second law of thermodynamics, molecules spontaneously move from region of higher concentration to one of lower concentration. However, sodium ions are present at 143 mM outside the cell and 15 mM inside the cell. Yet sodium cannot pass through the plasma membrane. Transport of sodium into the cell is achieved by
 (a) facilitated diffusion
 (b) release of acetyl choline
 (c) release of norepinephrine
 (d) sodium transporter
16. The choice of the enzyme used in ELISA depends on
 (a) purity of the enzyme
 (b) turnover number
 (c) its absence in biological sample which is being analysed
 (d) its availability in bulk
17. The T-cell antigen receptor
 (a) recognises conformational epitopes on the native molecule
 (b) has Ig light chains
 (c) is made up of heavy chain and β_2 microglobulin
 (d) recognises epitopes on linear peptides associated with MHC determinants
18. The advantage of degeneracy in codons is that it
 (a) minimises the deleterious effects of mutations
 (b) provides more flexibility
 (c) help to code proteins resistant to proteases
 (d) helps to code proteins of very high molecular weight
19. The pK_a 's lysine are given below
 $pK_a(\text{COOH}) = 2.2$, $pK_a(\alpha\text{-NH}_3^+) = 9.0$,
 $pK_a(\epsilon\text{-NH}_3^+) = 10.0$
 The pI of lysine is

- (a) 7.07
 (b) 9.50
 (c) 6.10
 (d) 5.60

20. The molecular weight of a bacterial DNA molecule is 2.64×10^9 . The average molecular weight of a nucleotide pair is 660. Assume that the average protein is made up of a chain of 400 amino acid residues. What is the maximum number of proteins that can be coded by the bacterial DNA molecule?
 (a) 20000
 (b) 3333
 (c) 6667
 (d) None of these
21. The coenzymes involved in the formation of acetyl Co-A from pyruvate are
 (a) thiamin pyrophosphate, lipoic acid and FAD
 (b) pyridoxyl phosphate, biotin and FAD
 (c) vitamin-B₁₂, folic acid and vitamin-C
 (d) NADH, lipoic acid and vitamin-E

Common Data for Questions 22 to 24

A restriction fragment, obtained with a type II endonuclease that recognises a six base pair site, was subjected to Maxam-Gilbert sequence with results as shown in the autoradiogram below

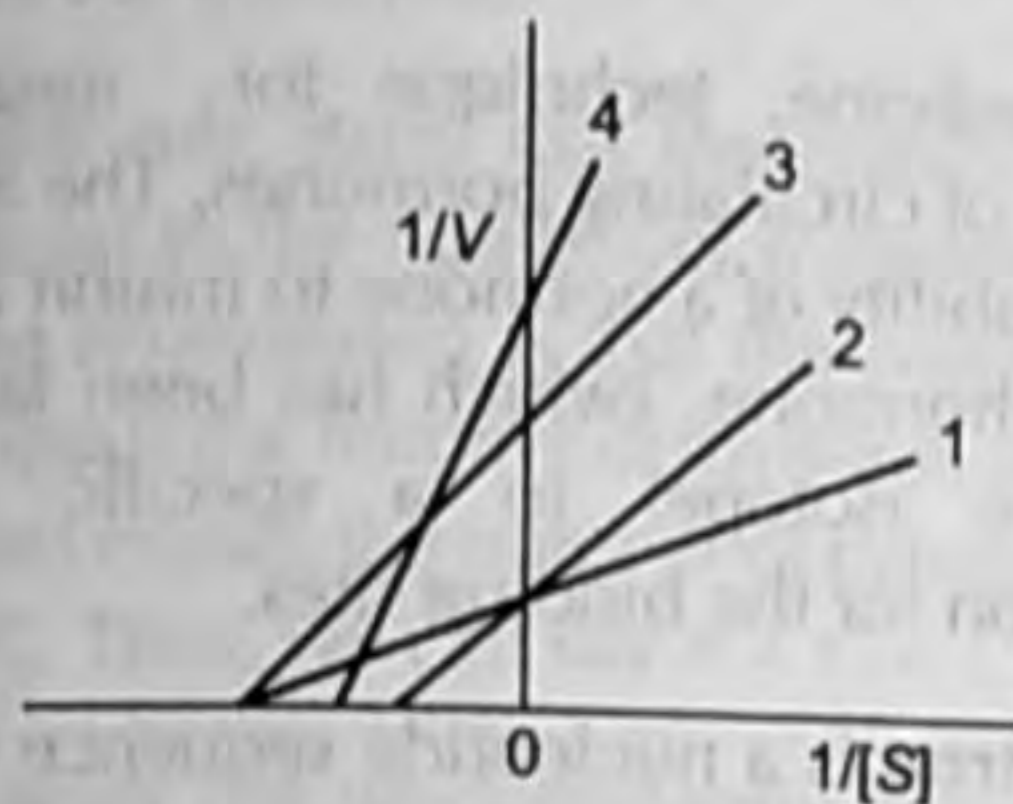
G	A + G	C	C + T
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—
—	—	—	—

22. The DNA sequence is
 (a) 3' CTAGATAGTATAG 5'
 (b) 5' CTAGATAGTATAG 3'
 (c) 3' GATCTATCATATC 5'
 (d) 5' GATCTATCATATC 3'
23. The restriction site is
 (a) TAGCTA
 ATCGAT
 (c) ATCCAT
 TAGGTA
 (b) TAGGTA
 ATCCAT
 (d) GATACC
 CTATGG

24. Considering this DNA sequence as a template strand, the sequence of the corresponding mRNA is
- 5' CTAGATAGTATAG 3'
 - 3' GATCTATCATATC 5'
 - 3' GAUCUAUCAUAUC 5'
 - 5' CUAGAUAGUAUAG 3'

Common Data for Questions 25 and 26

The kinetic data for an enzymatic reaction in the presence and absence of inhibitors are plotted in the following figure



25. Which line represents the kinetics without inhibitor?
- Line 1
 - Line 2
 - Line 3
 - Line 4
26. Which line represents kinetics of non-competitive inhibitor?
- Line 1
 - Line 2
 - Line 3
 - Line 4

Statement for Linked Answer Questions 27 and 28

Transmission at many synapses in central nervous system is mediated by acetylcholine. Acetylcholine is

cleaved to acetate and choline by the enzyme acetylcholine esterase which can be inhibited by di-isopropyl phosphofluoridate (DIPF).

27. The mode of action of DIPF is by
- modifying histidine residue
 - covalently modifying a crucial serine residue
 - inducing a conformational change in the protein
 - forming a complex with choline
28. Based on its mode of action, DIPF is used as
- As therapeutic agent to treat neuro degenerative diseases
 - A nerve gas
 - As an of acetyl choline
 - All of the above

Statement for Linked Answer Questions 29 and 30

The following fragments are isolate on partial hydrolysis of hydrolysis of nonpeptide X:

Val-Arg-Pro-Gly, Lys-Phe-Val-Arg, Ala-Gly-Ser-Lys

29. The correct sequence of X is
- Ala-Gly-Ser-Lys-Ala-Pro-Val-Arg-Gly
 - Val-Arg-Gly-Lys-Phe-Val-Arg-Ala-Pro
 - Lys-Phe-Val-Arg-Ala-Gly-Ser-Pro-Gly
 - Ala-Gly-Ser-Lys-Phe-Val-Arg-Pro-Gly
30. The number of fragments obtained when X is digested with trypsin is
- 0
 - 2
 - 3
 - 4