

**I : BIOCHEMISTRY****Q. 1 – Q. 10 carry one mark each.**

- Q.1 Which one of the following **DOES NOT** inhibit protein biosynthesis?  
(A) Puromycin (B) Chloramphenicol (C) Cycloheximide (D) Oligomycin
- Q.2 The activation of the complement components occurs via three distinct pathways. Which of the following component(s) is specific to the 'Alternate Pathway'?  
(A) Factor B and D (B) Mannose binding protein (C) C1qr2s2 (D) C2
- Q.3 Which one of the following enzymes fixes CO<sub>2</sub> into organic form?  
(A) Ribulose 5-phosphate kinase (B) Ribulose 1,5-bisphosphate carboxylase  
(C) Pyruvate dehydrogenase (D) Carbonic anhydrase
- Q.4 Cytochrome C is normally found in the inner mitochondrial membrane. It is released into the cytoplasm during  
(A) Apoptosis (B) Necrosis (C) Cell differentiation (D) Cell proliferation
- Q.5 Horseradish peroxidase and alkaline phosphatase are the two enzymes commonly utilized as reagents in ELISA, because these enzymes  
(A) are colored proteins (B) are very small  
(C) have high turnover number (D) bind to ELISA plates
- Q.6 The polarity of water molecule is due to  
(A) its tetrahedral structure  
(B) bonding electrons being attracted more to oxygen  
(C) bonding electrons being attracted more to hydrogen  
(D) its weak electrolytic property
- Q.7 Cyanide poisoning is due to its direct inhibition of  
(A) Electron transport chain (B) Fatty acid biosynthesis  
(C) Fatty acid oxidation (D) Nucleic acid biosynthesis
- Q.8 In humans, the largest energy reserve is  
(A) liver glycogen (B) muscle glycogen  
(C) blood glucose (D) adipose tissue triacylglycerol
- Q.9 A mixture of four proteins of pIs 11, 7, 5 and 3 are loaded on DEAE anion-exchange column equilibrated with low ionic strength buffer of pH 8. Which of the four proteins would be expected to be retained on the column?  
(A) Protein with pI 11 but not the others  
(B) Proteins with pIs 11 and 7 but not 5 and 3  
(C) Proteins with pIs 7, 5 and 3  
(D) Protein with pI 7 but not the others
- Q.10 Valinomycin, a cyclic peptide antibiotic, facilitates the transport of which one of the following ions?  
(A) K<sup>+</sup> (B) Ca<sup>2+</sup> (C) Na<sup>+</sup> (D) H<sup>+</sup>

**Q. 11 - Q. 20 carry two marks each.**

Q.11 Match P, Q, R and S with the appropriate numbers 1 to 6 on the right

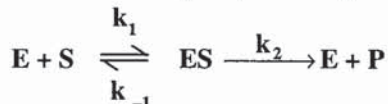
- |                |                         |
|----------------|-------------------------|
| P) Basophils   | 1) Perforin             |
| Q) T cells     | 2) Phagocytosis         |
| R) B cells     | 3) Albumin              |
| S) Neutrophils | 4) Macroglobulin        |
|                | 5) Fc receptors for IgE |
|                | 6) Plasma cells         |

- (A) P -5, Q-1, R-6, S-2  
(B) P-1, Q-2, R-3, S-4  
(C) P-3, Q-4, R-5, S-1  
(D) P-2, Q-6, R-1, S-3

Q.12 Two purified DNA samples A and B contain equal number of basepairs. Each of these DNA samples has one site each for *EcoRI* and *BamHI* restriction enzymes. Complete digestion with both the enzymes yielded 3 DNA bands and 2 DNA bands respectively for A and B upon electrophoresis of the digestion products. Which one of the following explains the observation?

- (A) A is circular DNA and B is linear  
(B) B is circular DNA and A is linear  
(C) A is circular DNA and B could be linear or circular  
(D) B is circular DNA and A could be linear or circular

Q.13 In the following enzyme catalyzed reaction which follows Michaelis-Menten kinetics



$K_m$  is equal to

- (A)  $k_{-1}/(k_1 \cdot k_2)$       (B)  $(k_1 \cdot k_2)/k_{-1}$       (C)  $k_1/(k_2 + k_{-1})$       (D)  $(k_2 + k_{-1})/k_1$

Q.14 Match the items in **Group I** with those in **Group II**

<b>Group I</b>	<b>Group II</b>
P) Progesterone	1) Peptide
Q) Dopamine	2) Fatty acid
R) Vasopressin	3) Carbohydrate
S) Prostaglandin	4) Catecholamine
	5) Eicosanoid
	6) Steroid

- (A) P-3, Q-4, R-1, S-2  
(B) P-6, Q-4, R-1, S-5  
(C) P-3, Q-5, R-4, S-1  
(D) P-6, Q-5, R-1, S-4

Q.15 Three samples of antibodies were electrophoresed under denaturing and reducing conditions on a 15 % acrylamide gel, followed by staining with Coomassie blue dye. Samples 1, 2 and 3 showed two, three and four stainable bands respectively. Which one of the following conclusions can be made from these observations?

- (A) Sample 1 is IgG, 2 is IgA and 3 is IgM  
(B) Sample 1 is IgA, 2 is IgM and 3 is IgG  
(C) Sample 1 is IgG, 2 is IgM and 3 is IgA  
(D) Sample 1 is IgA, 2 is IgG and 3 is IgM

Q.16 Four identical PCR reactions were carried out in tubes named I, II, III and IV. Besides the usual mix of dNTPs, each of the tubes respectively contained  $\gamma$ - $^{32}\text{P}$  dATP,  $\beta$ - $^{32}\text{P}$  dATP,  $\alpha$ - $^{32}\text{P}$  dATP and  $\alpha$ - $^{32}\text{P}$  rNTP. Which one of the tubes will have radiolabeled PCR product?

- (A) Tube I                      (B) Tube II                      (C) Tube III                      (D) Tube IV

Q.17 Match the following:

**Group I**

- P) Polynucleotide kinase  
Q) Fluoride  
R) Ras  
S) *lac* operon

**Group II**

- 1) ATPase  
2) GTPase  
3) Transketolase  
4) Enolase  
5) 5' end of DNA  
6) 3' end of DNA  
7) Only positive regulation  
8) Positive and negative regulation

- (A) P-5, Q-4, R-2, S-8  
(C) P-4, Q-2, R-1, S-6

- (B) P-6, Q-3, R-1, S-7  
(D) P-1, Q-7, R-5, S-3

Q.18 Collagen,  $\alpha$ -keratin and tropomyosin have common structural features. They are

- P) disulfide bridges to neighboring proteins.  
Q) repeating sequences of amino acids  
R) a high  $\beta$ -sheet content  
S) superhelical coiling

- (A) P,Q                      (B) Q,R                      (C) Q,S                      (D) P,R

Q.19 Match the following

**Group I**

- P) Tyrosine hydroxylation  
Q) Tyrosine iodination  
R) Tyrosine phosphorylation  
S) Tyrosine oxidation

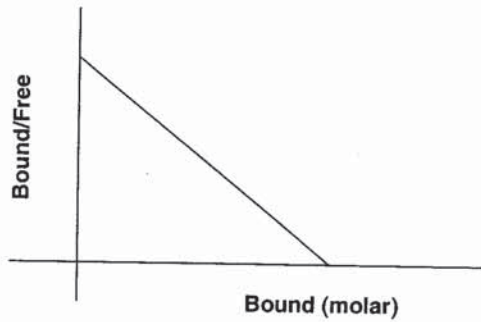
**Group II**

- 1) Thyroxine  
2) T cell Receptor  
3) DOPA  
4) Estradiol receptor  
5) Epinephrine  
6) Melanin  
7) Endorphin  
8) Serotonin

- (A) P-1, Q-6, R-5, S-4  
(C) P-2, Q-5, R-3, S-4

- (B) P-5, Q-7, R-4, S-8  
(D) P-3, Q-1, R-2, S-6

Q.20 Scatchard analysis of ligand-receptor interaction yielded the graph shown below. The affinity of the ligand-receptor interaction can be obtained from



- (A) Y intercept
- (B) X intercept
- (C) Slope of the line
- (D) Product of X intercept and Y intercept

**END OF SECTION - I**