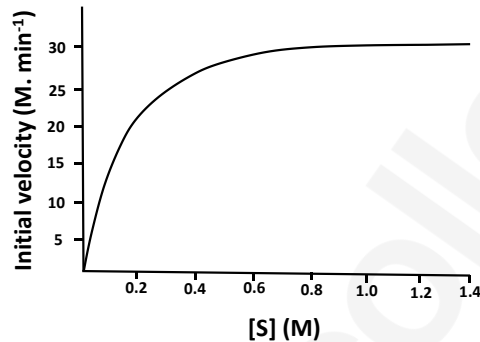
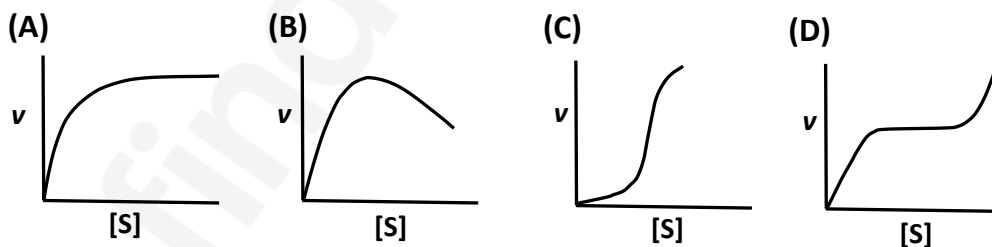


**Q. 1 – Q. 10 carry one mark each & Q.11 - Q.20 carry two marks each.**

- Q.1 To which one of the following classes of enzymes does chymotrypsin belong?  
 (A) Oxidoreductase (B) Hydrolase (C) Transferase (D) Isomerase
- Q.2 The substrate saturation profile of an enzyme that follows Michaelis-Menten kinetics is depicted in the figure. What is the order of the reaction in the concentration range between 0.8 to 1.4 M?



- (A) Zero (B) Fraction (C) First (D) Second
- Q.3 Which one of the following conformations of glucose is most stable?  
 (A) Boat (B) Half Chair (C) Chair (D) Planar
- Q.4 Which one of the following profiles represent the phenomenon of cooperativity?



- Q.5 Which one of the following amino acids is responsible for the intrinsic fluorescence of proteins?  
 (A) Pro (B) Met (C) His (D) Trp
- Q.6 The glycosylation of the proteins occurs in\_\_\_\_\_.  
 (A) glyoxysomes (B) lysosomes  
 (C) Golgi apparatus (D) plasma membrane

- Q.7 Which one of the following properties of the myeloma cells is used in the hybridoma technology to generate monoclonal antibody?
- (A) lack of thymidylate synthase  
 (B) over-expression of hypoxanthine-guanine phosphoribosyl transferase  
 (C) over-expression of inosine 5'-monophosphate cyclohydrolase  
 (D) lack of hypoxanthine-guanine phosphoribosyl transferase
- Q.8 The movement of protons through the  $F_0F_1$ -ATPase during mitochondrial respiration is required for \_\_\_\_
- (A) the increase in pH of mitochondrial matrix.  
 (B) changing the conformation of  $F_0F_1$ -ATPase to expel the ATP.  
 (C) importing  $P_i$  from inter membrane space.  
 (D) decreasing the affinity of ADP to  $F_0F_1$ -ATPase.
- Q.9 The number of  $NADP^+$  molecules required to completely oxidize one molecule of glucose to  $CO_2$  through pentose phosphate pathway is \_\_\_\_ (correct to integer number).
- Q.10 Measurement of the absorbance of a solution containing NADH in a path length of 1cm cuvette at 340 nm shows the value of 0.31. The molar extinction coefficient of NADH is  $6200 M^{-1} cm^{-1}$ . The concentration of NADH in the solution is \_\_\_\_  $\mu M$  (correct to integer number).

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

- Q.11 Among the reagents given below which one of the combination of reagents will **NOT** break the disulphide bonds in the immunoglobulin molecules?

(P) Reduced glutathione                      (Q) Dithiothritol  
 (R) Sodium dodecyl sulphate              (S) Methionine

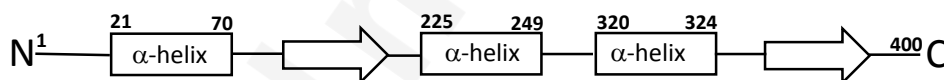
(A) R&S                      (B) P&R                      (C) P&S                      (D) Q&R

- Q.12 Match the protein elution condition given in **Group I** with the appropriate chromatography matrices from **Group II**.

	<b>Group I</b>		<b>Group II</b>
<b>P</b>	Increasing concentration of sodium chloride	<b>i</b>	Phenyl-Sepharose
<b>Q</b>	Increasing concentration of histidine	<b>ii</b>	Chromatofocusing
<b>R</b>	Decreasing concentration of ammonium sulphate	<b>iii</b>	DEAE-Sephacryl
<b>S</b>	Decreasing concentration of $H^+$	<b>iv</b>	Ni-NTA

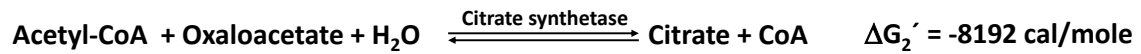
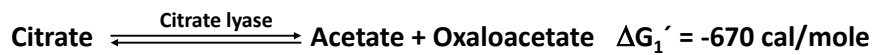
- (A) P-iii; Q-iv; R-i; S-ii                      (B) P-ii; Q-iv; R-i; S-iii  
 (C) P-i; Q-ii; R-iii; S-iv                      (D) P- iv; Q-ii; R-iii; S-i

- Q.13 Which one of the following is **NOT** a neurotransmitter?  
 (A) Adrenaline (B) Glutamate (C) Histamine (D) Histidine
- Q.14 The type-II hypersensitivity reaction is mainly mediated by \_\_\_\_.  
 (A) IgE (B) IgM (C) IgA (D) T cells
- Q.15 Which one the following reaction mechanisms drives the conversion of low energy 3-phosphoglyceraldehyde to high energy 1,3-bisphosphoglycerate?  
 (A) Oxidation without anhydride bond formation  
 (B) Oxidation coupled with anhydride bond formation  
 (C) Substrate level phosphorylation  
 (D) Formation of carboxylate
- Q.16 A polymerase reaction is carried out for 10 cycles in a volume of 1 ml with 5 molecules of template DNA. Assuming that the efficiency of the reaction is 100 %, the number of molecules of DNA present in 100  $\mu$ l at the end of the reaction is \_\_\_\_ (correct to integer number).
- Q.17 The secondary structure topology diagram of 400 amino acid long "Protein-X" is depicted in the figure. The start and end amino acid residue numbers of each  $\alpha$ -helix are marked. The percentage (correct to integer number) of residues forming  $\alpha$ -helix is \_\_\_\_.



- Q.18 An enzyme follows Michaelis-Menten kinetics with substrate S. The fraction of the maximum velocity ( $V_{\max}$ ) will be observed with the substrate concentration  $[S] = 4K_m$  is \_\_\_\_ (correct to one decimal place). ( $K_m$  is Michaelis-Menten constant)
- Q.19 The mass spectrum of benzoic acid will generate the fragment as a base peak (100% relative abundance) of  $m/z$  (mass to charge ratio) at \_\_\_\_ (correct to integer number).

Q.20 The standard free energy ( $\Delta G'$ ) values of reactions catalyzed by citrate lyase and citrate synthetase are -670 and -8192 cal/mol, respectively.



The standard free energy (in cal/mol) of acetyl-CoA hydrolysis is \_\_\_\_ (correct to integer number).

**END OF THE QUESTION PAPER**