

Daily Tutorial Sheet 2	JEE Advanced (Archive)
------------------------	------------------------

16.(B) Here, the -OH of hemiacetal group is equatorial therefore, it is a β -pyranose of an aldohexose.

17.(6) A decapeptide has nine peptide (amide) linkage as

Therefore, on hydrolysis, it will absorb nine water molecules.

Hence, total mass of hydrolysis product = $796 + 18 \times 9 = 958$

$$\Rightarrow$$
 mass of glycine in hydrolysis product = $\frac{958 \times 47}{100}$ = 450

$$\Rightarrow$$
 number of glycine molecule in one molecule of decapeptide = $\frac{450}{75}$ = 6

(Mol wt of glycine =
$$75 \,\mathrm{gmol}^{-1}$$
)

18.(8) The D-form of given sugar is

CHO
$$\begin{array}{c|c} CHO \\ CH_2 \\ CHOH \\ CHOH \\ CHOH \\ CH_2OH \\ D-Sugar \end{array} \qquad \begin{array}{c|c} CH_2OH \\ H \\ OH \\ H \\ D-Pyranose \end{array}$$

Total number of chiral centers = 3

Total stereoisomers = $2^3 = 8$

19.(4) The amino acid remain completely in Zwitter ionic form at its isoelectric point. Amino acids with additional acidic group have their isoelectric pH less than 7.0 and increasing pH above isoelectric point makes them anionic.

On the other hand, amino acids with additional basic group have their isoelectric pH greater than 7.0 and decreasing pH below isoelectric point (by adding acid solution) makes them cationic. The given peptide with following R_1 and R_2 are basic, will remain protonated (cationic) at pH = 7.0.

Peptide	R ₁	R ₂
IV	$\mathrm{CH_2CONH_2}$	$(CH_2)_4NH_4$
VI	$(CH_2)_4NH_2$	$(CH_2)_4NH_4$
VIII	CH ₂ OH	$(\mathrm{CH_2})_4\mathrm{NH_4}$
IX	$(CH_2)_4NH_2$	CH ₃

Thus, 4 is the correct integer.



$$\begin{array}{c|c} & O \\ * & \parallel & * \\ H_2N-CH-C-OH+H_2N-CH-COOH \\ \parallel & \parallel \\ R & R' \end{array}$$

C* is chiral carbon tetrapeptide has four amino acids joined by three peptide linkage.

-COOH group is on alanine part, thus it is at fixed C-terminal position in each combination.

 $Glycine\ is\ optically\ inactive\ thus\ it\ cannot\ be\ on\ the\ N-terminal\ side.\ Thus,\ possible\ combinations\ are$ $Phe\ -\ Gly\ -\ Val\ -\ Gly\ -\ Ala,\quad Val\ -\ Phe\ -\ Gly\ -\ Ala$

Thus, in all four combinations are possible.

21.(1)
$$H_{3}^{+}$$
 C_{1}^{+} C_{1}^{+} C_{2}^{+} C_{1}^{+} C_{2}^{+} C_{2}^{+} C_{2}^{+} C_{2}^{+} C_{3}^{+} C_{4}^{+} C_{1}^{+} C_{2}^{+} C_{2}^{+} C_{3}^{+} C_{4}^{+} C_{1}^{+} C_{2}^{+} C_{3}^{+} C_{4}^{+} C_{4}^{+} C_{4}^{+} C_{5}^{+} C_{5}^{+}

(A) is glycine which is only naturally occurring amino acid. While (B), (C) and (D) are not the naturally occurring amino acids.



- **25.(A)** Rayon is prepared by acetylation of cellulose.
- **26.(D)** The configuration at the anomeric centre (that derived from the carbonyl carbon) is denoted alpha $(\alpha -)$ or beta $(\beta -)$ by reference to the stereo centre that determines the absolute configuration. In the beta isomer, the OH group on C-1 is on the same face of the ring relative to the CH₂OH substituent on C-5.

27.(ACD) Sucrose +
$$H_2O \longrightarrow glucose + fructose (dextro)$$

Glucose $\xrightarrow{[O]}$ gluconic acid

Monosaccharides are simplest carbohydrates and can't be hydrolysed

Cyclic hemiacetal pyranose (six membered) forms of glucose are called as anomers.

$$nCF_2 = CF_2 \xrightarrow{S_2O_8^{2-}} \leftarrow (CF_2 - CF_2)_n$$

28.(AB) (A)

(B)

- Nylon 6 is H having amide linkage
- (C) Cellulose units is composed of βD glucose units
- (D) Natural rubber contain Cis alkene units