Exercise-1

> Marked questions are recommended for Revision.

PART - I : SUBJECTIVE QUESTIONS

Section (A) : Carbohydrates

- A-1. What are monosaccharides ?
- A-2. Draw the Fischer projections for the open-chain structures of D-glucose and L-glucose ?
- A-3. The fischer projection of D-fructose is given below, write the fischer projection of L-fructose. CH_2OH

C=O HO H H OH H OH CH₂OH D-Fructose

- A-4. Write the reaction of D-glucose with HNO₃.
- A-5. Give reasons as the evidence in support of cyclic structure of glucose
- A-6. What is mutarotation ?
- A-7. What do you understand by glycosidic linkage?
- A-8. What are reducing sugars ?
- A-9. What are the hydrolysis products of sucrose ?
- A-10. What is the basic structural difference between starch and cellulose ?
- A-11. Simple six memebered ring compound (eg. Cyclohexane) are not soluble in water whereas glucose and sucrose are soluble in water. Explain why ?

Section (B) : Amino Acids & Proteins

- B-1. What do you mean by the following also give example(a) Non -essential amino acids(b) Essential amino acids
- B-2. Amino acids show amphoteric behaviour. Explain why?
- **B-3.** Tyrosine is an α -amino carboxylic acid shown below :

Write the most stable structural formula -(a) In it's cationic form (c) In it's dianionic form

(b) In it's anionic form

- (d) In it's Zwitter ionic form
- B-4.> How will you identify a basic amino acid ?
- **B-5.** Complete the following reactions :

(i)
$$R-CH-COO^{-} \xrightarrow{HCl(aq)}{1 \text{ eq.}} \rightarrow NH_2$$

(iii) HOOC – CH₂ – CH – COOH
$$\xrightarrow{\text{NaOH(aq)}}$$

|
+NH₃



B-6. Why an amino acid is usually solid at room temperature.

- B-7. The melting point and solubility (in H₂O) of amino acids are generally high. explain why?
- **B-8.** What is the product obtained when glycine hydrochloride reacts with two equivalents of NaOH ? Write the chemical reactions involved.

B-9.> What is the denaturation of proteins ?

PART - II : ONLY ONE OPTION CORRECT TYPE

Section (A) : Carbohydrates

	H∖_ _C ≠0						
A-1.	H OH H OH H OH H OH H OH						
	ĊH₂OH						
	(A) Aldopentose	(B) Aldohexose	(C) Ketopentose	(D) Aldoheptose			
A-2.	The letter D in D-glucos (A) dextrorotatory	se signifies (B) mode of synthesis	(C) its configuration	(D) its diamagnetic nature			
A-3.	CH ₂ O C=O CHOF For the structure CHOF CHOF CHOF CH ₂ O	H H H , total possible optical i H H	somers are				
	(A) 12	(B) 4	(C) 16	(D) 8			
A-4.	Carbohydrates have : (A) –OH group	(B) –CHO group	(C) >C=O group	(D) All			
A-5.	Which of the following r (A) Glucose	nonosaccharide is pento (B) Fructose	se ? (C) Arabinose	(D) Galactose			
A-6.æ	α -D-glucose and β -D-g	lucose differ from each	other due to the differen	ce in one of the carbon atoms,			
	with respect to its (A) Number of –OH gro (C) Conformation	ups	(B) Configuration(D) Size of hemiacetal ring				
A-7.a	Which of the following p (A) Glucose and fructos (C) Glucose and arabin	pairs form the same osaz se lose	zone ? (B) Glucose and galactose (D) Lactose and maltose				
A-8.	Glucose when treated	with CH ₃ OH in preser	nce of dry HCI gas giv	es α - and β -methylglucosides			
	(A) an aldehydic group (C) a cyclic structure		(B) a – CH₂OH group (D) five – OH group				
A-9.	α-D (+) glucopyranose (A) acetal	is example of (B) ketal	(C) hemiacetal	(D) hemiketol			
A-10. 🕿	Which of the following i (A) Penta-acetyl derivat (C) Reaction with Fehlin	ndicates the presence of tive of glucose ng's solution	5 –OH groups in glucose (B) Cyanohydrin format (D) Reaction with Toller	e ion of glucose n's reagent			

Section (B) : Amino Acids & Proteins

B-1. Which of the following is α -amino acid?





D)
$$CH_3 - CH_2 - CH - CH_2 - NH_2$$

 $|$
COOH

is

(

B-3. Which of the following is a basic amino acid?

(A)
$$H_2N - C - NH (CH_2)_3 - CH - COOH$$

(B) $HOH_2C - CH - NH_2$
(B) $HOH_2C - CH - NH_2$
(C) $CH_2 - CH_2 - CH - COOH$
(D) $HOOC - CH_2 - CH - COOH$
(D) $HOOC - CH_2 - CH - COOH$

- B-4. The force of attraction between the neighbouring peptide chains is

 (A) Vander Waal's force
 (B) Covalent bond
 (C) Hydrogen bond
 (D) Peptide linkage
- **B-5.** The name of the given dipeptide is :

-	j	H ₂ NCHCONI	HCH ₂ COOH	
		CH3		
	(A) Gly-Gly	(B) Gly-Ala	(C) Ala-Ala	(D) Ala-Gly
B-6.a	The three pKa values of	aspartic acid are 1.89, 3	.65 and 9.60. The pI of t	he amino acid
	(A) 2.77	(B) 6.62	(C) 5.74	(D) 7.0

Section (C) : Vitamins and Nucleic Acids

C-1.	Which of the following is (A) Glucose	s a vitamin - (B) Keratin	(C) Maltose	(D) Riboflavin
C-2.	Vitamin B₀ is known as (A) Pyridoxine	(B) Thiamine	(C) Tocopherol	(D) Riboflavin
C-3.	The best source of vitar (A) Oranges	nin A is - (B) Beans	(C) Carrots	(D) Wheat
C-4.	Vitamin D is called - (A) Ascorbic acid (C) Thaimine		(B) Calciferol or ergoca (D) Riboflavin	lciferol
C-5.	Which of the following is (A) Vitamin C	s found in cod-liver oil ? (B) Vitamin E	(C) Vitamin A	(D) Vitamin B ₁
C-6.	Vitamin E is also called (A) Cyanocobalamin	: (B) Tocopherol	(C) Lactoflavin	(D) Ascorbic acid
C-7.	The best source of vitar (A) Code liver oil	nin C is : (B) Egg yolk	(C) Citrus fruits	(D) Fish liver oil
C-8.	Milk contains vitamins :	(B) A B ₁₂ and D	(C) C. D and K	(D) B₁ B∈ and D
				(E) E, B0 and B

Biomolecules C-9. Nervousness anaemia is caused by the deficiency of vitamin $(B) B_2$ (C) B₆ (D) B₁₂ (A) B₁ Deficiency of vitamin E causes C-10. (A) Scurvv (B) Loss of appetite (C) Loss of sexual power and reproduction (D) Beriberi C-11. Which of the following is fat soluble vitamin? (A) Vitamin A (B) Pyridoxine (C) Riboflavin (D) Thiamine Which one of the following vitamin contains a metal atom ? C-12. (A) Vitamin A (B) Vitamin B₂ (C) Vitamin B₆ (D) Vitamin B₁₂ Identify the vitamin whose deficiency in our food decreases reproductive power : C-13. (B) vitamin C (A) vitamin A (C) vitamin D (D) vitamin E C-14. Beri-beri is casued due to : (A) vitamin A (C) vitamin C (D) vitamin D (B) vitamin B C-15. The sugar present in DNA is : (A) Glucose (B) Deoxyribose (C) Ribose (D) Fructose C-16. The pentose sugar in DNA and RNA has the : (A) Open chain structure (B) Pyranose structure (C) Furanose structure (D) None of the above C-17. Which of the following is not a pyrimidine base ? (A) Uracil (B) Guanine (C) Cytosine (D) Thymine The relationship between the nucleotide triplets and the amino acids is called C-18. (A) Translation (B) Transcription (C) Replication (D) A genetic code C-19. Which of the following statements about DNA is not correct ? (A) It has a double helix structure (B) It undergoes replication (C) The two strands in a DNA molecule are exactly similar (D) It contains the 2-deoxyribose pentose sugar. C-20. Which of the following statements about RNA is not correct ? (A) It has a single strand (B) It does not undergo replication (C) It does not contain any pyrimidine base (D) It controls the synthesis of proteins Oils and fats are esters of higher fatty acids with : C-21. (A) Ethanol (B) Glycol (C) Glycerol (D) Methanol C-22. The cheif constituents of cell membranes are : (A) Simple triglycerides (B) Waxes (C) Phospholipids (D) Proteins C-23. The fats present in the body act as (A) Food storage only (B) Heat insulator only (C) Shock absorber only (D) All the three above C-24. The most concentrated source of energy in the human body is (A) Fats (C) Proteins (D) Nuclei acids (B) Sugars

PART - III : MATCH THE COLUMN

1. Match Column-I with Column-II.

	Column-I		Column-II
	(polymer)		(monomer)
(A)	Sucrose	(p)	Linkage and hydrolysis product D(+) glucose
(B)	Maltose	(q)	Linkage and hydrolysis product D(-) fructose
(C)	Lactose	(r)	D(+) galactose
(D)	Cellulose	(s)	$\alpha(1 \rightarrow 4)$
		(t)	$\beta(1 \rightarrow 4)$

2. Match Column-I with Column-II.

	Column-I		Column-II
(A)	NH₃⁺ │ CH₃–CH–COO⁻	(p)	Acidic amino acid
(B)	Arginine	(q)	Neutral amino acid
(C)	Valine	(r)	Zwitter ion
(D)	Aspartic acid	(S)	Basic amino acid

Exercise-2

PART-I: ONLY ONE OPTION CORRECT TYPE

(C) both

1. Haworth's projection of α -D glucose is :



2. Which is correct structure of β -D-glucopyranose.





(D) none

- **3.** 3 molecule of phenylhydrazine is used in Osazone formation. The correct statement about the use of phenylhydrazine is :
 - (A) All the three molecules react in similar manner.
 - (B) Two molecules reacts in similar manner whereas the third reacts in different way.
 - (C) All the three molecules react in different way.
 - (D) Only two react in same manner but the third molecule remains unreacted.



PART - II : SINGLE AND DOUBLE VALUE INTEGER TYPE

- **1.** Consider an amylose chain of 4000 glucose unit. At how many cleavage require to lower the average length to 400 units.
- 2. How many statements are correct?

D-glucose, on treating with methanol in presence of dry HCl gives methyl glucosides according to the following reaction



(ii) The glucosides do not react with hydrogen cyanide or hydroxylamine

(iii) Behaviour of glucosides as stated in S_1 and S_2 indicates the absence of free –CHO group.

(iv) The two forms of glucosides are enantiomers.

How many statements are correct?

- **3.** An octapeptide (Mol. wt. = 516 g) on complete hydrolysis given glycine and alanine (Mol. mass = 89 g). Alanine contributes 41.59% to total weight of hydrolysed product. How many number of alanine unit present in octapeptide.
- **4.** Among the following amino acids no. of essential amino acids are Glycine, Alanine, Valine, Cysteine, Leucine, Isoleucine, Serine, Threonine.
- 5. Calculate of pI of glutamic acid HOOCCH₂CH₂—CH—COOH \leftarrow pK_a=2.19 \uparrow I pK_a=4.25 $\stackrel{\text{NH}_3}{\oplus} \leftarrow$ pK_a=9.67 (report answer pI×10 upto two digit)
- 6. No of optical isomers possible for fructose CH₂(OH)–CH(OH)–CH(OH)CH(OH)–CO–CH₂–OH is :

PART - III : ONE OR MORE THAN ONE OPTIONS CORRECT TYPE

1.ര.

H OH The correct statements about above structure of glucose are :

- (A) It is a Pyranose form
- (B) It is a furanose form
- (C) It is a β -anomer
- (D) It is a D –sugar

2.	D-Mannose differs from D-glucose in its stereochemistry at C-2. The pyranose form of D-Mannos					
	CH₂OH	CH₂OH	CH₂OH	CH₂OH		
	(A) HO OH HO OH HO HHO OH	(B) HO OH HO OH H HO	(C) HOHHOHH			
3.	Which of the following is	s /are reducing sugar				
	(A) Sucrose	(B) Glucose	(C) Fructose	(D) methylmaltoside		
4.2	Which of these are poly	saccharides of glucose	?			
	(A) Starch	(B) Cellulose	(C) Sucrose	(D) Lactose		
	0110	сно	ÇH₂OH			
		Н-ОН	c=o			
5.	^(I) HOH					
	ĊH₂OH	CH₂OH	H → OH CH₂OH			
	The correct statement a	about the sugars given al	pove are			
	(A) I and II are L-Sugar	s	(B) II and III are D-Suga	ar		
	(C) I and III are D-suga	rs	(D) I is L-sugar			
	CH, OH					
	$\int_{-\infty}^{\infty} dx$					
6.	$ \begin{array}{c} I \\ (CHOH) \\ \end{array} \xrightarrow{\text{NaBH}_4} A $	+ B				
	The product A and B in	the a above reaction are	2			
	(A) Diastereomers		(B) Enantiomers			
	(C) Anomers		(D) Optically active hex	ahydroxy compounds		
7~	The correct statements	about poptidos aro :				
1.0%	The conect statements	about peptides are.				

- (A) A dipeptide has one peptide link between two amino acids.
- (B) By convention N-Terminus is kept at left and C- terminus at right in the structure of a peptide

(C) If only one amino group and one carboxylic acid, group are available for reaction, then only one dipeptide can forms.

- (D) A polypeptide with more than hundred amino acid residues (mol. mass > 10,000) is called a protein
- 8. Correct statement about peptide linkage in a protein molecule is/are correct ?
 - (A) It is amide linkage
 - (B) It has partial double bond character.
 - (C) It is hydrophilic in nature
 - (D) It connects protein molecules through H-bonds.

PART - IV : COMPREHENSION

Read the following passage carefully and answer the questions. Comprehension # 1



3.	(A) (I) (ii) (R)	(B) (III) (iii) (S)	(C) (II) (i) (R)	(D) (IV) (i) (Q)
4.	Which of the follow	ving combination gives Br	₂ /H ₂ O test ?	
	(A) (II) (iii) (R)	(B) (I) (ii) (Q)	(C) (IV) (ii) (Q)	(D) (III) (iii) (S)

5.Which of the following combination is correct set for invert sugar ?
(A) (II) (i) (Q)(B) (III) (iii) (R)(C) (II) (iv) (R)(D) (II) (iii) (R)

Exercise-3

* Marked Questions may have more than one correct option.

PART - I : JEE (ADVANCED) / IIT-JEE PROBLEMS (PREVIOUS YEARS)

1. Aspartame, an artificial sweetener, is a peptide and has the following structure : [JEE-2001(M), 5/100] CH₂C₆H₅ $H_2NCH - CONH - COH_3$ ĊH₂ – COOH Identify the four functional groups (i) Write the zwitter ionic structure (ii) (iii) Write the structures of the amino acids obtained from the hydrolysis of aspartame. (iv) Which of these two amino acids, is more hydrophobic ? 2. Following two aminoacids leusine and glutamine form dipeptide linkage. What are two possible dipeptides ? (CH₃)₂CHCH₂CHCOOH and H₂NCOCH₂CH₂ – CHCOOH [JEE-2003(M), 2/60] ŃΗ, ΝH₂ 3. Which of the following pairs give positive Tollen's Test? [JEE-2004(S), 3/84] (A) Glucose, sucrose (B) Glucose, fructose (C) Hexanol, Acetophenone (D) Fructose, sucrose 4. The Fischer projection formula of D-glucose is [JEE 2004(M), 2/60)]



(i) Give Fischer projection formula of L-glucose.

(ii) Give the product of reaction of L-glucose with Tollen's reagent.

5. The two forms of D-Glucopyranose obtained from solution of D-Glucose are known as :

[JEE-2005(S), 3/84]

- (A) Epimers(B) Anomers(C) Enantiomers(D) Geometrical Isomers
- 6. Which of the following disaccharide will not reduce tollen's reagent.

[JEE-2005(M), 2/60]



7. Statement-1 : Glucose gives a reddish-brown precipitate with Fehling's solution. [JEE-2007, 3/162] because

Statement-2 : Reaction of glucose with Fehling's solution gives CuO and gluconic acid.

- (A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
- (B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
- (C) Statement-1 is True, Statement-2 is False
- (D) Statement-1 is False, Statement-2 is True
- 8.* The correct statement(s) about the following sugars X and Y is(are) :



- (A) **X** is a reducing sugar and **Y** is a non-reducing sugar.
- (B) X is a non-reducing sugar and Y is a reducing sugar.
- (C) The glucosidic linkages in **X** and **Y** are α and β , respectively.
- (D) The glucosidic linkages in **X** and **Y** are β and α , respectively.

(B) an aldohexose

- 9. A decapeptide (Mol. Wt. 796) on complete hydrolysis gives glycine (Mol. Wt. 75), alanine and phenylalanine. Glycine contributes 47.0 % to the total weight of the hydrolysed products. The number of glycine units present in the decapeptide is [JEE 2011, 4/180]
- **10.** The following carbohydrate is

(A) a ketohexose



(D) an α -pyranose

[JEE 2009, 4/160]

[JEE 2011, 3/180]

11. When the following aldohexose exists in its D-configuration, the total number of stereoisomers in its pyranose form is : [JEE-2012, 4/136]

(C) an α -furanose

СНО | СН₂ | СНОН | СНОН | СНОН | СНОН

12. The substituents R1 and R2 for nine peptides are listed in the table given below. How many of these [JEE-2012, 4/136] peptides are positively charged at pH = 7.0 ?

⊕ H₃N–CH–CO–NH–CH–CO–NH–CH–CO–NH–CH–COC							
 	I R₁	 R ₂ H					
Peptide	R ₁	R ₂					
I	Н	Н					
Ш	Н	CH₃					
111	CH ₂ COOH	Н					
IV	CH ₂ CONH ₂	(CH ₂) ₄ NH ₂					
V	CH ₂ CONH ₂	CH ₂ CONH ₂					
VI	(CH ₂) ₄ NH ₂	(CH ₂) ₄ NH ₂					
VII	CH ₂ COOH	CH ₂ CONH ₂					
VIII	CH ₂ OH	(CH ₂) ₄ NH ₂					
IX	(CH ₂) ₄ NH ₂	CH ₃					

13. A tetrapeptide has - COOH group on alanine. This produces glycine (Gly), valine (Val), phenyl alanine (Phe) and alanine (Ala), on complete hydrolysis. For this tetrapeptide, the number of possible sequences (primary structures) with - NH2 group attached to a chiral center is :

[JEE(Advanced)-2013, 4/120]

14. The total number of distinct naturally occurring amino acids obtained by complete acidic hydrolysis of the peptide shown below is : [JEE(Advanced)-2014, 4/120]



The structure of D-(+)-glucose is CHO 15.



-Н

ĊH₂OH

HO-



HO-

-H

CH₂OH





 For 'invert sugar', the correct statement(s) is(are) [JEE(Advanced)-2016, 3/124] (Given : specific rotations of (+)-sucrose, (+)-maltose, L-(-)-glucose and L-(+)-fructose in aqueous solution are +66°, +140°, -52° and +92°, respectively)

- (A) 'invert sugar' is prepared by acid catalyzed hydrolysis of maltose
- (B) 'invert sugar' is an equimolar mixture of D-(+)-glucose and D-(-)-fructose
- (C) specific rotation of 'invert sugar' is -20°
- (D) on reaction with Br2 water, 'invert sugar' forms saccharic acid as one of the products

Comprehension # 2 (for 18 to 19)

Treatment of compound **O** with KMnO₄/H⁺ gave **P**, which on heating with ammonia gave **Q**. The compound **Q** on treatment with Br₂/NaOH produced **R**. On strong heating, **Q** gave **S**, which on further treatment with ethyl 2-bromopropanoate in the presence of KOH followed by acidification, gave a compound **T**.









19. The compound **T** is (A) glycine

(B) alanine

(C) valine

20.* The Fishcher presentation of D-glucose is given below.



D-glucose

The correct structure(s) of β -L-glucopyranose is (are)



[JEE(Advanced)-2016, 3/124]

(0)



[JEE(Advanced)-2016, 3/124] (D) serine

[JEE(Advanced)-2018, 4/120]

ЭH

	PART - II : JEE	(MAIN) / AIEEE F	PROBLEMS (PR	EVIOUS	YEARS)
		JEE(MAIN) OFF	LINE PROBLEMS		
1.	A substance forms zwir (1) – NH_2 , – COOH (3) Both (1) and (2)	tter ion. It can have func	tional group. (2) – NH ₂ , – SO ₃ H (4) None of these	[AIEEE-2002, 3/225]
2.	Complete hydrolysis of (1) D-fructose	cellulose gives (2) D-ribose	(3) D-glucose] (4) L-gluco	AIEEE-2003, 3/225] ose
3.	The reason for double (1) van der Waal's forc (3) hydrogen bonding.	helical structure of DNA es.	is: (2) dipole-dipole intera (4) electrostatic attract	[ction. ions.	AIEEE-2003, 3/225]
4.	Which base is present (1) uracil	in RNA but not in DNA? (2) cytosine	(3) guanine	[(4) thymin	AIEEE-2004, 3/225] e
5.	Insulin production and compound belongs to v (1) a co- enzyme	d its action in human which of the following ca (2) a hormone	body are responsible t tegories? (3) an enzyme	for the leve [(4) an anti	el of diabetes. This AIEEE-2004, 3/225] ibiotic
6.	In both DNA and RNA, (1) C_5' and C_2' respecti (2) C_2' and C_5' respecti (3) C_1' and C_5' respecti (4) C_5' and C_1' respecti	heterocylic base and ph vely of the sugar molecu vely of the sugar molecu vely of the sugar molecu vely of the sugar molecu	iosphate ester linkages a ile ile ile ile.	ire at : [AIEEE 2005, 3/225]
7.	The pyrimidine bases p (1) cytosine and guanir (3) cytosine and uracil	present in DNA are ne	(2) cytosine and thymin (4) cytosine and adeni	ne ne	AIEEE-2006, 3/165]
8.	The term anomers of g (1) a mixture of (D)–glu (2) enantiomers of gluc (3) isomers of glucose (4) isomers of glucose	lucose refers to icose and (L)–glucose cose that differ in configuratio that differ in configuratio	n at carbon one (C–1) ns at carbons one and fo	[pur (C–1 and	AIEEE-2006, 3/165]
9.	The secondary structur (1) α-helical backbone. (3) sequence of α-amir	re of protein refers to: no acids.	(2) hydrophobic interactions.(4) fixed configuration of the poly		AIEEE-2007, 3/120] eptide backbone.
10.	α -D-(+)-glucose and β -(1) epimers	D-(+)-glucose are (2) anomers	(3) enantiomers] (4) conforr	AIEEE-2008, 3/105] mers
11.	The two functional grou (1) –CHO and –COOH	ups present in a typical c (2) >C=O and –OH	arbohydrate are : (3) –OH and –CHO] (4) –OH ai	AIEEE-2009, 4/144] nd –COOH
12.	The presence or abse DNA. (1) 1 st	ence of hydroxy group of (2) 2 nd	on which carbon atom c (3) 3 rd	of sugar diffe [A (4) 4 th	erentiates RNA and NEEE-2011, 4/120]
13.	The change in the optic	cal rotation of freshly pre	pared solution of glucos	e is known a	IS:
	(1) racemisation	(2) specific rotation	(3) mutarotation	[A] (4) tautom	NEEE-2011, 4/120] nerism





14. The correct structure of product 'P' in the following reaction is :

 $\xrightarrow{NEt_3} P$

OCOCH₃







15. The correct match between item 'I' and item 'II' is: Item 'l'

(Compound)

Asn-Ser + (CH₃CO)₂O-

- Lysine (A)
- (B) Furfural
- (C) Benzyl alcohol
- (D) Styrene
- (1) (A) \rightarrow (R), (B) \rightarrow (P), (C) \rightarrow (Q), (D) \rightarrow (S)
- (3) (A) \rightarrow (Q), (B) \rightarrow (R), (C) \rightarrow (S), (D) \rightarrow (P)

[JEE(Main) 2019 Online (10-01-19), 4/120] Item 'II'

[JEE(Main) 2019 Online (10-01-19), 4/120]

(Reagent)

- (P) 1-Naphthol
- Ninhydrin (Q)
- (R) KMnO₄
- (S) Ceric ammonium nitrate
- (2) (A) \rightarrow (Q), (B) \rightarrow (P), (C) \rightarrow (S), (D) \rightarrow (R)
- (4) (A) \rightarrow (Q), (B) \rightarrow (P), (C) \rightarrow (R), (D) \rightarrow (S)
- Among the following compounds, which one is found in RNA? 16.







17. The correct match between Item I and Item II is :

	Item I	lte	m II				
(A)	Ester test	(P)	Tyr				
(B)	Carbylamine test	(Q)	Asp				
(C)	Phthalein dye test	(C)	Ser				
		(D)	Lys				
(1) ((1) (A) \rightarrow (Q); (B) \rightarrow (S); (C) \rightarrow (R)						
(3) ($A) \to (R); (B) \to (S);$	(C) –	→ (Q)				



- (4) (A) \rightarrow (Q); (B) \rightarrow (S); (C) \rightarrow (P)
- Among the following compounds most basic amino acid is: [JEE(Main) 2019 Online (12-01-19), 4/120] 18. (1) Asparagine (2) Serine (3) Histidine (4) Lysine
- 19. The correct structure of histidine in a strongly acidic solution (pH = 2) is:

[JEE(Main) 2019 Online (12-01-19), 4/120]



- [JEE(Main) 2019 Online (11-01-19), 4/120]

[JEE(Main) 2019 Online (11-01-19), 4/120]





B-4. Number of amino groups is more than the number of carboxylic groups.

- **B-5.** (i) $R-CH-\dot{N}H_3$ (ii) $R-CH-COO^ COO^-$ (iii) $R-CH-COO^ H_{NH_3}$ (ii) $H_2 - CH-COO^-$ (iii) $HOOC-CH_2-CH-COO^-$ (iv) $CH_2-CH_2-CH_2-NH-C$ H_3
- **B-6.** Due to its existence in the form of zwitter ion, there exist a very strong intermolecular attraction which is responsible for high melting point of amino acid.
- **B-7.** Amino acids contain two functional groups which can make H-bonds that is the reason why they have high m.p. and solubility in water.

B-8.
$$CI^{\Theta}H_{3}N - CH_{2} - C - OH + NaOH \longrightarrow NH_{3}CH_{2}CO^{\Theta} + H_{2}O + NaCl$$

 $Glycine hydrochloride \longrightarrow OH = OH$

$$\overset{\bigoplus}{\mathsf{NH}_3\mathsf{CH}_2\mathsf{C}}_{\mathsf{O}} \overset{\mathsf{O}}{\mathsf{O}} + \overset{\mathsf{NaOH}}{\operatorname{2nd}} \overset{\longrightarrow}{\operatorname{eqv.}} \mathsf{H}_2\mathsf{N} \overset{\mathsf{H}}{\operatorname{-}} \mathsf{CH}_2 \overset{\mathsf{O}}{\operatorname{-}} \overset{\mathsf{O}}{\mathsf{O}} \overset{\oplus}{\mathsf{Na}} + \mathsf{H}_2\mathsf{O}$$

B-9. When protein in native form is subjected to a physical change like temperature or pH, the H-bonds are disturbed. As a result globules get unfold and helices get uncoiled therefore proteins loses its activity. During denaturation 2° and 3° structures get destroyed but 1° structure remain the same. Ex: Coagulation of egg while on boiling and curdling of milk caused by bacteria present in milk.

				PAR	T – II				
A-1.	(B)	A-2.	(C)	A-3.	(D)	A-4.	(D)	A-5.	(C)
A-6.	(B)	A-7.	(A)	A-8.	(C)	A-9.	(C)	A-10.	(A)
B-1.	(B)	B-2.	(B)	B-3.	(A)	B-4.	(C)	B-5.	(D)
B-6.	(A)	C-1.	(D)	C-2.	(A)	C-3.	(C)	C-4.	(B)
C-5.	(C)	C-6.	(B)	C-7.	(C)	C-8.	(A)	C-9.	(C)
C-10.	(C)	C-11.	(A)	C-12.	(D)	C-13.	(D)	C-14.	(B)
C-15.	(B)	C-16.	(C)	C-17.	(B)	C-18.	(D)	C-19.	(C)
C-20.	(C)	C-21.	(C)	C-22.	(C)	C-23.	(D)	C-24.	(A)

PART – III

 $\textbf{1.} \qquad A \rightarrow (p,q) \text{ ; } B \rightarrow (p,s) \text{ ; } C \rightarrow (p,r,t) \text{ ; } D \rightarrow (p,t)$

2. (A - q,r); (B - s); (C - q); (D - p)

Bior	nolecules 🖊								
				EXER	CISE - 2				
				PA	RT - I				
1.	(A)	2.	(B)	3.	(B)	4.	(A)	5.	(D)
6.	(C)	7.	(B)	8.	(B)				
				PA	RT - II				
1.	9	2.	3	3.	3	4.	4	5.	32
6.	2 ³ = 8								
				PAI	RT - III				
1.	(ACD)	2.	(AC)	3.	(BC)	4.	(AB)	5.	(BD)
6.	(AD)	7.	(ABCD)	8.	(ABCD)				
				PAF	RT - IV				
1.	(B)	2.	(B)	3	(C)	4	(B)	5	(C)
				EXER	CISE - 3				
				PA	RT - I				
		CH ₂ 0	C ₆ H ₅						
1.	H ₂ NCH-CO) ОИН-СН-	COOCH ₃						
	 CH ₂ – C		ortomin o)						
	(i) In aspana	rtame four	functional grou	ips are pre	esent which are	е			
	(a)	–NH ₂ (An	nine)		(b) (–COO⊦	H) (Carbox	ylic acid)		
	(c)	∬ −C−NH−	(2° amide)		(d) –C – O –	(Ester)			
	(ii) Zwitter	ion structu	re is givens as	below :	(u)	()			
		+	CH ₂ C ₆ H ₅ 						
	H ₂	N-CH-CC	DNH-CH-COO	CH ₃					
		$CH_2 - C$	CH-C-H-						
	(iiii) H _a N – C	 :H_C_NH.	-CH-COOCH	Hydrolysis	H ₂ N−CH−(COOH +	CH ₂ C ₆ H ₅	5	
					´	юон 'н	2N-CH-CO0 (b)	H	
	Hence on I	nydrolysis	two amino acid	(a) and (b) are obtained				
	(iv) In abo	ve two ar	NH ₂ nino acids	2-CH-CO	OH is more h	nydrophob	ic due to pr	esence of n	on-polar
	C ₆ H ₅ –CH ₂ -	- or benzy	l group.	∪H ₂ – H	5 ⁰ 6				



5. (B)

L-glucose

6. P is a reducing sugar as one monosaccharide has free reducing group because glycosidic linkage is (1, 4). Whereas in Q both the reducing groups are involved in glycosidic bond formation

7.	(C)	8.	(BC)	9.	6	10.	(B)	11.	8
12.	4 [(iv) , (vi), (vi	ii) & (ix)]	13.	4	14.	1	15.	(A)
16.	(C)	17.	(BC)	18.	(A)	19.	(B)	20.	(D)
PART - II									

JEE(MAIN) OFFLINE PROBLEMS										
1.	(3)	2.	(3)	3.	(3)	4.	(1)	5.	(2)	
6.	(3)	7.	(2)	8.	(3)	9.	(4)	10.	(2)	
11.	(3)	12.	(2)	13.	(3)	14.	(3)	15.	(1)	
16.	(1)	17.	(1)	18.	(2)	19.	(4)	20.	(3)	
			JEE(MAIN) ON	LINE PRO	BLEMS				
1.	(4)	2.	(4)	3.	(1)	4.	(4)	5.	(3)	
6.	(1)	7.	(4)	8.	(2)	9.	(1)	10.	(3)	
11.	(4)	12.	(1)	13.	(1)	14.	(2)	15.	(2)	
16.	(4)	17.	(4)	18.	(4)	19.	(1)			