

2020

**BIOCHEMISTRY — HONOURS**

**Paper : CC-1**

**Full Marks : 50**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

1. Answer **any five** questions : 2×5
- (a) Why phenylalanine is very poorly soluble in water, while serine is freely water soluble?
  - (b) Distinguish between nucleotide and nucleoside.
  - (c) Humans are unable to digest cellulose. Why?
  - (d) Differentiate between salting in and salting out methods.
  - (e) Peptide bonds are planar and adopt either a cis or trans conformation. Draw a peptide bond in the energetically most favourable conformation.
  - (f) How do you differentiate DNA and RNA using absorbance?
  - (g) What are gangliosides? Write about their function.
  - (h) Write the structure of two biologically important sugar derivatives.
  - (i) Draw the epimeric structure of glucose with respect to C<sub>2</sub>.
  - (j) Which amino acid has imidazole ring in its structure? Draw its structure.
  - (k) Considering their structure, differentiate between starch and cellulose.
  - (l) What are essential and non-essential fatty acids? Give examples.
2. Answer **any two** questions :
- (a) (i) What is ceramide? Give an example of wax.
  - (ii) What is lectin? (2+1)+2
  - (b) (i) Differentiate between amylose and amylopectin.
  - (ii) Why N-acetylmuramic acid is biologically important?
  - (iii) What is mutarotation? 2+2+1
  - (c) (i) What are the functions of BOC and DCC in Merrifield solid phase peptide synthesis?
  - (ii) Discuss the effect of alkali on DNA and RNA. 3+2
  - (d) (i) What is Chargaff's rule?
  - (ii) Differentiate major and minor groove considering their structure and function in DNA. 2+3

**Please Turn Over**

3. (a) Name two nucleotides which are used as source of energy.  
(b) Describe the clover leaf structure of t-RNA with a neat diagram.  
(c) Name one peptide of non-protein origin. Draw its structure.  
(d) Describe the role of enzyme carboxypeptidase in protein sequencing. 2+3+3+2

**Or,**

4. (a) What are glycerophospholipids?  
(b) Write the function of cardiolipin.  
(c) Differentiate between A, B, Z form of DNA.  
(d) What are met alloproteins? Explain with example. 2+2+3+(2+1)
5. (a) What are chaperone? Describe its role in protein folding.  
(b) Describe different types of secondary structures present in protein.  
(c) How ring structure is formed in glucose?  
(d) Draw any structure of triose. 3+3+3+1

**Or,**

6. (a) What is anomeric effect? Give an example.  
(b) What are the composition and use of chitin?  
(c) Cite one example for each where nucleotides are used as  
    (i) source of energy  
    (ii) component of coenzyme, and  
    (iii) second messenger. (2+1)+(2+2)+3
7. (a) Write two names of MUFA.  
(b) Sucrose is a non-reducing disaccharide, whereas maltose is a reducing one – Explain with their structure.  
(c) Write the name of two sterols which are present in plant and fungi.  
(d) Describe the cooperativity between protein subunits by using sequential model. 2+3+2+3

**Or,**

8. (a) Draw the absorption spectra of protein.  
(b) What is T<sub>m</sub>?  
(c) Describe a disease which occurs due to defect in protein folding.  
(d) What is Hill plot? 3+2+2+3
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