P. P. SAVANI UNIVERSITY
Third Semester of B.Sc. Examination
December-2021
SSBT2130–Biochemistry and Metabolism-I

11.12.2021, Saturday **Time: 09:00 a.m. to 11:30 a.m.** **Maximum Marks: 60**

Instructions:
1. **The question paper comprises of two sections.**
2. **Section I and II must be attempted in separate answer sheets.**
3. **Make suitable assumptions and draw neat figures wherever required.**
4. **Use of scientific calculator is allowed.**

Section-I (Total Marks - 30)

Q.1 Short Questions **[10]**

1.1 Objectives **[05]**

1.1a Chemical nature of carbohydrate is_____?
- **A** Polyhydroxy aldehydes and phenols
- **B** Polyhydroxy aldehydes and ketones
- **C** Polyhydroxy aldehydes and alcohols
- **D** Polyhydroxy ketones and phenols

1.1b Which of the following is reducing sugar?
- **A** Glucose
- **B** Dihydroxyacetone
- **C** Eryhthulose
- **D** None of the above

1.1c In maltose, the linkage is_____?
- **A** β-1-4 linkage
- **B** β-1-2 linkage
- **C** α-1-4 linkage
- **D** α-1-2 linkage

1.1d Naturally occurring carbohydrates are_____?
- **A** L types
- **B** D types
- **C** Racemic (L+D types)
- **D** Z types

1.1e Which type of alcohol is present in waxes?
- **A** Glycerol
- **B** Monohydric acid
- **C** Sphingosine
- **D** None of the above

1.1f Which of the following is a non-glyceric lipid?
- **A** Phopholipids
- **B** Oils
- **C** Fats
- **D** Waxes

1.1g Which of the following is true regarding saturated fatty acids?

- **A** Double bonds are absent
- **B** Loosely packed
- **C** Low melting point
- **D** Liquid at room temperatures

1.1h Sphingolipids are similar to phospholipids, except glycerol backbone is replaced by_____?

- **A** Choline
- **B** Sphingosine
- **C** Fattyacid
- **D** Phosphate

1.1i Which of the following best describes chemical structure of phospholipid?

- **A** 3 fatty acid + 1 glycerol + phosphate group
- **B** 2 fatty acid + 1 glycerol + phosphate group + alcohol attached
- **C** 1 fatty acid + 3 glycerol + phosphate group
- **D** 2 fatty acid + 1 glycerol + phosphate group

1.1j Which of the following is the example of ketohexose?

- **A** Glucose
- **B** Fructose
- **C** Ribose
- **D** Glyceraldehyde

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a Define "epimers"

1.2b Draw the chemical structure of α-D-Glucose

1.2c Define "Reducing sugar"

1.2d Define "Lipids"

1.2e Give scientific name of "Table sugar" and "Milk sugar"

Q.2 Short Notes (Attempt any two) **[06]**

A Why carbohydrates are important?

B What are the biological functions of lipid in living organisms?

C Write a note on "Structure and functions of Lactose and Sucrose".

Q.3 Explain in detail (Attempt any two) **[14]**

A Explain classification of carbohydrates along with suitable illustration.

B Write about lipids and their classification with suitable examples?

C Classify fattyacids based on their chemical structures with necessary illustration. Provide their biological functions in brief.

Section-II (Total Marks - 30)

Q.1 Short Questions [10]

1.1 Objectives [05]

1.1a A phosphodiester bond is present in

- **A** Between two nucleotides
- **B** Between N-Base and Phosphate
- **C** Between N-Base and Sugar
- **D** Between Sugar and Phosphate

1.1b How many base pairs are there in one full turn of the DNA double helix?

- **A** 4
- **B** 10
- **C** 16
- **D** 64

1.1c A piece of DNA was analyzed and 15% of its nucleotides were adenine. What percentage would be uracil?

- **A** 15%
- **B** 0%
- **C** 30%
- **D** 60%

1.1d The arm of t-RNA that is complimentary to the coding genes present in m-RNA

- **A** Acceptor arm
- **B** Ribosome binding arm
- **C** Anticodon arm
- **D** T arm

1.1e Which of the following statement is Incorrect about SnRNA?

- **A** It is small nuclear RNA
- **B** It helps in RNA splicing
- **C** It removes non-coding region
- **D** It will remove coding region

1.1f Which of the following amino acid has sulphur functional group?

- **A** Methionine
- **B** Lysine
- **C** Tyrosine
- **D** Alanine

1.1g All the amino acids are optically active except

- **A** Glutamic acid
- **B** Tryptophan
- **C** Glycine

D Alanine

1.1h Which of the following amino acids has a negative charge at physiologic pH ?

A Aspartic Acid
B Histidine
C Proline
D Glycine

1.1i At pI the charge of on the amino acid will be

A Positive
B Negative
C Neutral
D None of the above

1.1j Which statement is mismatched?

A The primary structure relates to the basic linear structure of a protein
B The secondary structure relates to the helical shape of a protein
C The tertiary structure is a higher level of protein folding
D The quaternary structure is related to the basic linear structure of a protein

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a Define peptide bond
1.2b Draw the structure of m-RNA
1.2c Define Zwitter Ion and Isoelectric pH
1.2d What are polar amino acids?
1.2e Which are the forms of DNA?

Q.2 Short Notes (Attempt any two) **[06]**

A Classify amino acids based on nutritional requirements.
B Write a note on structure of t-RNA.
C Draw the structures: ATP, UMP, GTP, dCDP

Q.3 Explain in detail (Attempt any two) **[14]**

A Explain in secondary structure of proteins.
B Give a note on Watson and crick model.
C Draw the structure of following amino acids: Tryptophan, Proline, Glutamic acid, Serine, Cysteine, Phenly Alanine, Tyrosine