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PG CBCS

M.Sc. Semester-I Examination, 2020

NUTRITION & DIETETICS

PAPER: NUD 102

BIOPHYSICAL AND BIOCHEMICAL ASPECT OF NUTRITION

Full Marks: 40 **Time: 2 Hours**

Write the answer for each unit in separate sheet

UNIT-3

Biophysical Aspect of Nutrition

Answer any two questions from the following: (250 Words) **2X10=20**

1. Differentiate acid and base according to the Brønsted–Lowry theory with a suitable example of chemical reaction. Define the proteolysis of water and indicate the dissociation constant. How does pH can be calculated by Henderson and Hasselbalch equation? 2+4+4
2. Define 'Energy' according to the thermodynamics. State the 1st Law of thermodynamics with its mathematical representation. State the relationship of Einstein equation with 1st Law of thermodynamics. Describe the characteristics of living organism according to the thermodynamics. 2+3+2+3
3. What do you mean by Entropy? State the importance of Entropy as per the law of thermodynamics with mathematical formulae. Write a short note on Efficiency. 2+5+3
4. Write the principle and application of column chromatography in nutrition. Classify the chromatography based on the principle of separation. Draw a block diagram of a HPLC system. Differentiate the normal phase and reverse phase chromatography. 3+2+2+3
5. Define buffer system and state its importance in acid-base equilibrium. What are the characteristics of a viscus fluid? What do you mean by "Shear stress" and "Shear rate"? Arrange the following fluid in ascending order as per their viscosity: i) Honey, ii) Water, iii) air of air conditioner, iv) exhaust air of motor bike, v) olive oil, vi) ethanol, vii) palm oil, viii) acetone. 3+2+2+3
6. Differentiate cathode and anode. Why is isoelectric point important in isoelectric focusing? Describe the principle, requirements, procedure and applications of agarose gel electrophoresis. 2+2+6

UNIT-4

Biochemical Aspect of Nutrition

Answer any two questions from the following: (250 Words) **2X10=20**

1. What do you mean by derived lipids? Describe the tertiary structure of protein with example. What is Gibbs free energy? 2+6+2
2. Write the structure of purine bases. Write down the classification of lipids. State the difference between nucleoside and nucleotide. What is anomeric carbon? 2+5+2+1

3. What is aliphatic amino acid? What do you mean by non-reducing carbohydrate? Write down the different properties of Howarth projection with example. 2+2+6
4. Mention the name of test by which carbohydrate can be determined. Describe a method for the separation of nuclic acid. What is diprotic amino acid? What do you mean by salting out? 1+4+2+3
5. An amino acid has 3 ionizing groups with different pk_a's ($pk_{a1,}$ pk_{a2} and pk_{a3}= 2.0, 10.5 and 3.8 respectively), Calculate the pI value of this amino acid. Define glycogenic amino acid with example. What is anti-parallel β-pleated sheet? 6+2+2
6. Explain the structure of DNA. How is Z-DNA different from other forms of DNA?Breifly describe the structure of tRNA 4+3+3

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