

**MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR**  
**SEMESTER END THEORY EXAMINATION, B. Tech. (DT)**

Semester	: II (V Dean)	Academic Year	: 2023-2024
Course No.	: EC-202	Course Title	: Physical Chemistry of Milk
Credits	: 2+1=3	Total Marks	: 50
Day & Date	: Monday; 05/08/2024	Time	: 2.00 hrs.

- Note : 1) All questions from **Section 'A'** are compulsory.  
2) Solve **any three** questions from **Section 'B'**.  
3) Draw neat and well labelled diagram wherever necessary.

**SECTION –‘A’**

- Q. 1 A) Define the following. (05)
- Colligative property
  - pH
  - Half life period
  - Surface tension
  - Emulsion
- B) Answer the following. (05)
- State the principle of lactometer.
  - What is Recknagel phenomenon?
  - Expand the term OD.
  - What do you mean by Brownian motion?
  - State the meaning of neutralization.
- Q. 2 A) State whether True or False. If false, rewrite the statement after making necessary corrections in the underlined word/s. (05)
- Addition of water increases the specific gravity of milk.
  - True solutions scatter the light whereas colloidal solution does not reflect light.
  - Radioactivity is result of a natural change of an isotope of one element into an isotope of a different element.
  - Homogenization of raw whole milk stimulates lipolysis and leads to decrease in surface tension.
  - Reversible colloids are thermo dynamically unstable.
- B) Choose the most appropriate answer from the options given below. (05)
- An example of weak acid is .....
    - HCl
    - CH<sub>3</sub>COOH
    - H<sub>2</sub>SO<sub>4</sub>
    - HNO<sub>3</sub>
  - The principal surfactants which lowers the surface tension of milk is .....
    - Immunoglobulin's
    - Salts
    - Phospholipids
    - Lactose
  - In ..... the linkages between the particles of a gel are due to electrical attraction and are not rigid or strong.
    - Broken gel
    - Non elastic gel
    - Elastic gel
    - All of these

(P.T.O.)

- iv) Amount of water added to milk and the freezing point depression of milk are .....
- |                           |                          |
|---------------------------|--------------------------|
| a) Inversely proportional | b) Directly proportional |
| c) Equal                  | d) None of these         |
- v) The reciprocal of viscosity is .....
- |                       |                      |
|-----------------------|----------------------|
| a) Apparent viscosity | b) Fluidity          |
| c) Relative viscosity | d) Kinetic viscosity |

**SECTION - 'B'**

- Q. 3 A) Define surface tension of milk. Explain the factors affecting the surface tension of milk. (05)  
B) Define gels. Mention different types of gels and explain the properties of gels. (05)
- Q. 4 A) State the Raoult's law. Explain the factors affecting freezing point of milk. (05)  
B) What is specific gravity? Explain different methods available for the determination of density/ specific gravity of milk. (05)
- Q. 5 A) State the Bronsted -Lowry's concept of acids and bases. (03)  
B) Explain the Kohlrausch's law. (03)  
C) What is buffering capacity and buffering index? How do the milk constituents contribute buffering index of milk? (04)
- Q. 6 A) Briefly discuss the properties of colloids. (03)  
B) Write the application of radioisotopes in dairy industry. (03)  
C) Define viscosity. What do you understand by Newtonian and non Newtonian behavior of solutions? (04)
- Q. 7 What are buffers? Mention different types of buffers and derive Handerson-Hasselbalch equation for preparation of buffer. (10)

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