

ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2011
EXAMINATION CATEGORY: TECHNICAL

PAPER III: SUBJECT SPEACILISATION PAPER for DAIRY TECHNOLOGY

Date	: 30th October 2011
Total Marks	: 100
Examination Time	: 2.5 Hours
Reading Time	: 15 minutes

INSTRUCTIONS

1. Write your Roll Number clearly on the answer booklet in the space provided
2. The first 15 minutes is being provided to check the number of pages, printing errors, clarify doubts and to read the instructions. You are **NOT PERMITTED TO WRITE** during this time.
3. Use either **Blue** or **Black** ink pen or ball point pen for the written part and **H.B Pencils** for the sketches and drawings.
4. All answers should be written on the Answer Booklet provided. Candidates are not allowed to write anything on the question paper.
5. This Question Booklet consists of **9 pages**. It is divided into two sections – namely SECTION A and SECTION B
6. **SECTION A** consists of two parts. **Part I and Part II.**

Part I consists of 30 multiple choice question carrying one (1) mark each and is **compulsory**. The answer of your choice should be clearly written **in whole** along with the question number and option number on your answer booklet.

Part II consists of four (4) short answer questions of five (5) marks each and all questions are **compulsory**.

7. **SECTION B** consists of two **Case Studies**. Choose only **ONE** case study and answer the question of your choice. Each case study carries fifty (50) marks in total.

SECTION A: Part I

Each question carries one (1) mark (30 x 1 = 30 marks). Answer all questions.

Choose the correct answer. The answer of your choice along with the option number should be clearly written in whole along with the question number on your answer booklet (e.g. Q1: c. sulfuric acid).

1. Milk protein is composed of the following
 - a. 2.0% casein, 0.6% whey protein
 - b. 2.3% casein, 0.8% whey protein
 - c. 2.7% casein, 0.6% whey protein
 - d. 3.0% casein, 0.4% whey protein

2. Skimming efficiency of milk in a separator is effected by several factors. Which of the following factors will not affect skimming efficiency
 - a. Temperature of milk
 - b. Speed of separator bowl
 - c. Flow rate of milk
 - d. Type of separator

3. Which is not a desirable effect of heat treatment
 - a. Inactivation of bacterial inhibitors
 - b. Maillard reaction
 - c. Improved rheological properties
 - d. Increase heat stability

4. Which of the following is a direct heating system
 - a. Plate Heat Exchanger
 - b. Tubular Heat Exchanger
 - c. Scraped Surface Heat Exchanger
 - d. Steam Infusion

5. During the log phase of microbial growth, the microbes exhibit
 - a. No growth
 - b. Decline in growth
 - c. Exponential growth
 - d. None of the above

6. Which of the following factors affects the dissolving of milk powder
 - a. Wettability
 - b. Dispersability
 - c. Sinkability
 - d. All of the above

7. How much skim milk containing 0.1% fat is needed to reduce the percentage fat in 200 kgs of cream from 34% to 30%
 - a. 20.35kgs
 - b. 25.35kgs
 - c. 26.75kgs
 - d. 30.65Kgs

8. A bacteriophage
 - a. Promotes bacterial growth
 - b. Has no effect on bacterial growth
 - c. Inhibits bacterial growth
 - d. Inhibits growth of yeasts and moulds

9. Milk fat has a high concentration of
 - a. Butyric acid
 - b. Oleic acid
 - c. Caproic acid
 - d. Linoleic acid

10. Fractionation is the process used for
- Removal of cholesterol from AMF
 - Separation of oil into high melting and low melting fats
 - Washing oil to obtain clear, shiny product
 - Reduce levels of FFAs
11. Aggregation of milk fat that occurs through the presence of fat crystal is known as
- Coalescence
 - Flocculation
 - Clustering
 - Partial coalescence
12. Casein micelles have
- Primary structure
 - Secondary structure
 - Tertiary structure
 - Quaternary structure
13. Which is the most hydrophobic of caseins
- α_s - casein
 - β - casein
 - κ - casein
 - None of the above
14. The particle diameter of fat globules is
- 1.0 – 5.0 μm
 - 0.1 – 10 μm
 - 20 – 300 nm
 - 3 – 6 nm

15. Which of the following is a property of casein
- Self association and association with other molecules by hydrophobic bonds
 - Cannot be easily denatured by heat
 - Tends to form strong bonds with divalent ions
 - All of the above
16. Exposure of whey proteins to extreme pH and temperature will result in
- Aggregation
 - Denaturation
 - Coalescence
 - Partial coalescence
17. Which of the following milk component undergoes maillards reaction that results in the burnt color of milk
- Proteins
 - Lactose
 - Fat
 - Minerals/vitamins
18. CaCl_2 (calcium chloride) is added to milk during cheese manufacture for
- Preservation
 - Acidification
 - Acceleration of aggregation and formation of a firmer network
 - Color
19. The amount of energy required to commence an enzymatic reaction is known as
- Chemical energy
 - Physical energy
 - Activation energy
 - None of the above

20. A nozzle atomizer is used in
- Evaporator
 - Roller dryer
 - Spray dryer
 - None of the above
21. Which of the following is not a component of the amino acid structure
- Amino group
 - Side chain
 - Carboxylic acid group
 - Triglyceride
22. Late blowing in cheese can be prevented by the addition of
- Sulphate
 - Nitrate
 - Phosphate
 - Chlorine
23. During the manufacture of cheese, moisture is removed from cheese by cutting the curd, this process of moisture removal is known as
- Cooking
 - Syneresis
 - Agglomeration
 - Texturing
24. The recompression of all vapor in an evaporator occurs through the use of
- TVR
 - MVR
 - High pressure pump
 - Calandria

25. Which of the following is not a component of casein micelles
- $\alpha_1 - \alpha_2 - \beta - \kappa$ - caseins
 - Water
 - Colloidal calcium phosphate
 - Proteose – peptones
26. Camembert cheese is
- Surface mould ripened
 - Bacterial surface ripened
 - Fresh cheese
 - Internal mould ripened
27. During the manufacture of butter, cream is aged for a certain period of time at refrigeration temperatures. The ageing process is required for
- Cooling the cream
 - Development of crystalline structure
 - Coagulation of cream
 - None of the above
28. Which of the following is not an effect of homogenization
- Inactivates enzymes
 - Incorporates fat in protein network
 - Whiter color of milk
 - Improves stability towards partial coalescence
29. Aggregation of casein micelles can be caused by
- Chymosin
 - Acidification
 - Ethanol
 - All of the above

30. Milk manufactured by a mixture of Anhydrous milk fat, skim milk powder and potable water is
- Reconstituted milk
 - Recombined milk
 - Toned milk
 - Homogenized milk

SECTION A: Part II

Part II consists of four (4) questions. All Questions must be answered and each question carries five (5) mark (4 x 5 = 20 marks).

Be as concise and precise as possible

1. There are several dairy farmers groups in existence spread across the country. These groups deal in the collection and marketing of fresh milk or in the production of dairy products.
What steps/measures will you institute to ensure the supply of good quality milk by the farmers to the milk collection centers? Describe at least 3 tests to be carried out in the collection centre to ensure the supply of good quality milk.
2. Define Probiotics and Prebiotics. Give examples of probiotic bacteria currently in use.
3. Define recombined milk and steps involved in its manufacture. Describe factors that influence the dissolving of milk powders.
4. Define agglomeration of milk powder. Draw and explain the various components of a spray dryer.

SECTION B

SECTION B consists of two questions. Choose ONLY ONE question and answer the question of your choice. (50 Marks)

Define pasteurization and homogenization of milk and describe the test used to ensure the success of pasteurization.

Describe various forms of heating systems and describe at least four different types of heat treatment.

What are the components of a HTST pasteurization plant and draw the flow diagram for a HTST pasteurization plant.

Why is homogenized milk more susceptible to rancidity than non homogenized milk?

OR

Describe the basic steps involved in cheese making and draw a process chart for the manufacture of Gouda cheese.

Describe the role of milk constituents such as fats, proteins etc during cheese making.

What type of milk is unsuitable for cheese making?

Provide at least one example of the following:

- Fresh cheese
- Surface mould ripened cheese
- Internal mould ripened cheese
- Internal bacterial ripened with no eyes
- Internal bacterial ripened with eyes
- Pasta filata
- Internal bacterial ripened with high salt

END OF PAPER

GOOD LUCK