**Chattogram Veterinary and Animal Sciences University (CVASU)**
**Department of Food Processing and Engineering**
MS in Food Processing and Engineering Final Examination
January-June Semester, 2023
**Course Title: Advanced Dairy Engineering**
**Course Code: ADE-501**

Full Marks: 40 Time: 2 hours

**Answer any four (4) questions. Figures in the right margin indicate full marks. Split answer is not allowed.**

| | | |
|---|---|---|
| 1 | a. What do you mean by dairy engineering. | 2 |
| | b. Explain the mechanism of milking machine. What are advantages of machine milking in compare to hand milking? | 2+3=5 |
| | c. Describe the basic physical-chemical properties of cows' milk. | 3 |
| 2 | a. Briefly describe the role of bacteria and moulds in dairy processing. | 4 |
| | b. How a food engineer designs a dairy farm premises, milk collection and reception unit and milk chilling system. | 6 |
| 3 | a. Explain the principles with schematic diagram of heat exchangers used in a typical diary industry. | 4 |
| | b. Write down the role of dairy industry evaporation. How you design a process line for a circulation evaporator. | 2+4=6 |
| 4 | a. Explain the principles of centrifugal pumps and positive displacement pumps. | 2×2=4 |
| | b. Shows a typical process flow of pasteurized market milk processing. | 6 |
| 5 | Design any two (2) of the following dairy products plant:<br>a. Yoghurt<br>b. Cheese<br>c. Milk Powder | 5×2=10 |

Chattogram Veterinary and Animal Sciences University
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**Subject Code & Title: NST-501, Novel Separation Techniques**

Total Marks = 40 Time = 2 Hours

(Figures in the right margin indicate full marks. Answer any **Four** questions, the Split answer is not allowed)

1. a) Show in form the stages of the filtration mechanism. Classify filtration according to the retentate and pore size. 4

   b) Explain the principle of following separation techniques: 6
      i) Affinity Chromatography,
      ii) Immuno Chromatography,
      iii) Zeolite Adsorption.

2. a) Differentiate between Physisorption and Chemisorption. Briefly describe the factors influencing adsorption. 6

   b) Define thermal separation. Differentiate the major thermal separation process between- i) Adsorption and absorption, ii) Adsorption and desorption. 4

3. a) Explain in brief the following topics (any two): 5
      i) Properties of supercritical fluid,
      ii) Advantages of vapour permeation process,
      iii) Pervaporation Process.

   b) Enumerate in brief the techniques of zone refining and electrodialysis. 5

4. a) With figure shortly describe the common modules/configurations of the membrane. 5

   b) Discuss the merits and demerits of different membrane reactors. 5

5. a) Give a brief outline of recent advances in separation techniques. 4

   b) Write down the following terms (any three): 6
      i) Cross-flow electro-filtration,
      ii) Operating equation for filtration process,
      iii) Reverse osmosis,
      iv) Ultra filtration.

**Chattogram Veterinary and Animal Sciences University**

MS in Food Processing and Engineering Final Examination

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**Course Title: Advanced Food and Industrial Microbiology**

**Course Code: AFM-501**

Total Marks: 40 Time: 2 hours

**Answer any four (4) questions. Figures in the right margin indicate full marks.**

1. **a.** How are N-nitrosamines formed in fermented meat products other than nitrites/nitrates? **5**

   **b.** Classify sausage. How is nitrosylmyoglobin formed in fermented sausage? **5**

2. **a**. How are *Monascus* pigments produced naturally? Briefly describe the uses of *Monascus* pigments in food industries. **5**

   **b**. What are the meat-inherent mechanisms of zinc protoporphyrin IX (ZnPP) formation? How is bacteria contributed to form ZnPP in fermented meat products? **5**

3. **a.** What is the biosynthesis of lactic acid? Write down the application of lactic acid fermentation in various industries. **5**

   **b.** Enlist different enzymes which are used on carbohydrate compounds and their industrial applications. **5**

4. **a.** Why is biosafety important? How many classes are of biosafety cabinet (BSC)? Mention the salient features of BSC II and BSC III. **5**

   **b.** What is upstream processing and downstream processing? Briefly describe the commercial processes for citric acid production. **5**

5. **Write short note on the followings:** **2.5×4=10**

**i.** Microbial metabolites

**ii.** Baker's yeast

**iii.** Lactic acid purification

**iv.** Beer brewing

**Chattogram Veterinary and Animal Sciences University**

MS in Food Processing and Engineering Final Examination

January-June Semester 2023

**Course Title: Food Irradiation**

**Course Code: FID-501**

Total Marks: 40 Time: 2 hours

**Answer any four (4) questions. Figures in the right margin indicate full marks.**

1. **a.** Why is food irradiated? Why does irradiated food not become radioactive? **5**

   **b.** How does irradiation affect shelf life of foods? How does irradiation destroy bacteria? **5**

2. **a.** Briefly describe the basics of radiation chemistry. **5**

   **b.** What equipment is employed to irradiate food? Briefly describe the grain irradiator with schematic diagram. **5**

3. **a**. Briefly illustrate the scope of irradiation. Write down the effects of irradiation on food components. **5**

   **b**. How biogenic amines are reduced by irradiation process? **5**

4. **a.** What are the basic principles of UV-light technology? Illustrate the mechanisms of UV-light generation. **5**

   **b.** State the basic principle of photochemistry. **5**

5. **Write short note on the followings:** **2.5×4=10**

   i. Role of irradiation in hospital diets

   ii. Irradiation preservation of cereals and legumes

   iii. Regulations of irradiated foods

   iv. Radurization, Radicidation and Radappertization

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**Subject Code & Title: FMD-501, Food Machinery Design**

Total Marks = 40 Time = 2 Hours

(Figures in the right margin indicate full marks. Answer any **Four** questions, the Split answer is not allowed)

1. a) Give a brief outline of the engineering properties of food materials. How does a food engineer implement machinery design for food Industries? 5
   b) Write down the basic requirement and content of vessel design. Explain the main components of a pressure vessel with a schematic diagram. 5

2. a) Mention the different design considerations which are used in the piping system. Completely design a food storage tank. 5
   b) Differentiate between direct contact and indirect contact heat exchanger. Illustrate the design configurations of a Heat exchanger. 5

3. a) Enumerate in brief the types of Evaporators and their design configuration factors. List the factors affecting in size reduction of material. 5
   b) Illustrate in brief the seed processing steps. Show in tabular form the names of different separator equipment used in seed handling operations with their specific property and uses. 5

4. a) Describe the theoretical & Practical design configuration of an ideal dryer. Mention different novel drying methods. 6
   b) Explain the following parts of a machine: 4
   i) Bearing, ii) Shaft, iii) Gear, iv) Chain drive.

5. a) Write down the important consideration of the piping design process. Mention the different types of valves that are generally used in piping systems. 5
   b) Write down the primary factors involved in conveyor equipment selection. How corrosion can be controlled by electropolishing and passivation? 5

**Chattogram Veterinary and Animal Sciences University (CVASU)**
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**Course Title: Food Additives, Contaminants and Toxicology**
**Course Code: FCT-501**

Full Marks: 40 Time: 2 hours

**Answer any four (4) questions. Figures in the right margin indicate full marks. Split answer is not allowed.**

| | | |
|---|---|---|
| 1 | a. What is toxicology? Briefly explain the phases of toxicological effects. | 1+4=5 |
| | b. What do you mean by food allergies and sensitivities? Tabulate the classification scheme for food allergies and sensitivities. | 1+4=5 |
| 2 | a. What are genetically modified (GM) organisms and GM foods? | 2 |
| | b. How is a safety assessment of GM food conducted? | 5 |
| | c. What are the main issues of concern of GM food for human health? | 3 |
| 3 | a. "Paralytic Shellfish Poisoning - Harmful Algal Blooms" Justify the statement. | 3 |
| | b. Describe the animal and human health problems related to food products contaminated with mycotoxins. | 3 |
| | c. Briefly explain the sources and adverse health effects of natural plant toxins in foods. | 4 |
| 4 | a. Write down the definition of food additive by Codex Alimentarius Commission. | 2 |
| | b. List the properties and functionalities of following food additives:<br>i) Anticaking and free flow agents<br>ii) Antioxidants<br>iii) Antibrowning and antimicrobial agents<br>iv) Coloring and curing agents,<br>v) Dough conditioners and strengtheners | 5 |
| | c. Write down the adverse health effects of artificial sweeteners. | 3 |
| 5 | a. Who performs food analysis and why? Briefly explain. | 4 |
| | b. Describe the multiresidue method used for pesticide analysis in fruit and vegetable. | 6 |