

Chittagong Veterinary and Animal Sciences University

Department of Food Processing and Engineering

MS in Food Processing and Engineering

Semester: July-December, 2018

Course Title: **Fermentation and Food Biotechnology**

Course Code: FFB-502

Full Marks: 40 Time: 2 hours

Answer any (5) questions. Figures in the right margin indicate full marks. Split answer is not allowed.

- 1 a. Categorize foods according to modern biotechnology with proper example. What is difference between probiotics, prebiotics, and synbiotics? 2+2=4
b. Briefly explain bioprocessing operations with appropriate schematic diagram. 4
- 2 a. What are genetically modified (GM) organisms and GM foods? Why are GM foods produced? Is the safety of GM foods assessed differently from conventional foods? 1+2+1=4
b. How risk assessment for the GM Foods is performed? What are the main issues of concern for human health? 2.5+1.5=4
- 3 a. What do you mean by PCR? Describe PCR principles, procedure and application in biotechnology. 1+3=4
b. Write down the characteristic features of major classes gene transfer methods. 4
- 4 a. What is the first step of gene expression? What are essential techniques in working with DNA in genetic engineering? 1+3=4
b. What is bioinformatics? Suppose you are assigned to clone an egg lysozyme into E. coli. What basic steps are used to produce a genetically engineered E. coli to produce prokaryotic and eukaryotic enzymes? 1+3=4
- 5 a. What is plant tissue culture? How genetically transformed plants are generated? 1+3=4
b. Which culture technique is most widely used for the generation of virus free plants and why? Explain. 4
- 6 a. Briefly explain production of lactic acid from glucose and its recovery and purification with industrial application. 4
b. Which compound of hops makes bitterness in beer? Outline the brewing process. 1+3=4

Chittagong Veterinary and Animal Sciences University

Department of Food Processing and Engineering

MS in Food Processing and Engineering

Semester: July-December, 2018

Course Title: **Advanced Unit Operations in Process and Food Engineering**

Course Code: AUP-502

Full Marks: 40 Time: 2 hours

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

- 1 a. Differentiate unit process and unit operation. How do you classify various unit operations? 2+3=5
b. What are the various application of unit operation in food processing? Why does the need arise to find various advanced unit operation techniques? 2+3=5
- 2 a. What do you mean by food analysis? Write down the rationale for food analysis. Explain various methods of sampling for food analysis. 1+2+2=5
b. State Fourier's first law? Explain different heating and cooling equipment of foods in food processing plant. 1+4=5
- 3 a. Classify chromatography types. Write down principle and application of High Performance Liquid chromatography (HPLC). 2+3=5
b. Write down principle, instrumentation and application of mass spectrometry (MS). 5
- 4 a. What is meant by steam economy in in evaporation? A stainless-steel pipe (thermal conductivity $17 \text{ W}/[\text{m}^\circ\text{C}]$) is being used to convey heated oil. The inside surface temperature is 130°C . The pipe is 2 cm thick with an inside diameter of 8 cm. The pipe is insulated with 0.04 m thick insulation (thermal conductivity $0.035 \text{ W}/[\text{m}^\circ\text{C}]$). The outer insulation temperature is 25°C . Calculate the temperature of the interface between steel and insulation, assume steady-state conditions. 1+4=5
b. What is thermal death time? Explain general method for thermal process calculation. 1+4=5
- 5 a. Apple juice is being concentrated in a natural-circulation single-effect evaporator. At steady-state conditions, dilute juice is the feed introduced at a rate of 0.67 kg/s. The concentration of the dilute juice is 11% total solids. The juice is concentrated to 75% total solids. The specific heats of dilute apple juice and concentrate are 3.9 and 2.3 kJ/(kg $^\circ\text{C}$), respectively. The steam pressure is measured to be 304.42 kPa. The inlet feed temperature is 43.3°C . The product inside the evaporator boils at 62.2°C . The overall heat-transfer coefficient is assumed to be 943 W/(m 2 $^\circ\text{C}$). Assume negligible boiling-point elevation. Calculate the mass flow rate of concentrated product, steam requirements, steam economy, and the heat-transfer area. 5
b. Write down the concept of equilibrium stage operation. What is the operating line concept in a cascade of ideal stages? Describe briefly a packed tower for gas absorption. 1+2+2=5

Chittagong Veterinary and Animal Sciences University
MS in Food Processing and Engineering Final Examination, 2018
July-December Semester, 2018
Course Title: Novel Food Processing Techniques
Course Code: NFP-502
Full mark: 40, Time: 2 hours

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

1. a. Are the natural food and organic food same? Enumerate in brief the principle of organic farming. Mention the basic steps of organic farm certification. 5
b. List the coating materials which are used in matrix encapsulation. Shortly describe the encapsulation procedure with technological flow sheet. 5
2. a. Define High Pressure Processing and describe the uses of High Pressure Processing to improve food safety and stability. 5
b. Explain with flow chart the principle of Pulse Electric Field processing. Outline the main processing parameter of Pulse Electric Field Processing. 5
3. a. Write down the application of osmotic dehydration. 5
b. Show in tabular form of hybrid drying technologies classification scheme. 5
4. a. Define Osmotic Membrane Distillation (OMD) and Osmotic dehydration. 5
Enumerate in brief the effect of different process parameters on mass transfer during osmotic dehydration.
b. How Radio Frequency Electric Field chamber can be configured for food processing? Show in tabular form the applications of Ultrasound in Food Processing. 5
5. a. Discuss the principle and application of microwave heating for food. Give a brief description on fundamentals of Ohmic Heating. 5
b. Discuss the role of applying novel food processing techniques for preserving nutritive value of food. 5

Chittagong Veterinary and Animal Sciences University
MS in Food Processing and Engineering
July- December Semester 2018 Final Exam
Course Title: **Nutraceuticals and Functional Foods**
Course code: **NFF- 502**

Total Marks: 40

Time: 2 hour

Answer any four (04) questions. Figures in the right margin indicate full marks.

1. a. Define bioactive compounds? Give an overview about the isolation of phytochemicals from plant origin? 07
b. Explain the function of nutraceuticals to prevent cancer? 03
2. a. Categories nutraceuticals? Briefly describe the nutraceuticals as new dietary ingredients? 06
b. Differentiate between: (i) Nutraceuticals vs Functional Foods 04
(ii) Prebiotic vs Probiotic
3. a. Analyze the the mechanism of antioxidant activity of nutraceuticals? 05
b. Assess the role of phytoestrogens and phytosterols? 05
4. a. Explain the effect of pH on food components? 05
b. Appraise the preamble of nitrites as anti-microbial? 05
5. a. Briefly describe about the natural anti-microbial of plant origin? 06
b. Assess the functional and sensory properties of nitrites? 04

Chittagong Veterinary and Animal Sciences University
MS in Food Processing and Engineering
July- December Semester 2018 Final Exam
Course Title: Advanced Technology of Animal products
Course code: ATA- 502

Total Marks: 40

Time: 2 hour

Answer any four (04) questions. Figures in the right margin indicate full marks.

1. a. Define aging? Appraise the steaming process of meat? 04
b. Give an overview about the physical properties of meat? 06
2. a. Appraise the problems associated with chilling of fish by ice? 06
b. Short note: (i) Fish meal 04
(ii) Set style yogurt vs stirred style yogurt
3. a. Define curing? Assess the effect of fish and fishery products during? 05
b. Appraise the fish spoilage mechanisms? 05
4. a. Summarize the external quality evaluation of egg? 05
b. Define homogenization? Assess the role of homogenization in milk processing? 05
5. a. Give an overview about the novel thermal generating procedures of meat? 05
b. Assess Analyze the palatability and eating quality of meat and meat products? 05

Chittagong Veterinary and Animal Sciences University
MS in Food Processing and Engineering Final Examination, 2018
July-December Semester, 2018

Course Title: Risk assessment and International Food Legislations Course

Course Code: RFL-502

Full mark: 40, Time: 2 hours

Answer any four (4) questions. A figure in the right margin indicates full marks.

1. a. Describe the principle method of determination of food quality and main dimensions of quality. Explain the functions and activities of quality control department in relation. 5
- b. Define food inspection and GMP. Give a general outline for sampling methodologies. 5
2. a. Enumerate in brief the sensory characteristics of food. 5
- b. Explain briefly the following terms : i) Microbiological quality classification and 5
ii) Microbiological test.
3. a. What is the Certification process of ISO? Are food adulteration and misbranding of foods same? - Justify your answer. 5
- b. Enumerate the basic quality management principles of ISO 9000 series. 5
4. a. Illustrate the appropriate process of designation of food additives. How food may deem to be misbranded? 5
- b. Illuminate the importance of product information and consumer awareness. Discuss the benefits of halal certification. 5
5. a. Clarify the major aims and objectives of Consumers Association of Bangladesh (CAB).Mention the main function of BSTI. 5
- b. Describe about the Joint FAO/WHO food standards program- Codex Alimentarius. 5