

**Chittagong Veterinary and Animal Sciences University**  
**Department of Applied Chemistry and Chemical Technology**  
**M.S. in Food Chemistry & Quality Assurance (July-December, 2018)**  
**Course Title: Food Quality Control**  
**Course Code: FQC-502**

**Full Marks: 40**

**Time: 02 hours**

[Figures in the right margin indicate full marks. Answer four (4) questions. Split answers are discouraged.]

1. a) Suppose you are a quality control officer of a renowned food industry and recently R&D section of this industry develops a new product. Now, how do you evaluate the quality of this produce? 06
- b) Narrate the activities of National Food safety Laboratory. 04
2. a) Design the basic principle of Atomic Absorption Spectrophotometer (AAS). 05
- b) Discuss different types of atomization techniques in AAS. 05
3. a) Enlist different food preservatives with their mode of actions. 07
- b) Briefly explain the negative effects of food preservatives in human life. 03
4. a) Design the basic principle of chromatographic technique. 05
- b) Explain the applications of GC-MS in food analysis. 05
5. a) Compare between food quality control and quality assurance. 03
- b) Elaborate different approaches towards quality assurance process. 07



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**M.S. in Food Chemistry & Quality Assurance (July-December, 2018)**  
**Course Title: Product Development and Project Management**  
**Course Code: PDPM-502**

**Full Marks: 40**

**Time: 02 hours**

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1. a) Suppose you are a director of Rohingya Refugee Relief Fund (RRLF) project funded by GlobalGiving. Now, how you briefly discuss the principle of project management? 06
- b) What are the principles that you should consider for optimal performance? 04
2. a) Discuss about the stages of product development. 07
- b) Design the drivers of innovative products. 03
3. a) "Market research can be used in all stages of product life cycle"- explain it. 06
- b) Criticize about stage-gate process. 04
4. a) List the roles of a project manager. 03
- b) How do you evaluate a project by SWOT? 07
5. a) Elaborate the basic steps of stakeholder analysis. 05
- b) Design the phases of project management. 05



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**M.S. in Food Chemistry & Quality Assurance (July-December, 2018)**  
**Course Title: Food Quality Assurance**  
**Course Code: FQA-502**

**Full Marks: 40**

**Time: 02 hours**

[Figures in the right margin indicate full marks. Answer four (4) questions. Split answers are discouraged.]

1. a) What is Quality Assurance? Discuss its importance. 01+04=05  
b) How do you establish Quality Assurance Program? 05
  
2. a) Elaborately discuss the working principle of HPLC. 05  
b) Mention applications and advantages of using Gas Chromatography. 05
  
3. a) Define GMP. Discuss about its principle and importance. 01+03+02=06  
b) What do you mean by the term HACCP? Write down the principles of HACCP. 01+03=04
  
4. a) Briefly discuss about the Quality Assurance system in food industries of Bangladesh. 05  
b) What is R&D? Discuss about the barriers and facilities associated with it in food sector. 05
  
5. a) Write a short note on the following: 3.5+3.5+3=10
  - i) Viscosity and Consistency
  - ii) Defects
  - iii) TQM



**Chittagong Veterinary and Animal Sciences University**  
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**M.S. in Food Chemistry & Quality Assurance (July-December, 2018)**  
**Course Title: Research Methodology and Case Studies**  
**Course Code: RMCS-502**

**Full Marks: 40**

**Time: 02 hours**

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1. a) Define and classify research. Illustrate the characteristics of research. 02+03=05  
b) Enlist the main objectives of research and explain them in detail. 05
  
2. a) Describe the steps of research. Enumerate the objectives of action research. 02+03=05  
b) What do you understand by research proposal? Give the structure of research proposal. State the criteria for evaluating the research proposal. 01+02+02=05
  
3. a) Explain the meaning and significance of a research design. 05  
b) Define sample design. How can you develop a sample design for a research project? 02+03=05
  
4. a) Differentiate between SRS and CRS with clear example. 05  
b) Why probability sampling is preferred than other?-Explain. 05
  
5. a) Under what circumstances stratified random sampling design is considered appropriate? How would you select such sample? 03+02=05  
b) Under what circumstances would you recommend: 1.25×4=05
  - i. A probability sample.
  - ii. A non-probability sample.
  - iii. A stratified sample.
  - iv. A cluster sample.



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**M.S. in Food Chemistry & Quality Assurance (July-December, 2018)**  
**Course Title: Applied Engineering Chemistry**  
**Course Code: AEC-502**

**Full Marks: 40**

**Time: 02 hours**

[Figures in the right margin indicate full marks. Answer four (4) questions. Split answers are discouraged.]

1. a) Discuss in detail about construction, suitability, pitfalls and advantages of plate type heat exchangers used in food industries. 07
- b) Enlist the types of heat exchangers. Draw a schematic of 2, 2-Shell and Tube type heat exchanger. 03
2. In a sugar plant 1000 tons of cane is crushed daily. The bagasse is 30% on the basis of cane. The clear juice which is 90% on the basis of cane is heated from 15.5°C to 71.1°C before clarification utilizing steam at 100°C. Calculate the quantity of water that should be evaporated in the evaporator if its concentration is raised from 15°Bx to 65°Bx in a triple effect evaporator. Juice entered the evaporator at 85°C and leaves at 101.7°C under a pressure of 0.689 bar. What percentage of energy liberated by the burning of bagasse is utilized at the evaporator if the calorific value of bagasse is 6300 KJ/kg (assuming 50% excess air is used in combustion). Calculate the heating surface required in a triple effect evaporator if the average evaporation rate is 40kg/m<sup>2</sup>/hr. 10
3. a) Why material and energy balance are important in industrial operations? 04
- b) Write the procedure used in material balance calculations. 03
- c) Discuss the terms recycle and by-pass used in operations. 03
4. a) Write the working principle of centrifugal pumps. What are the advantages of it? 06
- b) Draw and discuss the pump characteristic curve with indicating efficiency, head and power. 04
5. a) What do you mean by pump priming operation and also indicate why is it necessary? 04
- b) Cavitation seems to be an important factor in corrosion. Discuss with your opinion: How this type of corrosion can prevented and maintained for effective production system. 06



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**M.S. in Food Chemistry & Quality Assurance (July-December, 2018)**  
**Course Title: Food Safety and Risk Analysis**  
**Course Code: FSRA-502**

**Full Marks: 40**

**Time: 02 hours**

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1. a) What do you mean by ISO-22000 and ISO-22000:2005? 02  
b) What are the requirements and benefits of ISO-22000? 04  
c) Describe two principles of food safety management system. 04
2. a) What are the components of risk analysis? 03  
b) Evaluate the relation between risk analysis and modern food safety system. 03  
c) Write down the conditions necessary for risk analysis. 04
3. a) Define risk management. 02  
b) Draw a model for risk management. 03  
c) Write down the characteristics of a good risk assessment. 05
4. a) What is HACCP? Draw a logic sequence for the application of HACCP. 04  
b) Briefly describe about "Food safety in Bangladesh and its current challenges". 06
5. a) Define risk communication. 02  
b) What are the goals of risk communication? 03  
c) Write down the elements of an effective risk communication. 05