HMM 3417 FOOD AND WATER MICROBIOLOGY SUPPLEMENTARY EXAM

INSTRUCTIONS: ANSWER ALL QUESTIONS IN SECTION **A** AND **B** AND ANY OTHER TWO IN SECTION **C**

SECTION A: MULTIPLE CHOICE QUESTIONS 20MKS

1. Which of the following food preservation methods involves removing water from the food product to prevent microbial growth?

   a) Freezing

   b) Canning

   c) Drying

   d) Irradiation

2. Which of the following viral pathogens is responsible for causing the most cases of foodborne illness in the developed world?

   a) Norovirus

   b) Rotavirus

   c) Hepatitis A

   d) Adenovirus

3. Which of the following bacterial species can cause a serious form of food poisoning known as hemolytic uremic syndrome (HUS)?

   a) Salmonella enterica

   b) Listeria monocytogenes

   c) Campylobacter jejuni

   d) Escherichia coli O157:H7

4. Which of the following bacterial toxins can cause paralysis and respiratory failure?

   a) Botulinum toxin

   b) Shiga toxin

   c) Cholera toxin

   d) Heat-labile toxin

5. Which of the following bacterial species can cause a serious form of food poisoning known as paralytic shellfish poisoning?

a) Vibrio cholerae

b) Clostridium perfringens

c) Escherichia coli O157:H7

d) Alexandrium tamarense

6. Which of the following viral pathogens is responsible for causing acute liver disease and can be transmitted through contaminated food or water?

   a) Norovirus

   b) Rotavirus

   c) Hepatitis A

   d) Adenovirus

7. Which of the following bacterial species can cause urinary tract infections, particularly in women?

   a) Escherichia coli

   b) Salmonella enterica

   c) Listeria monocytogenes

   d) Vibrio cholerae

8. Which of the following bacterial species is responsible for causing typhoid fever?

   a) Salmonella enterica

   b) Escherichia coli O157:H7

   c) Clostridium perfringens

   d) Listeria monocytogenes

9. Which of the following food preservation methods involves removing water from the food product to prevent microbial growth?

   a) Freezing

   b) Canning

   c) Drying

   d) Irradiation

10. Which of the following fungal genera is responsible for producing aflatoxins, a group of carcinogenic compounds that can contaminate food products such as peanuts, corn, and tree nuts?

    a) Aspergillus

b) Penicillium

c) Fusarium

d) Rhizopus

11. Which of the following fungal genera is responsible for producing citric acid, a common food additive used as a flavoring and preservative agent?

    a) Aspergillus

    b) Penicillium

    c) Fusarium

    d) Rhizopus

12. Which of the following fungal genera is responsible for producing roquefortine, a mycotoxin that can contaminate food products such as blue cheese?

    a) Aspergillus

    b) Penicillium

    c) Fusarium

    d) Rhizopus

13. Which of the following fungal genera is responsible for producing patulin, a mycotoxin that can contaminate apple products such as juice and cider?

    a) Aspergillus

    b) Penicillium

    c) Fusarium

    d) Rhizopus

14. Which of the following fungal genera is responsible for causing a type of food spoilage known as "black mold" or "black rot" in fruits and vegetables?

    a) Aspergillus

    b) Penicillium

    c) Fusarium

    d) Alternaria

15. Which of the following bacteria is commonly used in the production of yogurt?

    a) Escherichia coli

    b) Streptococcus thermophilus

    c) Salmonella enterica

d) Listeria monocytogenes

16. Which of the following bacteria is responsible for causing spoilage in milk, leading to a sour taste and unpleasant odor?

a) Lactobacillus acidophilus

b) Streptococcus thermophilus

c) Lactococcus lactis

d) Pseudomonas fluorescens

17. Which of the following seafood is most commonly associated with ciguatera poisoning?
a. Salmon
b. Oysters
c. Tuna
d. Shrimp

18. What is the main cause of scombroid poisoning?
a. Bacterial contamination

b. Viral contamination

c. Parasitic contamination

d. Histamine production

19. Which of the following is a common symptom of paralytic shellfish poisoning?
a. Nausea

b. Diarrhea

c. Tingling or numbness

d. Abdominal pain

20. Which of the following toxins is commonly found in shellfish that have been exposed to red tide?
a. Ciguatoxin

b. Saxitoxin

c. Histamine

d. Tetrodotoxin

SECTION B: SHORT ANSWER QUESTIONS 40MKS

1. Describe Indicator organisms and coliform group of bacteria (6mks)
2. Describe the characteristics of a good food safety indicator (6 Marks)
3. Describe Common starter cultures in fermented daily products (6mks)
4. Describe Germ Theory of Disease (Mid-1800s) (6mks)
5. Describe steps of starch conversion in food microbiology (6mks)
6. Describe Bacteriological examination of milk and dairy products (5mks)
7. Outline methods of mycotoxins detection in the laboratory (5mks)

SECTION C: LONG ANSWER QUESTIONS 40MKS

A. Discuss the laboratory methods for water analysis 15mks
    I. Outline types of coliforms in water samples (5mks)
B. Discuss biochemical changes of milk products (10mks)
    I. Discuss foodborne pathogens that cause food spoilage (10mks)
C. Discuss types of chromatographic and immunoassay methods in detection of aflatoxin (10mks)
    I. Discuss common Sources of Microorganisms in Food (10mks)

COURSE OUT LINE HMM 3417 FOOD AND WATER MICROBIOLOGY (75 Hours)

WEEK	TOPICS	SUBTOPICS
WEEK ONE	Introduction to Food microbiology	• What is food microbiology • Terminology in food microbiology • Microorganisms and their importance in food microbiology • Molds, yeast, bacteria. general features and classification
WEEK TWO	History and Development of Food Microbiology	• Food microbiology - its origins and scope • Historical Developments in Food Microbiology
WEEK THREE	Principles of food microbiology	• Principles of food preservation • Control of micro organism Anaerobic condition, high temperature, low temperature, drying, Fermentation.
WEEK FOUR	Classification of various groups of microorganism associated with dairy industry	• Acetic acid bacteria • lactic acid bacteria • Propionic Acid Bacteria
WEEK FIVE	Factors influencing microbial growth in food	• Extrinsic and intrinsic factors • Chemical preservation and additives • Canning process
WEEK SIX	Application of microbial enzyme s in food industry	• Significance of enzyme in food industries • Enzyme uses in food indusry
WEEK SEVEN	Common sources of microorganism in food	• Common sources of poisoning • Bacteriologic examination of meats and meat products • Cereals.sugarproducts,vegitables,fruits • Meat and meat products • Fish and sea foods
WEEK EIGHT	Microbiological quality standards of food	• Quality assurance • Government regulatory practice and policies

WEEK NINE	Food contamination and spoilage	• Food poisoning • Food born infections • Bacterial toxin and • Mycotoxin in food
WEEK TEN	Microbiology of raw and pasteurized milk	• Biochemical change in fermented milk • Acid fermented milk, yoghurt, cultured butter milk, probiotics • Starter cultures for fermented dairy products
WEEK ELEVEN	Bacteriological examination of milk and dairy products	• Study on spoilage organism in dairy industry
WEEK TWELVE	Water microbiology	• Introduction and importance of bacteria considered as indication of faecal condamination • Examination of water • Collection and transportation of water
WEEK THERTEEN	Bacteriological examination of water	• Presumptive coliform count • Eijikman test • Membrane filtration test • Interpretation of result
WEEK FOURTEEN	REVISION	
WEEK FIFTEEN	FINAL EXAMINATION	

. Core Reading Materials

1. Dongyou Liu(2021). Molecular Food Microbiology, 1st ed. ISBN 9780815359500. CRC Press.
2. Dongyou Liu (2017). Laboratory Models for Foodborne Infections, 1st ed. CRC Press.
3. R. Russell M. Paterson and Nelson Lima (2016). Molecular Biology of Food and Water Borne Mycotoxigenic and Mycotic Fungi, 1st ed. CRC Press. ISBN 9781466559868.
4. Peter A. White, Natalie E. Netzler and Grant S. Hansman (2017). Foodborne Viral Pathogens, 1st ed. CRC Press. ISBN 9781466579507.