

## SECOND MIDTERM EXAMINATION

(60 total points)

1. Name the food **vehicle** frequently associated with *B. cereus* vomiting type of food poisoning. (2 pts)  
**cooked rice**
2. Circle **one answer per question** below: (2 pts)
  - (a) *B. cereus* foodborne poisoning is an **infection** or **intoxication**
  - (b) The symptoms of the vomiting type of *B. cereus* poisoning are **more** or **less** severe than the diarrheal type.
3. How is **foodborne botulism** different from **infant botulism**? (4 pts)
  - (a) **Foodborne botulism: the neurotoxin is formed in the food during growth of the organism.**
  - (b) **Infant botulism: *C. botulinum* spores are ingested. Spores colonize the intestinal tracts of infants, germinate, multiply, and produce neurotoxin that travels through the bloodstream to the central nervous system and causes flaccid paralysis.**
4. *C. botulinum* produces what type of a toxin? (Hint: target area and stability) (1pt)  
**Neurotoxin that is heat-labile**
5. True or False (4 pts):  
  **T**   Enterotoxin A (SEA) is the one most frequently associated with gastroenteritis caused by *S. aureus*.  
  **F**   *S. aureus* produces a neurotoxin that is heat stable  
  **T**   *S. aureus* can tolerate a high concentration of NaCl; 10–20%.  
  **F**   Proper personal hygiene is not important in controlling *S. aureus*.
6. Name the principal toxin involved in **scombroid fish poisoning**. (2 pts)  
**histamine**
7. Which fish are the source of **tetrodotoxin**? (2 pts)  
**pufferfish**
8. What is the **significance** of each of the following in the names of aflatoxins? (1 pt each)  
**B fluoresce blue on chromatograms**  
**G fluoresce green on chromatograms**

M shed in milk

9. Why did **alimentary toxic aleukia** occur in the Orenberg District of the USSR during World War II? (3 pts)  
**People were obliged to eat grain that had molded while it spent the winter under snow.**
10. Which mushroom is the most important source of **amatoxins**? (3 pts)  
***Amanita phalloides* (Death Cap)**
11. What illness is associated with **chronic consumption** of *cassava*? (2 pts)  
**goiter, goiter-cretinism**
12. Name a federal agency that is responsible for enforcing **tolerance limits** for drugs in food. (2 pts)  
**FDA, USDA**
13. What **property** of ultraviolet light limits its applications in food processing? (2 pts)  
**lack of penetrating ability**
14. At a given pH, why are organic acids usually more effective than mineral acids as **preservatives**? (3 pts)  
**Organic acids are likely not to be ionized, so they penetrate bacterial membranes better; also, it takes a much higher molarity of an organic acid than of mineral acid to reduce pH to a given level.**
15. What is the difference between **qualitative** and **quantitative** microbiological detection methods? (2pts)
  - (a) **Qualitative: Determine the possible presence of certain microorganisms (mostly bacteria) or foodborne pathogens in the food.**
  - (b) **Quantitative: Enumerate or estimate directly or indirectly the microbial load in the product.**
16. What method must be used to **detect viruses** (e.g., noroviruses) in food extracts? (2 pts)  
**reverse transcription-polymerase chain reaction (RT-PCR)**
17. Define **HACCP**. (2pts)  
**HACCP is a preventive system to food contamination. It is a systematic approach for assuring production and processing of safe foods.**
18. Two part question:  
What do the following acronyms stand for: (1.5pts)  
GMPs: **Good manufacturing practices**  
SOPs: **Standard operating procedures**

**SSOPs: Sanitation standard operating procedures**

The following programs fall under the jurisdiction of what **agencies**? (1.5pts)

GMPs: **Food and Drug Administration (FDA)**

SOPs: **Food and Drug Administration (FDA)**

SSOPs: **United States Department of Agriculture (USDA)**

19. What are antimicrobial treatments? (2pts)  
**Means or interventions used to minimize, reduce, or eliminate microbial contamination on foods.**
20. Give an example of one **chemical** and one **thermal** antimicrobial intervention. (2pts)
  - (a) **Chemical: Chlorination, organic acids, cetylpyridinium chloride (CPC), acidified sodium chlorite (ASC), ozone, salts (e.g., NaCl)**
  - (b) **Thermal: Hot water, steam**
21. What is **predictive microbiology**. (2pts)  
**A description of the microbial response to a particular environmental condition. It is performed using models as a basis on which predictions are made.**
22. Why is **predictive microbiology** important to the field of food safety? (2 pts)  
**Can provide objective means for evaluating the effect food processing operations on microbial growth.**
23. How does one define the **stationary phase** of a microbial growth curve? (2 pts)  
**Rates of multiplication and death are equal, so total numbers do not change.**
24. In physical processing of food, what is the significance of **z value**? (2 pts)  
**Predicts the change in temperature that will cause a 10-fold change in the *D* value.**
25. What major classification of microorganisms is based on their response to  $E_h$ ? (2 pts)  
**aerobic-anaerobic**
26. What is the significance of **nitrite** in food preservation? (2 pts)  
**Nitrite is the basis of curing, which helps prevent botulism.**