



**UNIVERSITY OF SWAZILAND**  
**Faculty of Health Sciences**

**DIPLOMA IN ENVIRONMENTAL HEALTH**  
**FINAL EXAMINATION PAPER 2009**

**TITLE OF PAPER** : **FOOD SAFETY & PRESERVATION**

**COURSE CODE** : **EHS 313**

**DURATION** : **2 HOURS**

**MARKS** : **100**

**INSTRUCTIONS** :

- ANSWER ONLY FOUR QUESTIONS**
- QUESTION ONE IS COMPULSORY**
- EACH QUESTION CARRIES 25 MARKS.**
- READ THE QUESTIONS & INSTRUCTIONS CAREFULLY**
- BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.**

**DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.**

## Question 1

### Multiple Choice Questions

(Choose the Best Answer)

1. In meat stored in cold temperature, which group of spoilage organisms is susceptible to injury at temperatures below 3.3deg C?
  - A. gram positive cocci
  - B. gram negative rods
  - C. gram positive rods
  - D. bacterial spores
  - E. psychrophiles
  
2. The effect of freezing bacteria is;
  - A. to inactivate some; whereas others are sensitive to freezing, frozen storage, and thawing; others resist freezing but are susceptible to frozen storage; others are unharmed
  - B. to injure vegetative bacteria which can recover later
  - C. to kill vegetative cells but not spores
  - D. to stop their growth, but not to kill them
  - E. to delay the multiplication of microorganisms
  
3. All but which of these factors affect preservation of dried fruits?
  - A. Water activity
  - B. Heat process
  - C. pH
  - D. Preservatives
  - E. Storage temperature
  
4. In jam preservation, which factor (s) is or are important:
  - A. Water activity
  - B. pH
  - C. heat processing
  - D. A and B
  - E. A and C
  
5. An intrinsic factor or a combination of intrinsic factors that adversely affects survival of gram negative bacteria on citrus fruits is?
  - A. Aw.
  - B. Anaerobic conditions
  - C. pH
  - D. All of the above
  - E. Both A and C

6. Avidin and lysozyme are intrinsic antimicrobial substances that are found in:
- A. eggs
  - B. garlic
  - C. meat
  - D. milk
  - E. yogurt
7. Factors that cause inhibition and death of microorganisms in the carbonated beverages are;
- A. carbon dioxide and low pressure
  - B. carbon dioxide and pH
  - C. pH and water activity
  - D. reduced oxidation-reduction potential and water activity
  - E. water activity and sugar content
8. Sulfur dioxide is added to foods for all but which one of these reasons?
- A. to control microorganisms
  - B. as an antioxidant
  - C. to reduce enzymatic browning
  - D. to prevent the loss of thiamine
  - E. to reduce non-enzymatic browning
9. Which form of sulfur dioxide is more active against microorganisms?
- A. bisulfate ions
  - B. sulfite ions
  - C. undissociated sulfur dioxide
  - D. any undissociated form
  - E. all forms are equally effective
10. The slope of the thermal death time curve is referred to as the:
- A. H value
  - B. D value
  - C. F value
  - D. L value
  - E. Z value
11. Which type of microorganism is most resistant to UV irradiation?
- A. bacterial spores
  - B. gram-positive cocci in chains
  - C. gram-positive cocci in clusters
  - D. gram-negative non-sporing rods
  - E. mold spores

12. Which of the following group of microorganisms is more sensitive to ionization?
- A. bacterial spores
  - B. gram-positive cocci
  - C. gram-positive rods
  - D. gram-negative bacteria
  - E. yeasts
13. Treatments such as drying or freezing affect bacteria in foods in which of these ways?
- A. kill all of them
  - B. have no effect on their viability
  - C. kill and injure some of them
  - D. resuscitate them
  - E. make them more resistant to chemicals
14. Egg white spoilage would most likely have been caused by which of these classes of microorganisms?
- A. gram-positive cocci
  - B. gram-positive rods
  - C. gram-negative rods
  - D. molds
  - E. yeasts
15. Why benzoic acid can not be relied on to preserve foods capable of supporting bacterial growth because?
- A. It can inhibit most yeast and molds
  - B. It is an antimycotic agent
  - C. Many spoilage bacteria are much more resistant to it
  - D. Food poisoning and spore-forming bacteria are generally inhibited by 0.01-0.02 % undissociated acid
  - E. Both A and B
16. UV light can damage certain foods, but it does not;
- A. cause butter to become rancid
  - B. cause oxidation of lipid in pork
  - C. cause oxidation of milk and the development of off flavors
  - D. cause sugar to become lumpy
  - E. produce discoloration spots on leaves of green vegetables
17. Which part of a microbial cell is the most susceptible to decomposition by UV irradiation?
- A. amino acids
  - B. lipids
  - C. nucleic acids
  - D. the cell wall
  - E. water molecules

18. UV irradiation is most useful for killing microbes;
- A. in aerosols
  - B. in air or surfaces
  - C. in milk
  - D. in untreated water
  - E. on surfaces of wet or greasy foods
19. A major disadvantage of ionizing irradiation of foods is that;
- A. foods cannot be irradiated in frozen state
  - B. considerable heat is produced
  - C. enzymes in foods are not inactivated
  - D. residues of non food material are produced
  - E. mutagenic, teratogenic, carcinogenic, and toxic factors are induced in foods
20. Bakeries have found UV helpful in controlling microorganisms;
- A. in interiors of cream-filled pies
  - B. in flour that is stained by rodent urine
  - C. in air to prevent spread of viable microorganisms to surface of bread
  - D. in jam and jelly fillings
  - E. in dough to accelerate fermentation
21. Which of these microbes is the most resistant to UV irradiation?
- A. *Aspergillus flavus*
  - B. *Bacillus subtilis*
  - C. *Escherichia coli*
  - D. *Saccharomyces cerevisiae*
  - E. *Staphylococcus aureus*
22. Curing salts are;
- A. ascorbic acid and nitrous oxide
  - B. sodium or calcium chloride and potassium permanganate
  - C. sodium chloride and sodium or potassium nitrite or nitrate
  - D. sodium and potassium nitrite or nitrate
  - E. sodium or potassium chloride and sodium nitrite
23. In dry sausages ( $A_w$  0.93 – 0.85) spoilage would likely be caused by;
- A. micrococci
  - B. yeasts
  - C. coliforms
  - D. *Staphylococcus aureus*
  - E. Molds

24. Which of the following foods would be more suspect as the vehicle for botulism?
- Mutton meat
  - Pork meat
  - Home canned beef
  - Home canned tomatoes
  - Industry canned green peas
25. Assume you prepared several batches of the same type of the salad under the same conditions, except that you added varying amounts of vinegar. In the salads with high vinegar content, you would expect;
- a higher pH and a lower bacteria count
  - a lower pH and a lower bacteria count
  - a higher pH and a higher bacteria count
  - a lower pH and a higher bacteria count
  - a neutral pH and no change in bacteria count

[25 Marks]

### Question 2

- What is "Maillard reaction" and how can you control it? [5]
- Why fruits and vegetables are likely to be spoiled by molds and yeast but less likely by bacteria? [5]
- You open a canned solid packed cured meat product and you find that the surface of the meat has yellow or brown discoloration. What would have caused that? [4]
- When you open a canned food product, you observe that there is a metallic taint on the surface of the food? Explain the cause. [6]
- What is thermophilic food spoilage in canned foods? [5]

[25 Marks]

### Question 3

- Demonstrate an understanding of the interrelationships between organic acids and pH and between temperature and water activity in food preservation [10]
- In a mixed microflora in food, you add acidity, what will be the effects? [5]
- What chemical food preservation would you prefer for bread and baked goods and why? [4]
- Using appropriate examples explain why antioxidants are added in foods. [3]
- How does the egg albumen protect shelled eggs against spoilage? [3]

[25 Marks]

**Question 4**

Choose any five (5) measures that are necessary to ensure milk safety and explain how these factors contribute in making sure that the milk we consume will not cause food borne illness?

**[25 Marks]**

**Question 5**

Eggs are highly nutritious food; it contains most of the essential food ingredients and nutrients required by the human body. It is also a perfect food article for the growth and multiplication of microorganisms, because of its good quality in microbial growth, and therefore it tends to spoil easily. Explain the measures that are necessary to ensure that this food article is kept safe for human consumption.

**[25 Marks]**