



UNIVERSITY OF SWAZILAND
Faculty of Health Sciences

DIPLOMA IN ENVIRONMENTAL HEALTH
FINAL EXAMINATION PAPER 2008

TITLE OF PAPER : INTRODUCTION TO FOOD MICROBIOLOGY
COURSE CODE : EHS 312
DURATION : 2 HOURS
MARKS : 100

INSTRUCTIONS : ANSWER ONLY FOUR QUESTIONS
: QUESTION ONE IS COMPULSORY
: EACH QUESTION CARRIES 25 MARKS.
: WRITE NEATLY
: 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 most appropriate answer)

1. Assume that a culture of pathogenic bacteria was in a favorable food medium. Assume further that the food medium was ingested. Foodborne disease would be less likely if the culture were in the;
 - A. logarithmic phase
 - B. accelerated death phase
 - C. lag phase
 - D. stationary phase
 - E. all of the above

2. Which of the following preservatives or procedures would be most concerned with the principle of osmotic pressure?
 - A. drying
 - B. refrigeration
 - C. acids
 - D. smoking
 - E. salts and sugars

3. Which statement is true in relation to aspergillus spp. mold
 - A. all species are Xerophilic and thermophilic
 - B. produce high amount of amylase and proteolytic enzymes
 - C. contribute in rancid flavors in dairy produce
 - D. grow on refrigerated and chilled meat exhibiting grayish brown growths
 - E. Both A and B

4. Which statement is true in relation to Penicillium spp. mold
 - A. will cause white patches in refrigerated and chilled meat
 - B. will show greenish patches on frozen and chilled meat
 - C. will cause grayish brown growths on refrigerated and frozen meat
 - D. grow and build up on equipment, therefore known as "machinery mold"
 - E. Both A and D

5. Refrigerated and chilled meat will develop----- moldy growth when spoiled by Sporotrichum mold species;
 - A. white patches in refrigerated and chilled meat
 - B. greenish patches on frozen and chilled meat
 - C. grayish brown growths on refrigerated and frozen meat
 - D. black patches on frozen and chilled meat
 - E. None of the above

6. Jam spoilage is most likely to have been caused by;
 - A. *Aspergillus repens*
 - B. *Thamnidium elegans*
 - C. *Geotrichum candidum*
 - D. *Sporotrichum carnis*
 - E. *Alternaria brassicae*

7. Two persons developed a food borne illness after the consumption of a biltong (salted dried meat), which among the microbes below would you suspect to have caused the sickness?
 - A. *Clostridium perfringens*
 - B. *Vibrio parahaemolyticus*
 - C. *Staphylococcus aureus*
 - D. *Bacillus cereus*
 - E. *Listeria monocytogenes*

8. Foods containing food borne disease bacteria are;
 - A. not necessarily decomposed in appearance
 - B. detectable by smell
 - C. detectable by taste
 - D. detectable by smell, taste and appearance
 - E. detectable by slight color change

9. The most effective measure which a food service manager can apply in the control of bacterial multiplication in the storage, preparation and service of food is;
 - A. time- temperature control
 - B. pH control
 - C. inventory control
 - D. dishwashing control
 - E. moisture control

10. Assume you prepared several batches of the same type salad under the same conditions, except that you added varying amounts of mayonnaise. In salads with high mayonnaise content, you would expect;
 - A. a higher pH and a lower bacteria count
 - B. a lower pH and a lower bacteria count
 - C. a higher pH and a higher bacteria count
 - D. a lower pH and a higher bacteria count
 - E. a neutral pH and a lower bacteria count

11. Under normal, comparable circumstances, which of the following would be expected to have the highest bacterial counts per gram?
 - A. Hamburger (grounded meat)
 - B. Round steak
 - C. Sirloin steak
 - D. T-bone steak
 - E. All of the above

12. Which of the following symptoms is not generally included in those of chemical food poisoning?
 - A. nausea
 - B. fever
 - C. abdominal pain
 - D. vomiting
 - E. the body is weak

13. The symptoms of *Clostridium perfringens* are largely;
 - A. nausea and vomiting
 - B. abdominal pains and diarrhea
 - C. chills and fever
 - D. fever and headache
 - E. vomiting and diarrhea

14. Bacteria are not likely to grow and multiply in Coca Cola soft drinks because of:
 - A. the low temperature during storage
 - B. the high concentration of sugar
 - C. the high concentration of caffeine
 - D. the low pH
 - E. the high pH

15. *Clostridium perfringens* food borne illness is transported by which of the following vehicles?
 - A. potato salad
 - B. meats served several hours or a day or so after cooking
 - C. raw vegetables
 - D. cooked vegetables
 - E. all of the above

16. Source(s) of *Yersinia enterocolitica* include:
 - A. pigs
 - B. cattle
 - C. rabbits
 - D. rodents
 - E. All of the above

17. Which of the following statement is not correct in reference to *Yersinia enterocolitica*?
- A. ferment sugars to produce acid but no gas
 - B. produce greater amount of toxin at low temperatures
 - C. produce illness that resembles that of *Escherichia coli*
 - D. temperature for growth ranges from -2 to 45 deg C , but optimum at 22-29 deg C
 - E. it has been isolated with high frequency in poultry
18. Which of the statement is not correct in reference to *Campylobacter jejuni*?
- A. temperature for growth ranges from 25 -45 deg C but optimum at 42-43 deg C
 - B. it is sensitive to freezing temperatures
 - C. it is catalase and oxidase positive but can not ferment carbohydrates
 - D. it has a special property, only motile below 30 deg C but non motile at 37 deg C
 - E. its diarrheal symptoms show watery stools that are foul smelling, fresh blood and mucus may be seen.
19. Which of the statement is correct in reference to *Clostridium perfringens*?
- A. produce toxins in the stomach and intestines of victims during Sporulation
 - B. produce toxins in the food during growth
 - C. it is aero tolerant, does not require stringent anaerobic condition for growth
 - D. it strictly anaerobic and will not grow in the presence of oxygen
 - E. Both A and C
20. You have found that your salad dressing is spoiled, yet the pH of storage was below 1.2, which among the yeast species below would you suspect to have caused the spoilage?
- A. *Zygosaccharomyces bailii*
 - B. *Saccharomyces cerevisiae*
 - C. *Zygosaccharomyces rouxii*
 - D. *Brettanomyces intermedius*
 - E. Both A and D
21. A rancid flavor in dairy products may be associated with one of the following mold species;
- A. *Geotrichum candidum*
 - B. *Cladosporium herbarum*
 - C. *Alternaria citri*
 - D. *Botrytis cinerea*
 - E. None of the above

22. Which of the following foods would be more suspect as the vehicle for botulism?
- A. Rare beef
 - B. Rare pork
 - C. Chocolate éclairs
 - D. Home canned grapefruits
 - E. Home canned green beans
23. An outbreak characterized by nausea, vomiting and diarrhea which appears two to six hours after ingestion of potato salad would lead you to suspect;
- A. Staphylococcal intoxication
 - B. Botulism
 - C. Shigellosis
 - D. Salmonellosis
 - E. None of the above
24. Staphylococcal intoxication is caused by;
- A. ingestion of spoiled food
 - B. ingestion of preformed toxins
 - C. toxins formed after ingestion
 - D. ingestion of staphylococcal microbes
 - E. All of the above
25. Concerning salmonella, all of the following are true except that;
- A. it may produce serious systemic diseases in human
 - B. a carrier state exists in some who recover
 - C. food animals do not serve as reservoirs
 - D. animal feed is often contaminated, as cross contamination occurs
 - E. none of the above

[25 Marks]

Question 2

- a. What is botulinum cook? [3]
- b. Which type of food is to be given a botulinum cook and why? [4]
- c. What type of food is likely to be spoiled by Clostridium botulinum and why?[4]
- d. How would you control botulism in food? [5]
- e. Explain the differences in bacterial toxins and mycotoxins? [5]
- d. You are not likely to find bacteria and molds growing or spoiling the same type of food; why is that so? [4]

[25 Marks]

Question 3

- a) Environmental factors such as moisture and temperature will influence the population of microorganisms on food. Using appropriate examples explain this statement. [15]
 - b) The Mbabane hospital out-patient department record book is showing a high number of staphylococcal infections. As an Environmental Health Officer (EHO) based in Mbabane, you are to find a solution on this problem? [10]
- [25Marks]**

Question 4

- a) Food borne illnesses outbreaks associated with excreta borne infections are a major concern in most third world countries. Why is that so? Good examples will enhance your answer. [15]
- b) Why is it important to perform routine food premises inspection by Environmental Health Officers (EHOs) in Swaziland? [10]

[25 Marks]

Question 5

Discuss food spoilage showing all the causes that are likely to result in food being rejected as unfit for human consumption. Your answer should show appropriate examples.

[25 Marks]