



UNIVERSITY OF SWAZILAND
Faculty of Health Sciences

DIPLOMA IN ENVIRONMENTAL HEALTH
FINAL EXAMINATION PAPER 2012

- 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. Reduction of water content in liquid foods without conversion to a dry state is known as:
 - A. concentration
 - B. condensation
 - C. evaporation
 - D. extraction
 - E. sublimation

2. The temperature range considered safe for holding highly perishable foods is;
 - A. below 5 deg C or above 55 deg C
 - B. below 8 deg C or above 60 deg C
 - C. below 10 deg C or above 55 deg C
 - D. below 5 deg C or above 60 deg C
 - E. below 0 deg C or above 100 deg C

3. If beef is prepared from the semi tropics climate (warm), and another beef from cooler climate areas are stored in a chiller? Which beef would store longer in the chiller before spoilage?
 - A. Beef from semi tropics
 - B. Beef from cooler climate
 - C. Equal storage duration
 - D. Will depend on the number of microbes
 - E. All of the above

4. Reports of foodborne disease indicate that the implicated food was usually;
 - A. a canned food
 - B. a food held for long periods at room temperatures.
 - C. an improperly cooked food
 - D. a food stored too long in the refrigerator
 - E. a food that has been handled by a sick food handler

5. Which of the following is not consistent with present knowledge of bacterial survival in frozen food?
 - A. it possible for food poisoning to occur from ingestion of a frozen product containing Staphylococcal toxins
 - B. pathogenic bacteria may survive freezing, but freezing destroys their ability to multiply
 - C. survival is affected by the speed and temperature of freezing
 - D. some multiplication of bacteria may occur in bulky batches during the freezing process.
 - E. in minced beef, salmonellae survived the freezing storage

6. Alternate partial thawing and freezing of foods under 5 deg C., results in a marked loss of quality. Which of the following statements is inconsistent with current knowledge about defrosting?
- A. defrost of any degree adversely affects the quality of frozen foods.
 - B. observed loss in quality due to defrost is operative even when the numbers of microorganisms are low
 - C. chemical and physical changes due to defrost take place which cannot be reversed
 - D. refreezing will stop quality deterioration.
 - E. the conditions during thawing and the time/temperature of holding after thawing are most important
7. Rapid heat transfer in cooking, cooling and thawing is important because a food should not remain in the danger zone too long. Which of the following would be most dangerous in the thawing out of frozen turkey?
- A. thawing at room temperature
 - B. thawing under running water at 13.5 deg C
 - C. thawing in a pan of water at room temperature
 - D. thawing under refrigeration
 - E. thawing under microwave oven
8. Which of the following has the longest recommended storage time at refrigeration (-1 to 2.5 deg C) temperatures
- A. beef
 - B. pork
 - C. chicken
 - D. fish
 - E. equal storage time
9. Some countries consistently report more foodborne outbreaks and more cases than others. The most likely explanation for this observation is that:
- A. The countries reporting high numbers of outbreaks have notoriously poor health departments
 - B. The environmental health officers "health inspectors" in these high reporting countries are lazy, inefficient, and poorly trained
 - C. These countries have higher rates because they encourage reporting and investigation of foodborne diseases.
 - D. The countries with higher rates have inferior sanitation practices in their food establishments.
 - E. These countries reporting higher rates are likely to be third world countries.

10. Which one of the following attributes of growth of microorganisms is not affected by temperature?
- A. duration of the lag phase
 - B. enzymatic and chemical composition of the cells
 - C. initial cell numbers
 - D. nutritional requirements
 - E. metabolic pathways and end products
11. Ultra violet (UV) irradiation is most useful for killing microbes:
- A. in aerosols
 - B. in air or on surfaces
 - C. in milk
 - D. in untreated water
 - E. on surfaces of wet or greasy foods
12. Enzymatic browning in bruised fruits and vegetables is caused by;
- A. Peroxidase
 - B. Pectolytic
 - C. Brown mold
 - D. Phenolase
 - E. Anthracnose
13. The primary cause of lethality in microorganisms exposed to ionizing irradiation is:
- A. change in proteins
 - B. damage to membranes
 - C. damage to microbial DNA
 - D. enzymes inactivation
 - E. change in proteins and enzymes inactivation
- 14 Bacterial soft rot in fruits and vegetables is likely to be caused by;
- A. *Erwinia carotova*
 - B. *Pseudomonas marginalis*
 - C. *Xanthomonas compestris*
 - D. A and B
 - E. A, B and C
15. Which one of these statements is **not correct**?
- A. Sorbic acid has a selective antimicrobial activity
 - B. Sorbic acid is ineffective against catalase negative bacteria, molds and yeast
 - C. Chemical preservatives retard or prevent growth of undesirable microorganisms in unheated food products
 - D. Curing salts will alter the color, flavor, texture and number of microbes
 - E. Salt when used as food preservative, dehydrate the cytoplasm (plasmolysis) of microbial cell causing unfavourable osmotic gradient

16. Which one of the statement is **not correct**?
- A. Too low temperature in storage of fruits and vegetables interferes with enzymatic system, allowing toxic substance build up resulting in pitting
 - B. Excess carbon dioxide during the storage fruits and vegetables result in chemical damage leading to brown heart in apples and pears.
 - C. Too low temperature may result in chilling injury in fruits and vegetables which may lead to woolen factor in peaches and khaki or brown color in bananas.
 - D. Proteins accounts for about 1% of a vegetable's composition, but can be as high as 4% in corn and 8% in legumes
 - E. Guavas have less vitamin C than citrus fruits
17. Which one of the statements is **not correct** about caffeine?
- A. It is an alkaloid which stimulates the cortex of the brain
 - B. Small doses improves attention, concentration and coordination
 - C. It also acts on the kidney to increase water elimination
 - D. Fruit juices from citrus fruits have less caffeine than coffee and tea
 - E. Caffeine makes muscle to be less susceptible to fatigue.
18. 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
19. 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. 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 no change in bacteria count
20. 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

21. 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
22. Custards and cream filled pastries are especially adapted to foodborne disease transmission. Which of the following is consistent with proper handling of these products?
- A. they should be cooled to 5 deg C, within one hour after preparation
 - B. they may be displayed unrefrigerated for periods up to 4 hours
 - C. if stored at 5 deg C, they may be held indefinitely
 - D. all should be discarded after 6 hours regardless of how they are handled.
 - E. None of the above is correct
23. If beef prepared from the semi tropics climate, another beef from cooler climate areas are stored in a chiller? Which beef would store longer in the chiller before spoilage?
- A. Beef from semi tropics
 - B. Beef from cooler climate
 - C. Equal storage duration
 - D. Will depend on the number of microbes
 - E. all of the above
24. The menace of contaminated oysters is increasing in USA, because of;
- A. increased use of boats with on board toilets
 - B. decrease in salinity of sea water
 - C. increase in poisonous plankton
 - D. increases pollution of coastal waters
 - E. A and C is correct
25. Which of the following are most susceptible to injury at temperatures below 10 deg C?
- A. bacterial spores
 - B. gram-positive cocci
 - C. gram-positive rods
 - D. gram –negative rods
 - E. psychrotrophs

[25 Marks]

Question 2

Select any five organic acids of your choice and then discuss each one under the following topics.

- antimicrobial activity
- microorganisms affected
- the types of food preserved

[25 marks]

Question 3

There are two ways in which canned or bottled foodstuffs may be spoiled; it is either microbiologically or chemically. Explain how these two types of food spoilage affect canned food stuffs.

- a. microbial spoilage (use at least two examples) [10]
b. chemically spoilage (use at least three examples) [15]

[25 Marks]

Question 4

- a. Demonstrate your understanding of the interrelationships of water activity and temperature in ensuring long shelf life of food. [10]
b. In the canning process of beef, explain the risk factors that are likely to result in foodborne illness. [15]

[25 marks]

Question 5

- a. Giving good examples, show how intrinsic factors are important in the preservation of foods. [5]
b. Show the relationship between time and temperature as related to the survival and growth of bacteria in foods. [6]
c. Besides being used to control microbial growth, what other function does SO_2 have in food? [3]
d. What is the effect of adding calcium sorbate salt to a mixed population of microorganism? [5]
e. Briefly explain the difference in pasteurized and Ultra Heat Treated (UHT) milk.? [6]

[25 marks]