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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2012/2013**

COURSE NAME : FOOD MICROBIOLOGY
COURSE CODE : BWD 10503
PROGRAMME : 1 BWD
EXAMINATION DATE : JUNE 2013
DURATION : 3 HOURS
INSTRUCTION : 1. ANSWER **ALL** QUESTIONS
2. WRITE ALL YOUR
ANSWERS IN THE ANSWER
BOOK

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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- Q1** (a) Choose the correct answer. Write **TRUE** or **FALSE**.
- (i) Eating and drinking are allowed inside a laboratory.
 - (ii) Wearing lab coat is not compulsory inside a laboratory.
 - (iii) When a chemical spills in a laboratory, students can immediately clean the spilled chemicals.
 - (iv) Students must seek permission first prior to beginning any work in the laboratory.
 - (v) It is not important to wear hand gloves when handling chemicals in the laboratory.
- (5 marks)
- (b) There are several aseptic techniques applied in the isolation and inoculation of microbes. Explain the procedure involved in inoculating a nutrient agar slant from agar plate using aseptic technique.
- (5 marks)
- (c) Yeasts and molds are widespread and very common food contaminants. Some yeasts and molds are not easily destroyed during food processing and cooking. Demonstrate a laboratory method that can be best applied to determine the presence of yeasts and molds in food? In your answer, list down the materials as well as explain some considerations that are needed in conducting such method.
- (10 marks)
- Q2** (a) Food is described as an ecosystem and is comprised of intrinsic and extrinsic factors. Outline these intrinsic and extrinsic factors and explain their effect on the growth of microbes in food.
- (10 marks)
- (b) Elimination of pathogenic microbes in the food is one of the greatest challenges in the food industry. Having said that, food microbiologist should be well-aware of the characteristics of these pathogenic microbes in order to contain them. Analyze the characteristic of each microbe and the diseases or illnesses they can cause when ingested by humans.
- (i) *Campylobacter jejuni*
 - (ii) *Clostridium perfringens*
 - (iii) *Yersinia enterocolitica*
 - (iv) Enterohemorrhagic *E. coli*
- (10 marks)

- Q3** (a) Microbes are all over the environment. What are the common sources or reservoir for microbes and explain how do they get into the kitchen and eventually contaminate the food?
(5 marks)
- (b) There are two modes of transmission of food pathogens to humans: intoxication and infection. Explain the differences between these two and give examples for each.
(5 marks)
- (c) Forty eight (48) children from School X were brought to the clinic due to diarrhea, vomiting and stomach cramps. All these are clear symptoms of food poisoning. Upon interviewing the patients, all children have eaten the same thing, beef burger sandwich bought from the school canteen. Being a food microbiologist, you are tasked to investigate the incident. Design a method on how you will find out the type of microorganism that contaminated the food and the source of food contamination, which eventually caused intoxication of the school children.
(10 marks)
- Q4** (a) Fermentation is one of the most important practices in food microbiology. Outline **FIVE (5)** uses of fermentation in the food industry.
(5 marks)
- (b) Analyze the process of fermentation in dairy industry. Use illustration or diagram to support your analysis.
(10 marks)
- (c) Fermentation involves a biochemical pathway by which bacteria are able to make energy from carbohydrates in the absence of oxygen. Assess the mechanism on how a glucose converted to pyruvic acid in Embden-Meyerhof-Parnas (EMP) pathway is different from that of Entner-Doudoroff pathway.
(5 marks)
- Q5** (a) Toxins produced by bacteria can cause foodborne illnesses or diseases to humans. Outline the toxin produced by the following bacteria and explain the disease(s) they caused as well as the symptoms of such disease(s).
- (i) *Clostridium perfringens*
 - (ii) *Psuedomonas aeriginosa*
 - (iii) *Bacillus anthracis*
 - (iv) *Cornyebacterium diphtheria*
- (10 marks)

- (b) The concept of selective media is simple. Some ingredients of the medium favor the growth of the targeted bacteria while at the same time adding particular ingredients that will inhibit the growth of competing bacteria. Name the selective media used to culture the following bacteria and demonstrate the effect of the main properties of such media to the growth and survival of undesired microorganisms.

- (i) *Staphylococcus aureus*
- (ii) *Listeria* species
- (iii) *Lactic acid* bacteria
- (iv) *Campylobacter* species

10 marks

- **END OF QUESTION** -