Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2015/2016

COURSE NAME	:	FOOD SAFETY AND TOXICOLOGY
COURSE CODE	:	BWD 21103
PROGRAMME	:	BWD
EXAMINATION DATE	:	JUNE 2016 / JULY 2016
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

Q1 Based on the LD_{50} for caffeine which is 200 mg/kg (using the mouse as an experimental animal) how many cups of caffeine would it take to kill an average human of your size (assuming that humans respond the same way as the mouse)?

(a) i. Calculate the average lethal dose for human size (yourself as the sample)

(2 marks)

ii. If each cup of coffee contains 90 mg caffeine, calculate how many cups is required to kill a person who is about your size

(3 marks)

(b) Based on the result in (a) ii, how many days is required to consume more than the recommended LD_{50} if you were to drink one cup of coffee per day?

(3 marks)

(c) Explain the possible outcome if you could drink exactly the number of cups of coffee as calculated in (b) all in one sitting, and discuss the most important assumption when using LD_{50} to estimate lethal dose for a human.

(12 marks)

Q2 On July 21, chicken fried rice prepared at a local restaurant was catered on to 82 children aged less than or equal to 6 years of age and nine staff of a day care center. Within the next two to four hours after lunch, 48 children aged between 2-5 years old and two of the staff started vomiting. Amongst the 50 individuals, 71% showed symptoms of nausea, 36% of abdominal cramps and 14% of diarrhea. Amongst the 82 children, 67 ate the catered lunch. The findings revealed that the rice had been cooked the night of July 20 and cooled at room temperature before refrigeration. On the morning before lunch, the rice was pan-fried in oil with pieces of cooked chicken, delivered to the day care centers at approximately 10:30 a.m., held without refrigeration and served at noon without reheating. Furthermore, laboratory analysis confirmed the presence of *Bacillus cereus* from leftover chicken fried rice at the concentration equal to 10^6 organisms per gram and a concentration of more than 10^5 organisms per gram from vomitus of infected children.

(a) Read the case carefully and identify **FIVE (5)** relevant facts on what happened in the day care center on that day.

(5 marks)

(b) Explain the problems on how this type of incidents could occur and suggest measures on how this occurrence may be prevented.

(15 marks)

Q3 Exposure to dioxins in the food supply originates largely from natural and man-made environmental sources. Dioxin breaks down very slowly in the environment and can be deposited on plants and taken up by animals. Since, dioxin may be concentrated in the food chain, livestock, fish and shellfish can have higher concentrations than plants, water, soil or sediments around them. The highest concentration of dioxin in livestock, fish and shellfish are typically found in fat and the liver. The presence of dioxin has been detected in foods since the early 1970's, and their monitoring has been increasingly critical since the late 1990's, as technology to measure this group of compounds at very low levels has improved significantly. However, the contribution of dioxin to dietary exposure and the possible introduction via the use of particular feed components has been identified and established only in the mid-2003. Efforts to reduce dioxin levels in the environment, as well as identifying production practices that can reduce dioxin levels in food and feed is a continuing process.

(a) List **FIVE (5)** methods to reduce dioxin contamination in food.

(5 marks)

(b) Many recent studies have shown the presence of dioxin in breast milk. Discuss whether to discourage or still encourage nursing of infants to prevent children from further exposure to dioxin.

(5 marks)

(c) Discuss **FOUR (4)** differences between the dioxin levels found in foods nowadays from that of the incidents of dioxin contamination encountered and reported in past years?

(10 marks)

(d) Based on the given study, discuss the different pathways by which dioxins enter the food chain.

(10 marks)

Q4 More than 4000 additives are added to the processed foods we eat each day. A normal human diet comprised mostly of processed food and each of us could easily be consuming more than 100 different additives every day.

(a) Give **THREE (3)** types of food additives and **ONE (1)** example of each type.

(6 marks)

(b) Explain the advantage and disadvantage of each type of additives given in (a).

(6 marks)

(c) Propose **THREE (3)** alternatives to avoid or reduce the use of each type of additives given in (a).

(18 marks)

- END OF QUESTION -