
UNIVERSITI SAINS MALAYSIA

First Semester Examination
Academic Session 2009/2010

November 2009

IMK 308 – Food Preservation Principles
[Prinsip Pengawetan Makanan]

Duration: 3 hours
[Masa: 3 jam]

Please check that this examination paper consists of SEVEN pages of printed material before you begin the examination.

[Sila pastikan bahawa kertas peperiksaan ini mengandungi TUJUH muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]

Instructions: Answer (**FIVE**) out of seven questions. You may answer the question either in Bahasa Malaysia or in English.

*[**Arahan:** Jawab (**LIMA**) daripada tujuh soalan. Anda dibenarkan menjawab soalan sama ada [untuk KBI] dalam Bahasa Malaysia atau Bahasa Inggeris.]*

In the event of any discrepancies, the English version shall be used.

[Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi Bahasa Inggeris hendaklah diguna pakai].

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1. Answer all parts of the following.
 - (a) Define water activity. (2 marks)
 - (b) Briefly describe the effect of solutes on water activity of a food. (8 marks)
 - (c) Water activity relates to safety of foods. Discuss. (10 marks)

2. Briefly describe the principles, advantages and disadvantages of the following drying methods.
 - (a) Freeze drying. (10 marks)
 - (b) Spray drying. (10 marks)

3. Answer all parts of the following.
 - (a) Define F_0 (2 marks)
 - (b) Describe briefly the methods and purposes of performing heat penetration test on a canned food product. (8 marks)
 - (c) Describe briefly the use of aseptic processing for canned food products. (10 marks)

4. Briefly answer the following.
- (a) How is partial vacuum created in the headspace of a canned food products?
(4 marks)
 - (b) Differentiate between coefficient of performance (COP) and ton refrigeration (TR).
(6 marks)
 - (c) Draw a flowchart for the production of canned pineapple cubes in syrup.
(4 marks)
 - (d) Why is quick freezing important in food industry?
(6 marks)
5. Write short notes on the following.
- (a) Vacuum hydrocoolers.
(5 marks)
 - (b) The 12 D concept.
(5 marks)
 - (c) 'Benzoic acid is more effective as a preservative in acidic food'.
(5 marks)
 - (d) Toxicological consequences on the presence and reactivity of sulphur dioxide in food.
(5 marks)
6. Answer all parts of the following.
- (a) Briefly discuss the important characteristics of microorganism useful in food fermentation and pickling.
(5 marks)
 - (b) Differentiate between total fermentation and partial fermentation of sugar.
(3 marks)
 - (c) Discuss the effects of fermentation on the color, flavour and nutritional value of a fermented product.
(12 marks)

7. Answer all parts of this question.

(a) What are the potential problems associated with microbial destruction related to irradiation?

(4 marks)

(b) Discuss five (5) main advantages of irradiation process.

(12 marks)

(c) Briefly discuss the differences between gamma rays and x-rays.

(4 marks)

1. *Jawab semua bahagian soalan ini.*

(a) *Takrifkan aktiviti air.* (2 markah)

(b) *Huraikan secara ringkas kesan zat terlarut terhadap aktiviti air makanan.* (8 markah)

(c) *Aktiviti air berhubungkait dengan keselamatan makanan. Bincangkan.* (10 markah)

2. *Huraikan prinsip, kelebihan dan kekurangan kaedah pengeringan yang berikut.*

(a) *Pengeringan sejukbeku.* (10 markah)

(b) *Pengeringan sembur.* (10 markah)

3. *Jawab semua bahagian soalan ini.*

(a) *Takrifkan F_0* (2 markah)

(b) *Huraikan secara ringkas kaedah dan tujuan melakukan ujian penembusan haba bagi suatu produk makanan terkaleng.* (8 markah)

(c) *Huraikan secara ringkas kegunaan pemprosesan aseptik pada produk makanan terkaleng.* (10 markah)

4. *Secara ringkas, jawab semua soalan berikut.*
- (a) *Bagaimanakah separa vakum terjana dalam ruang kepala produk makanan terkaleng?*
(4 markah)
 - (b) *Bezakan antara pekali prestasi (COP) dan tan refrigerasi (TR).*
(6 markah)
 - (c) *Lukis suatu carta-alir penghasilan kiub nenas terkaleng dalam sirap.*
(4 markah)
 - (d) *Kenapakah penyejukbekuan kadar cepat penting dalam industri makanan?*
(6 markah)
5. *Tulis nota ringkas bagi perkara berikut.*
- (a) *Alat pendingin-hidro vakum.*
(5 markah)
 - (b) *Konsep 12 D.*
(5 markah)
 - (c) *'Asid benzoic lebih berkesan sebagai pengawet dalam makanan berasid'.*
(5 markah)
 - (d) *Kesan toksikologi terhadap kehadiran dan reaktiviti sulfur dioksid dalam makanan.*
(5 markah)
6. *Jawab semua bahagian soalan ini.*
- (a) *Secara ringkas , bincangkan kriteria yang penting bagi mikroorganisma yang berguna dalam fermentasi dan penjerukan makanan.*
(5 markah)
 - (b) *Bezakan antara fermentasi penuh dan fermentasi separa.*
(3 markah)
 - (c) *Bincangkan kesan fermentasi terhadap warna, perisa dan nilai nutrisi satu produk terfermen.*
(12 markah)

7. *Jawab semua bahagian soalan ini.*

(a) *Apakah potensi masalah mengenai pemusnahan mikrobial berkaitan dengan iradiasi?*

(4 markah)

(b) *Bincangkan lima (5) kebaikan utama proses iradiasi.*

(12 markah)

(c) *Bincangkan secara ringkas perbezaan antara sinaran gamma dan sinaran X.*

(4 markah)

