
UNIVERSITI SAINS MALAYSIA

Supplementary Semester Examination
Academic Session 2010/2011

June 2011

IMK 308 – FOOD PRESERVATION PRINCIPLES
[PRINSIP PENGAWETAN MAKANAN]

Duration: 3 hours
Masa: [3 jam]

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

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

Instructions: Answer FIVE questions. You may answer the questions either in Bahasa Malaysia or in English.

Arahan: *Jawab LIMA soalan. Anda dibenarkan menjawab soalan sama ada 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.]

Answer any FIVE out of seven questions below.

1. Briefly explain how foods can be preserved by lowering its water activity.
(20 marks)

2. Answer all parts of this question:
 - (a) List five reasons for drying food products
(3 marks)

 - (b) Sketch and describe briefly a typical drying curve of a food product.
(7 marks)

 - (c) Explain why case hardening can happen and how would you reduce its occurrence during drying.
(10 marks)

3. Answer all parts of this question:
 - (a) Explain briefly the principle of freeze drying with the aid of a water phase diagram.
(4 marks)

 - (b) Briefly describe the two drying stages involved in freeze drying.
(8 marks)

 - (c) What are the advantages and disadvantages of freeze drying?
(8 marks)

4. Explain the preservation principles of the following products;
 - (a) UHT milk
(10 marks)

 - (b) Canned fruit cocktails
(10 marks)

5. Answer all parts of this question:
- (a) Draw a flowchart for the production of hard ice cream (10 marks)
 - (b) Explain the effects of freezing rate on the final quality of frozen food products (10 marks)
6. Write short notes on the followings;
- (a) F_0 (5 marks)
 - (b) Vapor compression cycle (7 marks)
 - (c) Explain the term “freeze-concentration” (8 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 four (4) main advantages of irradiation process (10 marks)
 - (c) Briefly discuss the differences between gamma rays and x-rays? (6 marks)

Jawab mana-mana LIMA soalan daripada tujuh soalan berikut.

1. *Jelaskan secara ringkas bagaimana makanan dapat diawet dengan menurunkan aktiviti airnya.*
(20 markah)

2. *Jawab semua bahagian soalan ini:*
 - (a) *Senaraikan lima sebab untuk pengeringan makanan.*
(3 markah)

 - (b) *Lakarkan dan huraikan secara ringkas kurva pengeringan tipikal untuk sesuatu produk makanan.*
(7 markah)

 - (c) *Jelaskan mengapa “case hardening” boleh berlaku dan bagaimana anda boleh mengurangkannya daripada berlaku semasa pengeringan.*
(10 markah)

3. *Jawab semua bahagian soalan ini:*
 - (a) *Jelaskan secara ringkas prinsip pengeringan sejukbeku dengan bantuan gambarajah fasa air.*
(4 markah)

 - (b) *Huraikan secara ringkas kedua-dua peringkat pengeringan yang berlaku semasa pengeringan sejukbeku.*
(8 markah)

 - (c) *Apakah kelebihan dan kelemahan pengeringan sejukbeku?*
(8 markah)

4. *Jelaskan prinsip pengawetan bagi produk berikut;*
 - (a) *Susu UHT*
(10 markah)

 - (b) *Koktel buah-buahan terkaleng*
(10 markah)

5. *Jawab semua soalan berikut*
- (a) *Lukis suatu carta alir bagi penghasilan ais krim keras*
(10 markah)
- (b) *Jelaskan kesan kadar penyejukan ke atas kualiti akhir produk tersejuk beku*
(10 markah)
6. *Tulis nota ringkas bagi yang berikut;*
- (a) F_o
(5 markah)
- (b) *Kitaran pemampatan wap*
(7 markah)
- (c) *Jelaskan terminologi “pemekatan-tersejukbeku”*
(8 markah)
7. *Jawab semua bahagian soalan ini:*
- (a) *Apakah potensi masalah mengenai pemusnahan mikrobial berkaitan dengan iradiasi*
(4 markah)
- (b) *Bincangkan empat (4) kebaikan utama proses irradiasi*
(10 markah)
- (c) *Bincangkan secara ringkas perbezaan antara sinaran gamma dan sinaran X*
(6 markah)