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UNIVERSITI SAINS MALAYSIA

First Semester Examination  
2010/2011 Academic Session

November 2010

**IMK 309 – FOOD PROCESSING TECHNOLOGY**  
**[TEKNOLOGI PEMROSESAN MAKANAN]**

Duration: 3 hours  
*Masa: [3 jam]*

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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.]*

1. Answer all parts of this question:

(a) Animal protein consists of three types of protein. State all the protein and explain their characteristics

(5 marks)

(b) For better textural preferences and products stability during frozen storage, some ingredients are added to surimi-based product. Explain common protein-based ingredients used including their types, forms, functions and the level of addition. Discuss the problems associated with their addition

(10 marks)

(c) Explain how the size of grinder plate orifice influence the texture of burger

(5 marks)

2. Answer all parts of this question:

(a) Dark-flesh fish shows different characteristics compared to white-flesh fish. Explain the differences between dark-flesh fish and white-flesh fish. Briefly describe modified method employed to produce surimi from dark-flesh fish

(10 marks)

(b) With the aid of a diagram, detail the steps in the processing of sausage

(10 marks)

3. Answer all parts of this question:

(a) Explain the purpose of refining process in surimi processing and describe how it is performed

(5 marks)

(b) Give five examples of white-flesh fish species that are suitable as raw material for surimi processing and reason why those species suitable as raw material

(5 marks)

(c) What are the roles of sugar, acid and pectin in a jam?

(10 marks)

4. Answer all parts of the following in relation to orange juice processing:
- (a) With the aid of a flow chart, sketch the production steps involved in orange juice processing. (5 marks)
  - (b) Explain why a well-functioning fruit sizer is essential to producing juice of high quality. (3 marks)
  - (c) Briefly describe the production of 'Not-From-Concentrate' (NFC) orange juice. (12 marks)
5. Discuss the major steps involved in a sugar refining operation. (20 marks)
6. Answer all parts of this question:
- (a) Briefly explain the reactions which occur during the mixing stage in breadmaking process (4 marks)
  - (b) Discuss the main changes in the dough during baking. (16 marks)
7. Answer all parts of this question:
- (a) With the aid of flow charts, describe briefly the processing of
    - (i) Cheddar cheese (6 marks)
    - (ii) Butter (6 marks)
  - (b) Explain briefly
    - (i) The operation of spray drying of milk (4 marks)
    - (ii) The importance of homogenization on milk quality (4 marks)

1. *Jawab semua soalan bahagian ini*

(a) *Protein haiwan terdiri daripada tiga jenis. Tuliskan semua protein terlibat dan terangkan ciri-cirinya*

*(5 markah)*

(b) *Untuk mendapatkan tekstur yang lebih diterima dan lebih stabil semasa penyimpanan sejukbeku, sejumlah ingredient ditambahkan dalam penghasilan produk berasaskan surimi. Jelaskan ingredient berasaskan protein yang biasanya digunakan meliputi jenis, bentuk, fungsi dan jumlah penambahan. Bincangkan masalah yang boleh berlaku berkaitan penambahannya*

*(10 markah)*

(c) *Jelaskan kenapa ukuran lubang alat pengisar boleh mempengaruhi tekstur burger*

*(5 markah)*

2. *Jawab semua soalan bahagian ini*

(a) *Ikan berdaging gelap mempunyai ciri-ciri yang berbeza berbanding ikan berdaging putih. Jelaskan perbezaan diantara ikan berdaging gelap dengan ikan berdaging putih. Huraikan secara ringkas kaedah modifikasi yang digunakan untuk pemprosesan surimi dari ikan berdaging gelap.*

*(10 markah)*

(b) *Dengan bantuan suatu gambarajah, rincikan tahapan pemprosesan sosej*

*(10 markah)*

3. *Jawab semua soalan bahagian ini*

(a) *Jelaskan tujuan dari proses refining dalam pemprosesan surimi dan huraikan bagaimana proses tersebut dilakukan*

*(5 markah)*

(b) *Berikan lima contoh jenis ikan berdaging putih yang sesuai untuk dijadikan bahan mentah pemprosesan surimi dan alasan kenapa jenis ikan tersebut sesuai untuk pemprosesan surimi*

*(5 markah)*

(c) *Apakah peranan utama gula, asid dan pektin di dalam jem?*

*(10 markah)*

4. *Jawab semua bahagian berikut berkenaan dengan pemprosesan jus oren:*
- (a) *Dengan bantuan carta alir, lakarkan langkah-langkah penghasilan yang terlibat dalam pemprosesan jus oren.*  
(5 markah)
  - (b) *Jelaskan mengapa satu pembahagi-size buah yang berfungsi baik adalah penting bagi menghasilkan jus yang berkualiti tinggi?*  
(3 markah)
  - (c) *Huraikan secara ringkas penghasilan jus oren jenis Not-From-Concentrate (NFC).*  
(12 markah)
5. *Bincangkan langkah-langkah utama yang terlibat dalam operasi pencerian gula.*  
(20 markah)
6. *Jawab semua bahagian soalan:*
- (a) *Jelaskan dengan ringkas tindakbalas yang berlaku semasa peringkat pencampuran dalam pemprosesan roti.*  
(4 markah)
  - (b) *Bincangkan semua perubahan utama dalam doh semasa pembekuan.*  
(16 markah)
7. *Jawab semua bahagian soalan ini.*
- (a) *Dengan bantuan carta alir huraikan dengan ringkas pemprosesan*
    - (i) *Keju Cheddar*  
(6 markah)
    - (ii) *Mentega*  
(6 markah)
  - (b) *Jelaskan secara ringkas*
    - (i) *Operasi pengeringan sembur susu*  
(4 markah)
    - (ii) *Kepentingan penghomogenan ke atas kualiti susu*  
(4 markah)