

---

UNIVERSITI SAINS MALAYSIA

First Semester Examination  
2009/2010 Academic Session

November 2009

**IMG 211 – Food Microbiology I**  
**[Mikrobiologi Makanan I]**

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** (5) questions. Answer **Four** (4) questions in **Section A** and **one** (1) question in **Section B**. You may answer the questions either in Bahasa Malaysia or in English.

**[Arahan:** Jawab **LIMA** (5) soalan. Jawab **Empat** (4) soalan dalam **Bahagian A** dan **satu** (1) soalan dalam **Bahagian B**. 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.]*

**SECTION A : Answer only Four (4) questions in a separate answer book**

1. List the major nutritional types of microorganisms. Identify their carbon source, energy source and electron source. (Give an example for each nutritional type of microorganism).  
(20 marks)
2. Define microbial growth. Describe the four phases of the growth curve in a system and discuss the causes of each.  
(20 marks)
3. Define the following terms : sterilization, sterilant, disinfection, disinfectant, sanitization, antiseptic, antisepsis, chemotherapy, germicide, bactericide and bacteriostatic.  
(20 marks)
4. Briefly describe the structure of the electron transport chain and its role in ATP formation. How do mitochondrial and bacterial chains differ?  
(20 marks)
5. Answer both parts of this question
  - (a) Describe the general relationship between DNA, RNA and proteins.  
(10 marks)
  - (b) What are the products of replication, transcription and translation?  
(10 marks)
6. Briefly describe the uptake (transport) of glucose and iron in facultative anaerobes.  
(20 marks)

**SECTION B: Answer one (1) question only**

7. Answer both parts of this question

(a) Explain various sterilization techniques employed in a microbiology laboratory.

(10 marks)

(b) Briefly describe the examination of viable microbial cells under a light microscope and the characteristics of bacteria, yeast and fungal cultures.

(10 marks)

8. Answer both parts of this question

(a) Explain the preparation of culture media and the techniques involved.

(10 marks)

(b) Describe briefly various staining techniques involved in identification of bacteria.

(10 marks)

**BAHAGIAN A: Jawab hanya Empat (4) soalan didalam buku jawapan yang berasingan**

1. *Senaraikan jenis-jenis mikroorganisma mengikut nutrisi utama. Kenalpasti sumber karbon, sumber tenaga dan sumber elektron. (Berikan satu contoh untuk setiap jenis mikroorganisma).*  
(20 markah)
2. *Takrifkan pertumbuhan mikrob. Huraikan empat fasa lengkok pertumbuhan didalam sistem dan bincangkan penyebab setiapnya.*  
(20 markah)
3. *Takrifkan istilah-istilah berikut: pensterilan, sterilan, pembasmian kuman, pembasmi kuman, pensanitasian, antiseptik, antiseptik, kimoterapi, germisid, bakterisid dan bakteriostatik.*  
(20 markah)
4. *Huraikan secara ringkas struktur rantai pengangkutan elektron dan peranannya dalam pembentukan ATP. Bagaimanakah rantai mitokondria berbeza daripada rantai bakteria?*  
(20 markah)
5. *Jawab kedua-dua bahagian soalan ini*
  - (a) *Huraikan hubungan umum antara DNA, RNA dan protein.*  
(10 markah)
  - (b) *Apakah produk-produk replikasi, transkripsi dan translasi?*  
(10 markah)
6. *Huraikan secara ringkas pengambilan (pengangkutan) glukosa dan ferum dalam anaerob fakultatif.*  
(20 markah)

**BAHAGIAN B: Jawab satu (1) soalan sahaja**

7. *Jawab kedua-dua bahagian soalan ini*
- (a) *Terangkan pelbagai teknik pensterilan yang digunakan dalam suatu makmal mikrobiologi.*  
(10 markah)
  - (b) *Huraikan secara ringkas pemeriksaan sel mikrob hidup dibawah mikroskop cahaya dan ciri-ciri kultur bacteria, yis dan kulapuk.*  
(10 markah)
8. *Jawab kedua-dua bahagian soalan ini*
- (a) *Terangkan berkenaan penyediaan medium kultur dan teknik-teknik yang terlibat.*  
(10 markah)
  - (b) *Huraikan secara ringkas pelbagai teknik pewarnaan yang terlibat dalam pengenalpastian bakteria.*  
(10 markah)