SULIT

POLITEKNIK MALAYSIA

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENGAJIAN TINGGI

JABATAN TEKNOLOGI KIMIA DAN MAKANAN

PEPERIKSAAN AKHIR

SESI I : 2022/2023

DMT30093: FOOD QUALITY ASSURANCE

TARIKH : 15 DISEMBER 2022
MASA : 11.15 PAGI – 1.15 PETANG (2 JAM)

Kertas ini mengandungi **SEMBILAN (9)** halaman bercetak.

Struktur (5 soalan)

Dokumen sokongan yang disertakan : Formula, Kertas Graf

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

INSTRUCTION:
This section consists of **FIVE (5)** structured questions. Answer **ALL** questions.

ARAHAN:
*Bahagian ini mengandungi **LIMA (5)** soalan berstruktur. Jawab **SEMUA** soalan.*

QUESTION 1
SOALAN 1

CLO1 C1

a) List **FOUR (4)** elements of Total Quality Management.
*Senaraikan **EMPAT (4)** elemen Pengurusan Kualiti Menyeluruh*

[4 marks]
[*4 markah*]

CLO1 C2

b) Explain **THREE (3)** importances of food quality control in a food industry.
*Jelaskan **TIGA (3)** kepentingan kawalan kualiti makanan dalam industri makanan.*

[6 marks]
[*6 markah*]

CLO1 C3

c) Your company is planning to produce chili sauce. Your team is required to come up with suitable product specifications. Using the Ishikawa Diagram:
Syarikat anda merancang untuk menghasilkan sos cili. Pasukan anda diperlukan untuk tampil dengan spesifikasi produk yang sesuai. Menggunakan Rajah Ishikawa:

i. Determine the appropriate properties for the sauce
Tentukan sifat yang sesuai untuk sos

[4 marks]
[*4 markah*]

ii. Explain the procedure for every sketch made
Terangkan prosedur bagi setiap lakaran yang dibuat

[6 marks]
[*6 markah*]

QUESTION 2
SOALAN 2

CLO1
C1

a) Give the definition of raw material.

Berikan definisi bahan mentah.

[2 marks]
[*2 markah*]

CLO1
C2

b) Briefly explain **TWO (2)** reasons why quality control procedures are not able to be implemented verbally.

*Terangkan secara ringkas **DUA (2)** sebab mengapa prosedur pengawalan kualiti tidak boleh dilakukan dengan secara lisan.*

[4 marks]
[*4 markah*]

CLO1
C3

c) i. RM Enterprise produces chicken sausage. Once a week, they receive raw materials. During the inspection process of raw materials, they have found many raw materials that do not follow the specifications. Write **FOUR (4)** steps that need to be implemented to handle raw materials which do not adhere to specifications.

*RM Enterprise menghasilkan sosej ayam. Seminggu sekali, mereka menerima bahan mentah. Semasa proses pemeriksaan bahan mentah, mereka mendapati banyak bahan mentah yang tidak mengikut spesifikasi. Tuliskan **EMPAT (4)** langkah yang perlu dilaksanakan untuk mengendalikan bahan mentah yang tidak mematuhi spesifikasi.*

[4 marks]
[*4 markah*]

CLO1
C3

ii. You work as a Quality Control Assistant for RM Enterprise. You are assigned to do quality inspection on frozen minced chicken during receiving process. Suggest **FOUR (4)** quality specifications that is appropriate for that raw material.

*Anda bekerja sebagai Pembantu Kawalan Kualiti untuk RM Enterprise. Anda ditugaskan untuk melakukan pemeriksaan kualiti ke atas ayam cincang beku semasa proses penerimaan. Cadangkan **EMPAT (4)** spesifikasi kualiti yang sesuai untuk bahan mentah tersebut.*

[4 marks]
[*4 markah*]

CLO1
C3

iii. Describe the potential hazards in terms of microbiological, chemical and physical hazard that might present in frozen minced chicken with appropriate example.
Jelaskan potensi bahaya dari segi bahaya mikrobiologi, kimia dan fizikal yang mungkin terdapat dalam ayam cincang beku dengan contoh yang sesuai.

[6 marks]
[*6 markah*]

QUESTION 3
SOALAN 3

CLO1
C1

a) State the definition of sample and sampling.

Nyatakan maksud sampel dan persampelan.

[4 marks]
[*4 markah*]

CLO1
C2

b) Explain **THREE (3)** factors that affect sampling in terms of nature of the test method that is being investigated.
*Terangkan **TIGA (3)** faktor yang mempengaruhi persampelan dari segi sifat semulajadi ujian yang dikaji.*

[6 marks]
[*6 markah*]

c) XYZ factory produces canned drink products. This factory runs the production for 24 hours with 10,000 canned drinks being produced daily.
Kilang XYZ menghasilkan produk minuman dalam tin. Kilang ini menghasilkan produk 24 jam dengan 10,000 minuman dalam tin dihasilkan setiap hari.

CLO1
C3

i. Write a suitable type of sampling for this canned drink and give **TWO (2)** justifications for your answer.
Tuliskan jenis persampelan yang sesuai bagi minuman dalam tin ini dan *berikan **DUA (2)** justifikasi bagi jawapan anda.*

[3 marks]
[*3 markah*]

CLO1
C3

ii. If you want to take 8 samples of canned drinks from a population of 120, show how the sampling is done. Given the starting point is 11.
Jika anda ingin mengambil 8 sampel minuman dalam tin daripada populasi sebanyak 120, tunjukkan bagaimana persampelan tersebut dijalankan. Diberi titik permulaan ialah 11.

[7 marks]
[*7 markah*]

QUESTION 4
SOALAN 4

CLO1
C1

a) List **TWO (2)** types of instruments to measure density.

*Senaraikan **DUA (2)** jenis instrumen untuk mengukur ketumpatan.*

[2 marks]
[*2 markah*]

CLO1
C2

b) Colour testing is an important physical characteristic testing in food industry. Explain **THREE (3)** purposes of colour testing for finished products.

*Ujian warna adalah ujian ciri fizikal yang penting dalam industri makanan. Terangkan **THREE (3)** tujuan ujian warna pada produk akhir.*

[6 marks]
[*6 markah*]

c) Table 1 shows five observations that are carried out daily to determine whether the brix readings reach the controlled value of 60°Brix.
Jadual 1 menunjukkan lima pemerhatian yang dilakukan untuk menentukan sama ada bacaan brix mencapai nilai kawalan 60°Brix.

Table 1: Brix for orange jam
***Jadual 1**: Brix bagi jem oren*

Reading / *Bacaan*	**Brix / *Brix*** (°brix)
1	59
2	60
3	59
4	56
5	58

CLO1
C3

i. Relate the results in Table 1 to the terms precision and accuracy.
Kaitkan keputusan Jadual 1 dengan istilah ketepatan dan kejituan.

[6 marks]
[*6 markah*]

CLO1
C3

ii. Roti Sedap Sdn Bhd produces various types of bread. However, they need to do some quality analysis on the bread products before entering the market. Suggest **THREE (3)** types of physical analysis that can be made along with the appropriate equipment used for the analysis.

*Roti Sedap Sdn Bhd menghasilkan pelbagai jenis roti. Bagaimanapun, mereka perlu membuat beberapa analisis kualiti kepada produk roti tersebut sebelum memasuki pasaran. Cadangkan **TIGA (3)** jenis analisis fizikal yang boleh dibuat beserta alat yang sesuai digunakan untuk analisis tersebut.*

[6 marks]
[*6 markah*]

QUESTION 5
SOALAN 5

CLO1
C1

a) State **TWO (2)** things to be considered in drafting an inspection form.

*Nyatakan **DUA (2)** perkara yang diambil kira semasa merangka borang pemeriksaan.*

[2 marks]
[*2 markah*]

CLO1
C2

b) Recording and reporting are important after the final production of a product. Explain **TWO (2)** significances of recording and reporting.

*Merekod dan melapor penting selepas pengeluaran akhir produk. Terangkan **DUA (2)** kepentingan merekod dan melapor.*

[4 marks]
[*4 markah*]

c) A food Quality Assurance Officer in an apple juice processing factory will inspect the defects of apple fruits in batches of 10. The type of defect to be inspected is mold infection on the outer layer of the apple fruit. The collected data are as follows:

Seorang Pegawai Jaminan Mutu Makanan di sebuah kilang pemprosesan jus epal ingin memeriksa kerosakan buah epal dalam 10 lot. Kerosakan yang ingin diperiksa ialah jangkitan kulat pada kulit luar buah epal. Data- data yang dikumpul adalah seperti berikut:

Table 2: The number of defected apple fruits

***Jadual 2**: Jumlah bilangan kerosakan sampel buah epal*

Batch/*kumpulan*	**Sample size/*saiz sampel***	**Defectives/ *kerosakan***
1	200	17
2	200	10
3	200	12
4	200	10
5	200	10
6	200	12
7	200	13
8	200	17
9	200	11
10	200	10

CLO1
C3

i. Calculate the fraction defective, average fraction defective (p), Upper Control Limit (UCL) and Lower Control Limit (LCL) for that data sampling.

Kirakan, pecahan kerosakan, purata pecahan rosak (p), Had Atas Kawalan (UCL) dan Kawalan Had Rendah (LCL) bagi data persampelan tersebut.

[7 marks]
[*7 markah*]

CLO1
C3

ii. Plot an appropriate graph according to the above data.
Plotkan graf yang sesuai berdasarkan data di atas.

[4 marks]
[*4 markah*]

CLO1
C3

iii. Write the summary of the graph.
Tuliskan ringkasan graf tersebut.

[3 marks]
[*3 markah*]

SOALAN TAMAT

DMT 30093 FOOD QUALITY ASSURANCE
Control Chart Limits Formula

Variable Data Chart Formulas

Chart Type	Subgroup Size	Control Limits
$\bar{X}$ and R Average and Range Chart	< 10 (usually 3-5)	$\bar{\bar{X}}$ Central Line: $\bar{\bar{X}} = \frac{(\bar{X}_1 + \bar{X}_2 + \ldots \bar{X}_k)}{k}$ $\bar{X}$ UCL = $\bar{\bar{X}} + A_2\bar{R}$ $\bar{X}$ LCL = $\bar{\bar{X}} - A_2\bar{R}$ R Central Line: $\bar{R} = \frac{(R_1 + R_2 + \ldots R_k)}{k}$ R UCL = $D_4\bar{R}$ R LCL = $D_3\bar{R}$
X and mR Individuals and Moving Range Chart Note: $\widetilde{mR}$ = Median Moving Range	1	X Central Line: $\bar{X} = \frac{(X_1 + X_2 + \ldots X_k)}{k}$ X UCL = $\bar{X} + (3.14 \times \widetilde{mR})$ X LCL = $\bar{X} - (3.14 \times \widetilde{mR})$ mR Central Line: Median Moving Range mR UCL = $(3.87 \times \widetilde{mR})$

Attribute Data Chart Formulas

Chart Type	Subgroup Size	Control Limits
p Chart Fraction Defective	Variable or Constant	Central Line: $\bar{p} = \Sigma np / \Sigma n$ UCL = $\bar{p} + 3\sqrt{(\bar{p}(1-\bar{p}))/n}$ LCL = $\bar{p} - 3\sqrt{(\bar{p}(1-\bar{p}))/n}$
np Chart Number Defective	Constant	Central Line: $\overline{np} = \Sigma np / k$ UCL = $\overline{np} + 3\sqrt{\overline{np}(1-\bar{p})}$ LCL = $\overline{np} - 3\sqrt{\overline{np}(1-\bar{p})}$
c Chart Number of Defects	Constant	Central Line: $\bar{c} = \Sigma c / k$ UCL = $\bar{c} + 3\sqrt{\bar{c}}$ LCL = $\bar{c} - 3\sqrt{\bar{c}}$
u Chart Number of Defects per Unit	Variable or Constant	Central Line: $\bar{u} = \Sigma c / \Sigma n$ UCL = $\bar{u} + 3\sqrt{\bar{u}/n}$ LCL = $\bar{u} - 3\sqrt{\bar{u}/n}$

Factors for Computing Control Chart Limits

$\bar{X}$ & R Chart				
Subgroup Size (n)	A_2	D_3	D_4	d_2
2	1.880	0	3.267	1.128
3	1.023	0	2.574	1.693
4	0.729	0	2.282	2.059
5	0.577	0	2.114	2.326
6	0.483	0	2.004	2.534
7	0.419	0.076	1.924	2.704
8	0.373	0.136	1.864	2.847
9	0.337	0.184	1.816	2.970
10	0.308	0.223	1.777	3.078