SULIT

KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

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

JABATAN TEKNOLOGI KIMIA DAN MAKANAN

PEPERIKSAAN AKHIR

SESI II : 2023/2024

DMT30093 : FOOD QUALITY ASSURANCE

TARIKH : 30 MEI 2024
MASA : 8.30 PAGI - 10.30 PAGI (2 JAM)

Kertas ini mengandungi **LAPAN (8)** halaman bercetak.

Struktur (5 soalan)

Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

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

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

QUESTION 1
SOALAN 1

CLO1 (a) State **FOUR (4)** elements of Total Quality Management for an organization.
*Nyatakan **EMPAT (4)** elemen Pengurusan Kualiti Menyeluruh bagi sesebuah organisasi.*

[4 marks]
[*4 markah*]

CLO1 (b) Explain **THREE (3)** responsibilities of a Quality Control Executive in the food industry.
*Terangkan **TIGA (3)** tanggungjawab Eksekutif Kawalan Kualiti dalam industri makanan.*

[6 marks]
[*6 markah*]

CLO1 (c) Your company is planning to produce tomato puree. Your team is required to create suitable product specifications using the Ishikawa diagram. Draw the main sequence of steps along with the procedures involved in producing tomato puree.
Syarikat anda merancang untuk menghasilkan puri tomato. Pasukan anda diperlukan untuk membuat spesifikasi produk yang sesuai dengan menggunakan Diagram Ishikawa. Lukiskan langkah-langkah utama yang mengikut aturan beserta prosedur yang terlibat dalam penghasilan puri tomato.

[10 marks]
[10 *markah*]

QUESTION 2

SOALAN 2

CLO1 (a) Define raw material.

Definasikan bahan mentah.

[2 marks]

[*2 markah*]

CLO1 (b) Explain **TWO (2)** reasons why the instructions involved in food quality control are not supposed to be implemented verbally.

*Terangkan **DUA (2)** sebab mengapa arahan yang berkaitan dengan kawalan kualiti makanan tidak boleh dilakukan secara lisan.*

[4 marks]

[*4 markah*]

CLO1 (c) i) You are the Quality Control Officer at a soy beverage company and responsible for receiving the raw materials such as soy protein flour before transferring them to the production department. Explain how to handle soy protein flour that does not meet the raw material specifications in **FOUR (4)** steps.

*Anda adalah seorang Pegawai Kawalan Kualiti di syarikat minuman soya dan bertanggungjawab untuk menerima bahan mentah seperti tepung protein soya sebelum dihantar ke bahagian pemprosesan. Terangkan bagaimana untuk mengendalikan tepung protein soya yang tidak memenuhi spesifikasi bahan mentah dalam **EMPAT (4)** peringkat.*

[8 marks]

[8 *markah*]

ii) Apply **THREE (3)** characteristics of process control in the production of soy beverages.

*Aplikasikan **TIGA (3)** ciri-ciri kawalan proses dalam penghasilan minuman soya.*

[6 marks]

[*6 markah*]

QUESTION 3
SOALAN 3

CLO1 (a) State the definition of sample and sampling.

Nyatakan maksud sampel dan persampelan.

[4 marks]
[*4 markah*]

CLO1 (b) Explain **THREE (3)** advantages of sampling in food industries.
*Terangkan **TIGA (3)** kebaikan pensampelan dalam industri makanan.*

[6 marks]
[*6 markah*]

CLO1

Table 3 (c) / *Jadual 3 (c)*

Sex *Jantina*	DTM 3A	DTM 3B
Male *Lelaki*	10	12
Female *Perempuan*	30	28

(c) You are required to conduct a survey on the satisfaction level of students with facilities. Based on the data in Table 3 (c),
Anda diminta membuat tinjauan mengenai tahap kepuasan pelajar terhadap kemudahan. Berdasarkan data dalam Jadual 3 (c),

i) Calculate the total of each student by getting 15 respondents from the data for the interview session.
Kirakan jumlah setiap pelajar dalam mendapatkan 15 responden daripada data tersebut bagi sesi temuduga.

[10 marks]
[*10 markah*]

QUESTION 4
SOALAN 4

CLO1 (a) List **TWO (2)** types of instruments to measure density.

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

[2 marks]
[*2 markah*]

CLO1 (b) Explain **THREE (3)** types of physical testing and their purposes for food products.

*Terangkan **TIGA (3)** jenis ujian fizikal dan tujuannya terhadap produk makanan.*

[6 marks]
[6 *markah*]

CLO1 (c) Table 4(c) shows five observations that are carried out daily to determine whether the brix readings of apple jam reach the controlled value of 60°Brix.

Jadual 4(c) menunjukkan lima pemerhatian yang dilakukan untuk menentukan sama ada bacaan brix jem epal mencapai nilai kawalan 60°Brix.

Table 4(c): Brix for apple jam
Jadual 4(c): Brix bagi jem epal

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

i) Relate the results in Table 4 (c) to the terms precision and accuracy.
Kaitkan keputusan Jadual 1 dengan istilah ketepatan dan kejituan.

[6 marks]
[*6 markah*]

ii) Prepare a list of three chemical testing methods and their purposes for the production of apple jam.
Sediakan senarai bagi tiga jenis kaedah ujian kimia beserta tujuannya dalam penghasilan jem epal.

[6 marks]
[*6 markah*]

QUESTION 5
SOALAN 5

CLO1 (a) List **FOUR (4)** types of charts commonly used in attribute control charts.
*Senaraikan **EMPAT (4)** jenis carta yang biasa digunakan dalam carta kawalan sifat.*

[2 marks]
[*2 markah*]

CLO1 (b) Recording and reporting are important after the final production of a product. Explain **TWO (2)** importances of recording and reporting.
*Merekod dan melapor adalah penting selepas pengeluaran akhir produk. Terangkan **DUA (2)** kepentingan merekod dan melapor.*

[4 marks]
[*4 markah*]

CLO1 (c) A food Quality Assurance Officer at 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 Table 5 (c):
Anda ialah 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 Jadual 5(c):

Table 5 (c): The number of defective apple fruits

Jadual 5(c): Jumlah bilangan kerosakan sampel buah epal

Batch/*kumpulan*	**Sample size/*saiz sampel***	**Defectives/ *kerosakan***
1	50	6
2	50	5
3	50	9
4	50	13
5	50	7
6	50	8
7	50	7
8	50	3
9	50	8
10	50	6

i) Based on Table 5 (c), calculate the fraction defective, average sample size, average fraction defective, Upper Control Limit and Lower Control Limit for the final product.

Berdasarkan Jadual 5 (c), kirakan jumlah pecahan rosak , purata saiz sampel, purata pecahan rosak, Had Kawalan Atas dan Had Kawalan Bawah untuk produk akhir.

[10 marks]

[*10 markah*]

ii) Sketch a graph by using the values of the Upper Control Limit and Lower Control Limit.

Lakarkan graf dengan menggunakan nilai-nilai Had Atas Kawalan dan Had Bawah Kawalan.

[4 marks]

[*4 markah*]

SOALAN TAMAT

DMT 30093 FOOD QUALITY ASSURANCE
Control Chart Limits Formula

Variable Data Chart Formulas

Chart Type	Subgroup Size	Control Limits
$\bar{\bar{X}}$ and R Average and Range Chart	< 10 (usually 3-5)	$\bar{\bar{X}}$ Central Line: $\bar{\bar{X}} = \frac{(\bar{X}_1 + \bar{X}_2 + \ldots \bar{X}_k)}{k}$ $\bar{\bar{X}}$ UCL = $\bar{\bar{X}} + A_2\bar{R}$ $\bar{\bar{X}}$ 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