

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi EMPAT (4) soalan berstruktur. Jawab semua soalan.

CLO1
C2

QUESTION 1
SOALAN 1

(a) Define:

Berikan definisi:

i. Mean

Purata

ii. Standard deviation

Sisihan Piawai

[4 marks]
[4 markah]

CLO1
C3

(b) Using Table 1(i), calculate the standard deviation.

Dengan merujuk pada Jadual 1(i), kirakan sisihan piawai.

Table 1(i) / *Jadual 1(i)*

Cell midpoint	Frequency
3.5	6
3.8	9
4.1	18
4.4	14
4.7	13

[7 marks]
[7 markah]

CLO1
C3

(c) Table 1(ii) is a typical \bar{X} and R chart form containing information on acid content in millilitres.

Jadual 1(ii) adalah carta kawalan dan R dengan mengandungi maklumat mengenai kandungan asid dalam mililiter.

Table 1(ii) / *Jadual 1(ii)***VARIABLES CONTROL CHART:****DEP/ AREA:****CHART ID:**

Part ID:		Operation ID:					Characteristic: Acid Content				
Check Method:		Nominal Value:					Tolerance: ± 0.20				
		1	2	3	4	5	6	7	8	9	10
SAMPLE READINGS	1	.85	.75	.80	.65	.75	.60	.80	.70	.75	.60
	2	.65	.85	.80	.75	.70	.75	.75	.60	.85	.70
	3	.65	.75	.75	.60	.65	.75	.65	.75	.85	.60
	4	.70	.85	.70	.70	.80	.70	.75	.75	.80	.80
SUM, $\sum X$		2.85	3.20	3.05	2.70	2.90	2.80	2.95	2.80	3.25	2.70
AVERAGE, \bar{X}											
RANGE, R											

i. Calculate the mean and range for each subgroup

Hitungkan nilai min dan julat untuk setiap kumpulan

[1 mark]

[1 markah]

ii. Calculate the upper and lower control limit.

Hitungkan nilai had kawalan atas dan had kawalan bawah.

[6 marks]

[6 markah]

- CLO1
C4
- (d) Below are the data of resistance in units of ohms for electrical components, obtained for plotting the control charts \bar{X} and σ with sample size 6. Subgroup was 25, $\Sigma X = 2046.5$ and $\Sigma \sigma = 17.4$. Determine control limits and center line.
- Data di bawah menunjukkan rintangan dalam unit ohm bagi komponen elektrik dan disediakan dalam bentuk carta kawalan \bar{X} dan σ dengan saiz sample 6. Subkumpulan adalah 25, $\Sigma X = 2046.5$ dan $\Sigma \sigma = 17.4$. Tentukan had kawalan dan garisan tengah.*

[7 marks]
[7 markah]

QUESTION 2
SOALAN 2

- CLO1
C2
- (a) Explain briefly **FIVE (5)** basic concepts of Total Quality Management (TQM).
- Terangkan secara ringkas **LIMA (5)** konsep asas Pengurusan Kualiti Menyeluruh.*

[5 marks]
[5 markah]

- CLO1
C3
- (b) Relate between Quality Control and Quality Assurance in a manufacturing industry.
- Hubungkaitkan di antara Kawalan Kualiti dan Jaminan Kualiti dalam industry pembuatan.*

[4 marks]
[4 markah]

- CLO1
C2
- (c) Control charts need to be generated for the frame manufacturing process. The revised fraction nonconforming is 0.08. Determine control limit for inspection rates of 1000 per day, 1500 per day and 2000 per day.
- Carta kawalan perlu dijanakan untuk proses pembuatan bingkai. Carta kawalan pecahan pembaikan adalah 0.08. Tentukan had kawalan untuk kadar pemeriksaan 1000 sehari, 1500 sehari dan 2000 sehari.*

[6 marks]
[6 markah]

CLO1
C3

- (d) Attribute control charts are used to determine whether the product is acceptable or not. Data were collected in subgroups sizes of 20 as in Table 2.

Carta kawalan atribut digunakan bagi menentukan samada sesuatu produk itu boleh diterima atau tidak. Data dikumpul dalam saiz subkumpulan 20 seperti didalam jadual 2.

Table 2 / Jadual 2

Sample	n	c	u	Sample	n	C	u
1	10	10			10	9	
2	10	10			10	8	
3	10	10			10	11	
4	10	30			10	7	
5	10	23			10	12	
6	10	15			10	10	
7	10	11			10	9	
8	10	17			10	15	
9	10	14			10	14	
10	10	17			10	14	

- i. Complete Table 2 for values of u and calculate the center line and control limit value.

Lengkapkan jadual 2 bagi nilai u dan kira nilai garisan tengah dan had kawalan.

[6 marks]
[6 markah]

- ii. Plot the appropriate chart for these data.

Plotkan carta kawalan yang sesuai bagi data ini

[4 marks]
[4 markah]

QUESTION 3
SOALAN 3

CLO2
C2

- (a) Figure 3(i) below shows a flow chart of single sampling plan switching criteria between normal, reduced and tightened inspection. Describe ALL the terms and conditions needed to switch between reduced to normal inspection (B), normal to tightened inspection (C), tightened to normal inspection (D) and the condition for discontinue inspection (E).

Rajah 3(i) di bawah menunjukkan carta alir kriteria pertukaran pelan pensampelan tunggal di antara pemeriksaan jenis biasa, ringan dan ketat. Terangkan KESEMUA syarat-syarat yang diperlukan untuk menukar pemeriksaan jenis ringan kepada biasa (B), pemeriksaan biasa kepada ketat (C), pemeriksaan ketat kepada biasa (D) dan syarat untuk menghentikan pemeriksaan (E).

[5 marks]
[5 markah]

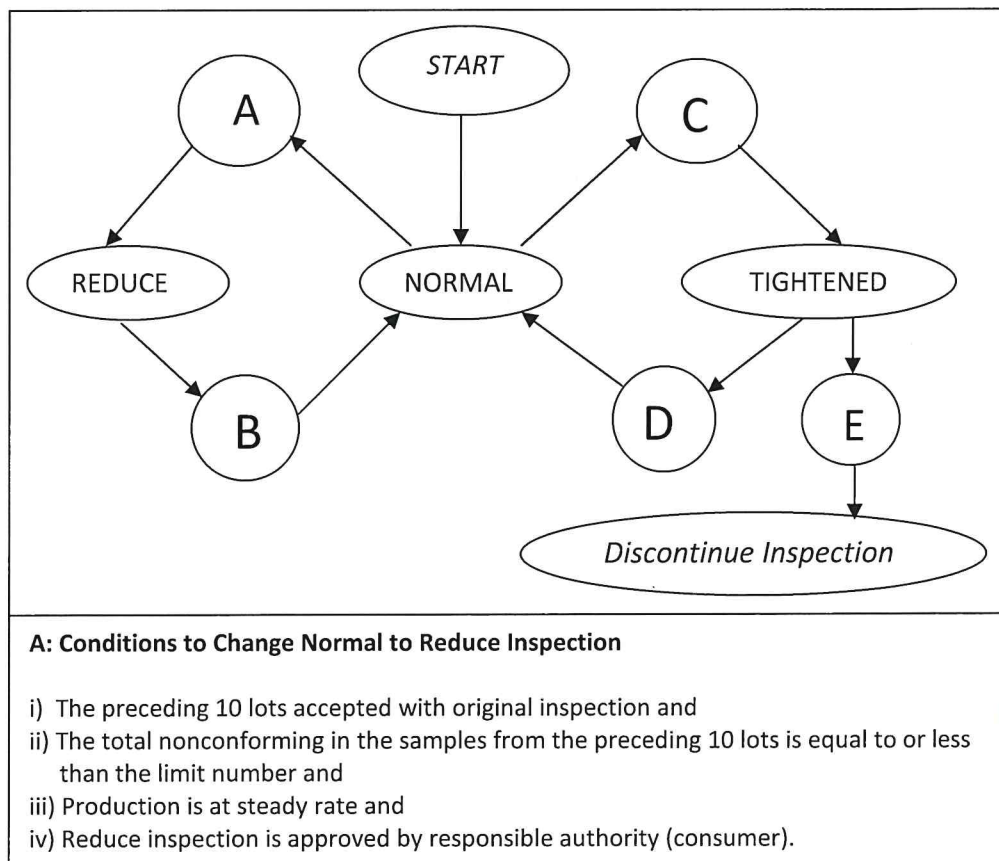


Figure 3(i) / Rajah 3(i)

CLO2
C4

- (b) Cherry Motors Corp. has a new supplier for push rods for engines in cars and is concerned about the incoming quality. They purchased push rods in lot of 5,000 at a time and wanted to determine an acceptance sampling plan. Quality officers have agreed on an AQL value of 0.15 defectives and the use of general inspection Level II.

Syarikat Cherry Motors mempunyai satu pembekal baru bagi rod tekan enjin pada kereta, dan ia prihatin terhadap kualiti bahan masuk. Mereka membuat pembelian rod tekan sebanyak 5,000 dalam satu lot dalam satu masa dan ingin menentukan satu pelan persampelan penerimaan yang sesuai. Pegawai kualiti telah bersetuju untuk menggunakan nilai AQL sebanyak 0.15 dan pemeriksaan umum Tahap II.

- i. By using Table MIL-STD-105E, determine the Single Sampling Plan (SSP) for normal inspection to be used. Analyze all the obtained information in detail.

Dengan menggunakan Jadual MIL-STD-105E, tentukan Pelan Persampelan Tunggal bagi pemeriksaan jenis biasa yang perlu digunakan dengan menganaliasa semua maklumat yang diperolehi secara terperinci.

[4 marks]

[4 markah]

- ii. Based on industrial rules for switching sampling plans, when there were preceding 10 lots on normal inspection have been accepted, the quality officers may decide to use reduced inspection for incoming inspection. By referring to this case, explain all the information needed to accept or to reject the whole lots with the aid of Table MIL-STD-105E.

Berdasarkan peraturan pertukaran rancangan persampelan di industri, apabila terdapat keadaan 10 lot sebelum pertukaran dalam pemeriksaan jenis biasa diterima, pegawai kualiti boleh membuat keputusan untuk menggunakan pemeriksaan jenis ringan untuk pemeriksaan akan datang. Dengan merujuk kepada kes ini, terangkan semua maklumat yang diperlukan untunk terima atau tolak lot dengan bantuan Jadual MIL-STD-105E.

[4 marks]

[4 markah]

CLO2
C2

- (c) Brown Company wants to determine the company's quality cost. Classify each cost in Table 3(ii) as prevention cost, appraisal cost, internal failure cost or external failure cost.

Syarikat Brown ingin menentukan kos kualiti syarikatnya. Klasifikasikan setiap kos dalam Jadual 3(ii) sebagai kos pencegahan, kos pentaksiran, kos kegagalan dalaman atau kos kegagalan luaran.

[5 marks]
[5 markah]

Table 3(ii)/ Jadual 3(ii)

Type of Cost/ <i>Jenis Kos</i>	Amount (\$)/ <i>Jumlah (\$)</i>
i. Penalty payments to customers – late shipments	30,000
ii. Materials and products scrapped before shipment	150,000
iii. Raw material inspection	90,000
iv. Quality training for employees	30,000
v. Losses due to defective products returned by customers	300,000

CLO2
C3

- (d) The quality cost is divided into two category (Price of Conformance and Price of Nonconformance). Figure 3(iii) shows the hidden costs of poor quality in iceberg effect.

Kos kualiti telah dipecahkan kepada dua kategori (Price of Conformance dan Price of Nonconformance). Rajah 3(iii) menunjukkan kos kualiti rendah yang tersirat di dalam kesan ketulan ais besar.

- i. List **THREE (3)** external failure cost activities and **THREE (3)** internal failure cost activities in Figure 3(iii).

*Senaraikan dengan jelas **TIGA (3)** aktiviti kos kegagalan luaran dan **TIGA (3)** aktiviti kos kegagalan dalaman yang terdapat dalam Rajah 3(iii).*

[6 marks]
[6 markah]

- ii. Relate the relationship occurred between Figure 3(iii) in visible and invisible Cost of Poor Quality (CoPQ).

Kaitkan hubungan yang berlaku di antara Rajah 3(iii) dalam Kos Kualiti Rendah yang dapat dilihat dan tidak dapat dilihat.

[1 mark]
[1 markah]

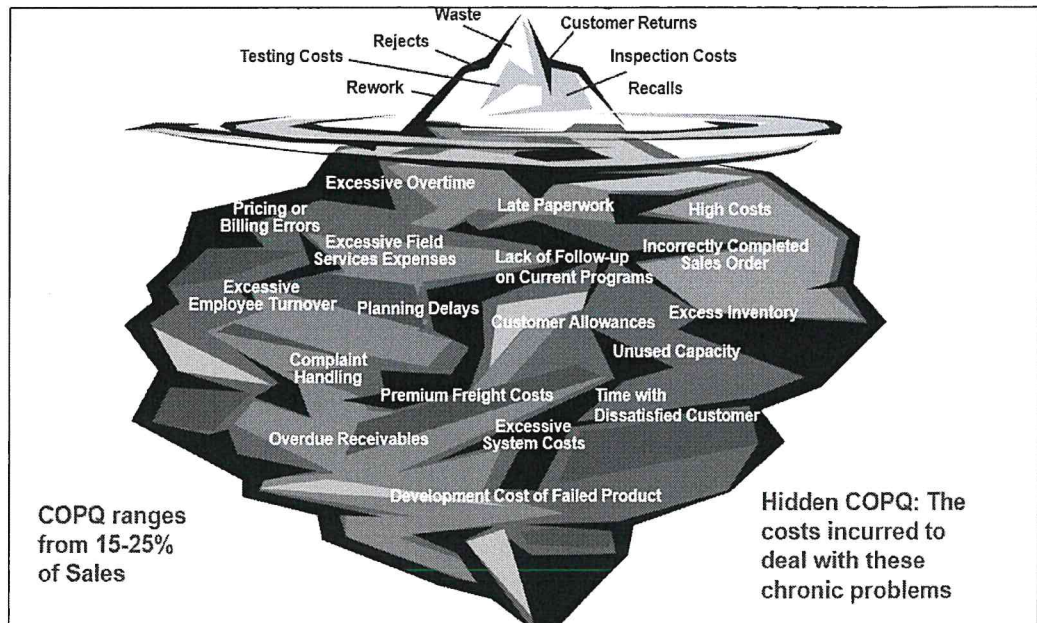


Figure 3(iii) / Rajah 3(iii)

QUESTION 4 SOALAN 4

CLO2
C3

- (a) Table 4(i) is referring to a simple design form for car valet operation and this type of form is one of the tool in 7 basic QC tools.

Jadual 4(i) merujuk kepada satu borang ringkas yang direka untuk urusniaga jaga kereta dan borang seperti ini merupakan salah satu alat dalam 7 alat asas kawalan kualiti.

- i. By referring to the table, translate **FOUR (4)** general functions of the form for quality improvement.

Dengan merujuk kepada jadual tersebut, terangkan secara umum EMPAT (4) fungsi borang berkenaan dalam peningkatan kualiti.

[4 marks]
[4 markah]

- ii. Relate **THREE (3)** advantages of using the following form in our real life.

Kaitkan TIGA (3) kelebihan menggunakan borang di bawah di dalam kehidupan sebenar kita.

[3 marks]
[3 markah]

Table 4(i) / Jadual 4(i)

Car type / Jenis kereta Car registration/ Pendaftaran kereta	Ford Focus W357 PHR
Interior vacuumed <i>Pembersihan dalaman</i>	√
Upholstery cleaned <i>Upholstery dibersihkan</i>	√
Dashboard cleaned <i>Dashboard dibersihkan</i>	√
Deodorised <i>Pewangi</i>	√
Body washed <i>Badan kereta dibersihkan</i>	√
Washed waxed & Polished <i>Dibersihkan, digilap dan dililinkan</i>	√
Under car washed <i>Bawah kereta dibersihkan</i>	√
Wheels washed <i>Roda dibersihkan</i>	√
Tyres blacked <i>Tayar dihitamkan</i>	√
Comments: Front bumper badly scratched on delivery, this cannot be covered Komen: Bumper depan dicalar dengan teruk sewaktu penghantaran, dan tidak dapat ditutupi	
Performed / Checked by J Bloggs <i>Dilaksanakan dan Disemak oleh J Bloggs</i>	Date 2 May 2008 Tarikh 2 Mei 2008

CLO2
C4

- (b) A project team investigated the show-rate for HIV medical appointments and presented their results to the quality committee: where 49% is for routine medical appointments and 31% is for initial medical appointments. In a subsequent meeting, the members brainstormed potential causes to lower the desired show-rate. By using information in Table 4(ii) as obtained from the meeting, develop a proper cause-and-effect diagram.

Satu pasukan projek telah mengkaji tentang kadar kehadiran bagi temujanji perubatan HIV dan hasil kajian telah dibentangkan kepada jawatankuasa kualiti di mana 49% adalah untuk temujanji perubatan rutin dan 31% untuk temujanji perubatan awal. Di dalam suatu perjumpaan seterusnya, ahli-ahli pasukan telah menyumbang saran sebab-sebab yang berpotensi dalam mengurangkan kadar kehadiran daripada yang diharapkan. Dengan menggunakan maklumat-maklumat yang diperolehi daripada Jadual 4(ii), lakarkan satu rajah sebab dan akibat yang sesuai.

[5 marks]
[5 markah]

Table 4(ii)/ *Jadual 4(ii)*

Effect	Major causes	Sub causes	Potential causes (minor causes)
Low show-rate for HIV medical appointments	Equipment	Computer	<ul style="list-style-type: none"> • Computer can only print reminders for appointments within 3 months • System taken down for routine maintenance
		Appointment cards	<ul style="list-style-type: none"> • Cards do not include exact clinic address • Only one appointment per card
	Environment	Remote location of clinic	<ul style="list-style-type: none"> • Remote location of clinic
	People	Patients	<ul style="list-style-type: none"> • Lack of childcare • Patients unaware of appointments
		Staff	<ul style="list-style-type: none"> • Staff gives patient wrong appointment information • Staff does not give patient printed appointment card
	Procedures	Reminder calls	<ul style="list-style-type: none"> • Difficult to reach patients directly by phone due to wrong number • Call placed by someone unknown by the patient
		Follow-up after no-show appointment	<ul style="list-style-type: none"> • No procedure in place to reschedule appointments

CLO2
C3

- (c) Explain briefly any **FOUR (4)** out of EIGHT quality management principles that underlie the ISO 9000:2000 family of standards.

Terangkan secara ringkas mana-mana EMPAT (4) daripada LAPAN prinsip pengurusan kualiti yang mendahului keluarga piawaian ISO9000:2000.

[8 marks]
[8 markah]

CLO2
C4

- (d) Draw a diagram for a process-based quality management system model based on process application in ISO 9001 standards. Then highlight **FIVE (5)** main clauses inside.

*Lukiskan gambarajah bagi satu model sistem pengurusan kualiti berdasarkan proses yang digunakan di dalam piawaian ISO 9001. Kemudian tunjukkan **LIMA (5)** klausa utama di dalamnya.*

[5 marks]
[5 markah]

SOALAN TAMAT