



UTHM

Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION SEMESTER I SESSION 2021/2022

COURSE NAME : TOTAL QUALITY MANAGEMENT
COURSE CODE : MPE 10303
PROGRAMME CODE : MPE
EXAMINATION DATE : JANUARY 2022
DURATION : 3 HOURS
INSTRUCTION :
1. ANSWER ALL QUESTIONS
2. THIS FINAL EXAMINATION
IS AN **ONLINE ASSESSMENT**
AND CONDUCTED VIA
CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

- Q1**
- (a) Illustrate a process map of problem solving method starting from identifying problems until standardize solutions with appropriate seven Quality Control tools and new seven Quality Control tools. (10 marks)
- (b) AMZ Sdn Bhd has quality issues in their production line. The quality control department has identified the actual causes of the problems as presented in **Table Q1**. Based on the results, the main causes of the problems are work-miss and machine breakdown.
- (i) Construct Ishikawa diagram based on man, machine, method, material and environment (4M1E) from **Table Q1**. (5 marks)
- (ii) Propose **THREE (3)** solutions for improvement based on main cause as stated in **Table Q1** using Tree Diagram. (6 marks)
- (iii) Evaluate the proposed solutions in question **Q1b(ii)** based on related criteria using prioritization diagram to determine the rank of priority. (6 marks)
- Q2** Quality Assurance (QA) department has conducted sampling inspection for finish product from LCD TV production line based on random sampling technique. QA inspectors have taken 27 times sampling with 100 samples of each time. The defects quantity has been recorded. Based on the data, QA department wants to evaluate the current process to determine stability of the production process. In this study, QA inspectors have used np chart for monitoring production line. Based on investigation, the main problem is part defect. Measurement data for the np chart collected is shown in **Table Q2**.
- (a) Calculate:
- (i) Upper Control Limit (UCL). (3 marks)
- (ii) Lower Control Limit (LCL). (3 marks)
- (b) Construct np chart based on **Table Q2**. (5 marks)
- (c) Analyse the np chart based on the result in **Q2(b)**. (5 marks)
- (d) Propose **THREE (3)** improvements on how to improve the result in **Q2(c)**. (9 marks)

Q3 Measurement data for the X chart collected is shown in **Table Q3**.

- (a) Calculate:
- (i) Upper Control Limit (UCL_x). (5 marks)
 - (ii) Lower Control Limit (LCL_x). (5 marks)
- (b) Construct X bar chart based on **Table Q3**. (6 marks)
- (c) Analyse the X chart based on the result in **Q3(b)**. (5 marks)

Q4 (a) AKB Sdn. Bhd. produces smart handphone for local and global market. However, AKB Sdn. Bhd. faces competition from global companies particularly from China companies. The company's operating cost and prices were high and its products were of relatively inferior quality compared to its competitors. As a result of this, return on assets fell to less than 20% and marketshare came down sharply from 90% in 2015 to just 20% in 2020. Between 2015 and 2020, AKB's profits decreased from RM 4.15 billion to RM 200 million. AKB quickly began starting improvement programme to strengthen their business result through implementing the benchmarking program.

Propose **SIX (6)** steps for implementing benchmarking in improving AKB Sdn. Bhd. based on the above scenario.

(12 marks)

(b) ABZ Sdn.Bhd is local company and producing LCD TV. Based on the current performance, ABZ's profits decreased from RM 100 million to RM 30 million compared to last year. The poor performance is caused by many claims from their customers. ABZ Sdn Bhd has quality issues in their production line and it is effecting on it's business performance. The company target for quality defect is less than 1.0%. However, the current performance of defect ratio is 3.0%. That poor performance translated into a lot of unnecessary payouts such as recovery cost and part replacement. Based on the results, the main cause of the problems are workmiss. Mr. Ahmad, manager of quality assurance department, was surprised by the large gap between process performance and the target of defect ratio. He decided to solve the problem by turning it into a Lean Six Sigma project.

Propose **FIVE (5)** processes based on DMAIC in Six Sigma program to improve ABZ Sdn.Bhd based on the above scenario.

(15 marks)

-END OF QUESTIONS-

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Table Q1: Actual Causes of Quality Problem

N0	CAUSES	QUANTITY
1	Workmiss amongst employees	45
2	Machine breakdown	35
3	SOP problem	5
4	Workplace unorganised	3
5	Improper schedule for 5S	3
6	Workplace problem	3
7	Plastic part bending	2
8	Panel fail	2
9	Lack of co-operation	1
10	Lack of awareness	1

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Table Q2: Measurement Data for np chart

SAMPLE	SAMPLE QUANTITY	DEFECTS	PROPOSITION
1	100	12	0.12
2	100	9	0.09
3	100	13	0.13
4	100	7	0.07
5	100	13	0.13
6	100	9	0.09
7	100	10	0.10
8	100	9	0.09
9	100	12	0.12
10	100	6	0.06
11	100	14	0.14
12	100	18	0.18
13	100	7	0.07
14	100	13	0.13
15	100	14	0.14
16	100	12	0.12
17	100	11	0.11
18	100	8	0.08
19	100	9	0.09
20	100	17	0.17
21	100	18	0.18
22	100	20	0.20
23	100	25	0.25
24	100	18	0.18
25	100	17	0.17
26	100	18	0.18
27	100	28	0.28
Sum			

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Table Q3: Measurement Data for X chart

SUBGROUP NUMBER	DATE	TIME	MEASUREMENTS				AVERAGE	RANGE
			X1	X2	X3	X4	X	R
1	02-Feb	8:00	36	41	35	37	37.25	6.00
2		9:00	41	42	43	42	42.00	2.00
3		10:00	35	42	33	38	37.00	9.00
4		11:00	48	38	39	42	41.75	10.00
5		12:00	39	34	44	40	39.25	10.00
6	03-Feb	8:00	42	42	43	34	40.25	9.00
7		9:00	44	42	41	46	43.25	5.00
8		10:00	33	42	38	36	37.25	9.00
9		11:00	50	45	47	48	47.50	5.00
10		12:00	47	43	36	42	42.00	11.00
11	04-Feb	8:00	38	41	39	38	39.00	3.00
12		9:00	37	37	41	37	38.00	4.00
13		10:00	40	38	47	35	40.00	12.00
14		11:00	38	39	45	42	41.00	7.00
15		12:00	50	42	43	45	45.00	8.00
16	05-Feb	8:00	30	32	29	32	30.75	3.00
17		9:00	41	40	29	34	36.00	12.00
18		10:00	38	44	28	58	42.00	30.00
19		11:00	35	41	37	38	37.75	6.00
20		12:00	56	55	45	48	51.00	11.00
21	06-Feb	8:00	43	36	35	38	38.00	8.00
22		9:00	39	38	43	44	41.00	6.00
23		10:00	42	39	39	36	39.00	6.00
24		11:00	38	40	45	37	40.00	8.00
25		12:00	39	42	35	40	39.00	7.00
Sum								