



UTHM

Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(TAKE HOME)
SEMESTER II
SESSION 2019/2020**

COURSE NAME : QUALITY CONTROL
COURSE CODE : BPB 24303
PROGRAMME : BPB
EXAMINATION DATE : JULY 2020
DURATION : 24 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS
(OPEN BOOK EXAMINATION)

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES.

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TERBUKA

Q1 Statistical Process Control (SPC) is a powerful collection of problem solving tools and the most sophisticated and useful method in achieving process stability and improving the process capability. In manufacturing industry, every product doesn't meet the desired range of quality consistently with the customer specification. This inconsistency occurs due to several sources of variations such as machines, operators, environment and materials. You are appointed as a quality manager in AZY company. AZY company produces LCD TV and exports to many countries over the world. However, recently, AZY company has received many claims from their customers due to screen brightness is too dark. AZY company wants to improve the problem urgently. LCD screen brightness problem is caused by many factors such as operator setting error, environmental issues, part failure and others. You are given a task to monitor, analyze and propose improvement for AZY company. To determine, whether the process is stable or not, you have collected data of the brightness of LCD TV as shown in **Table Q1**. You collected 25 times data and four samples of each time. Based on this data, you have to monitor the process and propose improvement to AZY company as soon as possible as a solution of the problem.

Table Q1: Measurement Data (Unit: cd/m²)

SUBGROUP NUMBER	DATE	TIME	MEASUREMENTS				AVERAGE X	RANGE R
			X1	X2	X3	X4		
1	02-Feb	8:00	840	842	833	838		
2		9:00	843	837	842	842		
3		10:00	844	840	835	837		
4		11:00	843	840	840	842		
5		12:00	841	833	844	840		
6	03-Feb	8:00	838	841	841	834		
7		9:00	856	855	845	850		
8		10:00	836	841	840	836		
9		11:00	839	844	842	845		
10		12:00	841	843	839	842		
11	04-Feb	8:00	847	841	836	838		
12		9:00	845	837	838	837		
13		10:00	843	838	847	835		
14		11:00	829	839	845	842		
15		12:00	829	842	843	845		
16	05-Feb	8:00	829	842	843	845		
17		9:00	837	840	829	834		
18		10:00	837	840	829	834		
19		11:00	835	841	837	838		
20		12:00	856	855	845	848		
21	06-Feb	8:00	838	840	845	837		
22		9:00	839	842	835	840		
23		10:00	842	839	839	836		
24		11:00	843	836	835	838		
25		12:00	839	838	843	844		
Sum								



Calculate:

- (a) \bar{X} (3 marks)
- (b) \bar{R} (3 marks)
- (c) Upper Control Limit (UCL_x). (3 marks)
- (d) Lower Control Limit (LCL_x). (3 marks)
- (e) Upper Control Limit (UCL_R). (3 marks)
- (f) Construct \bar{X} bar chart based on **Table Q1**. (5 marks)
- (g) Construct R chart based on **Table Q1**. (5 marks)
- (h) Analyse the \bar{X} bar chart whether the process is stable or not based on the result in **Q1(f)** with justification. (5 marks)
- (i) Analyse **TEN (10)** possible causes of the problem through Ishikawa diagram. Apply 4M1E in the answer. (5 marks)
- (j) Analyse the possible causes through relationship diagram to determine the main causes. (5 marks)
- (k) Propose **FIVE (5)** main solutions in details with justification for improving the process through three diagram based on the result in **Q1(j)** (10 marks)

-END OF QUESTIONS-