



FACULTY OF ENGINEERING AND BUILT ENVIRONMENT

Supplementary 2018

DEPARTMENT OF QUALITY AND OPERATIONS MANAGEMENT

PROGRAMME ND: OPERATIONS MANAGEMENT
ND: MANAGEMENT SERVICES

MODULE QUALITY ASSURANCE 2A

CODE OQA2A01 / QAS22A2

DATE 18 July 2018

DURATION 3 HOURS

TIME 08h00 – 1h000

TOTAL MARKS 100

EXAMINER DR N SUKDEO

INTERNAL MODERATOR MR Y MULONGO

EXTERNAL MODERATOR N/A

NUMBER OF PAGES 5 PAGES including cover page

INSTRUCTIONS TO CANDIDATES:

- Please answer all questions.
- Question papers must not be handed in.
- This is a closed book assessment.
- Read the questions carefully and answer only what is asked.
- Number your answers clearly.
- Write neatly and legibly.
- Structure your answers by using appropriate headings and sub-headings.
- The general University of Johannesburg policies, procedures and rules pertaining to written exam apply.

...Cont/

QUESTION ONE

- 1.1 The PAF paradigm translates quality costs into three categories which are then subdivided into other categories. Describe the different types of costs under the different categories. [8]
 - 1.2 Explain the following concepts for globalization:
 - 1.2.1 Licencing [1]
 - 1.2.2 Partnering [1]
 - 1.2.3 Globalisation [1]
 - 1.2.4 Physical Environment [1]
 - 1.2.5 Task Environment [1]
 - 1.3 Discuss in detail, the three spheres of quality. [6]
 - 1.4 Evaluate the engineering perspective with regard to functional perspectives in quality. [4]
 - 1.5 Identify and explain the eight dimensions of product quality. [8]
 - 1.6 Mention the four components of Customer Relationship Management. [4]
- [35]**

QUESTION TWO

- 2.1 Recently, a medical office administered the SERVQUAL survey to its customers as a way determine where it should focus its process improvement. Forty surveys were administered to customers before and after they were treated. On the basis of their response, the following averages were computed for each item.

Dimensions	Items
Tangibles	1 – 4
Reliability	5 – 9
Responsiveness	10 – 13
Assurance	14 – 17
Empathy	18 – 22

Item Number	Average Perception	Average Expectation
1	4.5	4.5
2	4.4	4.3
3	5.5	5.8
4	5.6	5.5
5	5.8	5.5
6	3.2	3.2
7	4.4	4.6
8	4.6	4.6
9	3.5	3.5

10	6.5	6.8
11	6.6	6.6
12	6.7	6.5
13	6.8	6.8
14	3.3	3.0
15	3.4	3.6
16	5.4	5.7
17	5.5	5.7
18	5.5	5.7
19	2.5	2.5
20	2.4	2.0
21	4.6	4.8
22	4.5	4.6

2.1.1 Calculate the difference between average perception and average expectation. [8]

2.1.2 Compute the dimension averages. [6]

2.1.3 Based on your findings, which dimensions should be emphasised? [2]

2.2 First National Bank (FNB) issues a national credit card through its various bank branches. The bank credit card business is highly competitive and interest rates do not vary substantially, so the bank decided to attempt to retain customers by improving customer service through a reduction in billing errors. The credit card division monitored its billing department process by taking daily samples of 200 customer bills for 30 days and inspecting their accuracy. The sample results are as follows:

<i>Sample k</i>	<i>Number of defectives</i>
1	7
2	12
3	9
4	6
5	5
6	8
7	10
8	11
9	14
10	10
11	9
12	6
13	3
14	2
15	8
16	10
17	12
18	14
19	16
20	15
21	13
22	9
23	10

24	12
25	15
26	14
27	16
28	12
29	15
30	14

2.2.1 Develop a p -chart for the billing process using 3σ control limits. [8]

2.2.2 Analyse and interpret the findings of the p -chart. [2]

2.3 Discuss the benefits of control charts. [4]

[30]

QUESTION THREE

3.1 What does Figure 1 represent? [2]

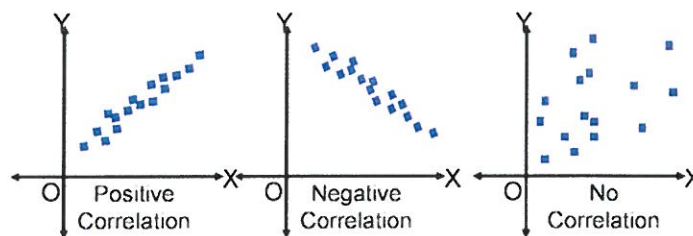


Figure 1

2.2 Discuss the benefits of using the diagram shown in Figure 1. [2]

2.3 With regard to Figure 1, construct a scatter diagram using the following data:

Determine the correlation between the time lost due to injuries and overtime hours. What do you conclude? [10]

Factory	Lost time (days)	Overtime hours
A	6	327
B	4	112
C	8	219
D	2	227
E	6	496

2.4 You are requested to improve safety in your department. Lately, there seems to be an increase of injuries in the Maintenance Department. You decide to investigate this perception by recording data by department for three months.

Category	Number of injuries
Maintenance	40
Admin	5
Training	5
Operations	4
Safety	3

- 2.4.1 Construct a pareto diagram and analyse the results. [12]
- 2.4.2 Mention the benefits of the pareto diagram as a quality improvement tool. [3]
- 2.5 What is service blueprinting? [2]
- 2.6 Determine the steps of a blueprinting process. [4]
- [35]**

Total = 100 marks

Control Limits for p-Charts

$$UCL = \bar{p} + z\sqrt{\frac{\bar{p}(1 - \bar{p})}{n}}$$

$$LCL = \bar{p} - z\sqrt{\frac{\bar{p}(1 - \bar{p})}{n}}$$

Control Limits for c-Charts

$$UCL = \bar{c} + z\sqrt{\bar{c}}$$

$$LCL = \bar{c} - z\sqrt{\bar{c}}$$

Control Limits for R-Charts

$$UCL = D_4\bar{R}$$

$$LCL = D_3\bar{R}$$

Control Limits for \bar{X} -Charts

$$UCL = \bar{\bar{x}} + A_2\bar{R}$$

$$LCL = \bar{\bar{x}} - A_2\bar{R}$$

Factor for Determining from \bar{R} the Three-Sigma Control Limits for \bar{X} - and R -Charts

NUMBER OF OBSERVATIONS IN EACH SAMPLE n	FACTOR FOR \bar{X} -CHART A_2	FACTORS FOR R -CHART	
		LOWER CONTROL LIMIT D_3	UPPER CONTROL LIMIT D_4
2	1.88	0	3.27
3	1.02	0	2.57
4	0.73	0	2.28
5	0.58	0	2.11
6	0.48	0	2.00
7	0.42	0.08	1.92
8	0.37	0.14	1.86
9	0.34	0.18	1.82
10	0.31	0.22	1.78
11	0.29	0.26	1.74
12	0.27	0.28	1.72
13	0.25	0.31	1.69
14	0.24	0.33	1.67
15	0.22	0.35	1.65
16	0.21	0.36	1.64
17	0.20	0.38	1.62
18	0.19	0.39	1.61
19	0.19	0.40	1.60
20	0.18	0.41	1.59