UNIVERSITY
OF
JOHANNESBURG

PROGRAM	:	NATIONAL DIPLOMA IN ENGINEERING METALLURGY
SUBJECT	:	**QUATILY CONTROL II**
CODE	:	**TKU21-2**
DATE	:	SUPPLEMENTARY EXAMINATION 00/07/2019
DURATION	:	(SESSION 1) 08:30– 10:30
WEIGHT	:	40:60
FULL MARKS	:	90
TOTAL MARKS	:	90

EXAMINER	:	MR K. MALANDALA
MODERATOR	:	MR E. GONYA
NUMBER OF PAGES	:	4 PAGES

INSTRUCTIONS TO STUDENTS:

1. **ANSWER ALL QUESTIONS.**
2. **DRAW NEAT DIAGRAMS AND WRITE CLEARLY, MARKS CAN BE DEDUCTED FOR UNTIDY WORK.**
3. **ROUND OFF ANSWER TO 3 DECIMAL PLACES**

Question 1 [6]

Define the following terms.

1.1 Nonconforming unit (2)

1.2 Control chart (2)

1.3 Probability (2)

Question 2 [5]

What are the objectives of control charts for variables?

Question 3 [20]

The strengths of 35 silvers are welds and the results are summarised in the tableau below:

Cell Mid-points	Frequency
2.1	5
2.6	4
3.1	7
3.6	3
4.1	4
4.6	2

3.1 Calculate the mean strength of the silver (3)

3.2 Find the median (4)

3.3 Find the mode (4)

4.4 Calculate the variance (6)

4.5 Calculate the coefficient of variation (3)

Question 4 [6]

A finite lot of 15 digital watches is 10 % nonconforming. Using the **hypergeometric** probability distribution, what is the probability that a sample of 3 will contain 2 nonconforming units?

Question 5 [6]

A steady stream of light bulbs has fraction of nonconforming of 0.05 %. If a sample 5 light bulbs is selected, what is the probability of having at most 3 nonconforming units in the sample?

Question 6   **[17]**

The following are the number of cars inspected at a Toyota at Multi-points inspections in Claremont:

Sub group Number	Number inspected	Number of Nonconforming
1	260	18
2	250	12
3	255	22
4	265	12
5	245	6
6	295	16
7	305	8
8	290	20
9	295	14
10	300	10

6.1 Determine the central line and control limits for the appropriate chart   (8)

6.2 Construct the appropriate chart for the data   (9)

Question 7   **[9]**

The count of nonconformities in 1000 square metres of rolled aluminium foil is 3. Find the probability of having (Use the Poisson distribution)

7.1 Four nonconformities   (4)

7.2 Less than 32 nonconformities   (5)

Question 8   **[15]**

The table below summarises the total number of defects for PC boards.

Sample Number	Total defects
1	7
2	3
3	6
4	2
5	1

6	11
7	2
8	15
9	8
10	12
11	3

8.1 Determine the trial central line and control limits. (8)

8.2 Construct the appropriate chart for the data. (6)

8.3 Is the process in control? (1)

Question 9 **[6]**

Given two plans for stipulated producer's risk with $\alpha = 0.05$, AQL= 1.2 % , C = 2 and C = 6. State which of the two plans has a better protection for the consumer.