Menoufia University Faculty of Engineering, Shebin El-Kom Production Engineering and Mechanical Design Department

Final Exam, 2<sup>nd</sup> semester, 2017-2018

Date of Exam: 19/5 / 2018



Subject: Acceptance Sampl.

Code: PRE-621 Year: 2017-2018 Time Allowed: 3Hrs.

Total Marks: 100 Marks

# Answer the following questions

### **Question One**

(30Marks)

- A A company wants to have a variable sampling plan that will not accept a shipment of polyester material, more than 10% of the time, if the lot average tensile strength is 95 psi or less. In the meantime, this company would like to have at least 95% of chance to accept a submitted lot with mean strength of 115 psi or more. The standard deviation of this polyester material is given as 20 psi. AQL = 115 psi, RQL = 95 psi, alpha = 5%, beta = 10% Find sample size, n, and acceptance level, if the sample has an average tensile strength less than the acceptance level, the lot is rejected; otherwise, it is accepted. (a1) (b2) (15 Marks)
- B A company wants to have a variable sampling plan that can be used to determine the disposition of lots of polyester material which has a lower specification limit of 90 psi. The plan shall not accept, more than 10% of the time, a lot with a fraction nonconforming that is 8% or more. In the meantime, it would like to have at least 95% of chance to accept a submitted lot with a fraction nonconforming of 1% or less. The standard deviation of this polyester material is given as 20 psi. LSL = 90 psi, AQL = p1 = 1%, RQL = p2 = 8%, alpha = 5%, beta = 10% Find the sample size n, mean and the critical distance K. (a2) (b2) (15 Marks)

## (20 Marks) **Question Two**

- A Explaining Changes in the OC Curve Effects of Increasing Sample Size While Holding Acceptance Number Constant - Effects of Increasing Acceptance Number While Holding (c3) (5 Marks) Sample Size Constant
- B Construct the AOQ curve for N = 500, n = 10, and c = 1. Let values of p vary from .05 to .40 in steps of .05. Find AOQL

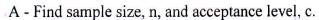
# PROPORTION DEFECTIVE, p

	PROPORTION DELEGIO									
		.05	.10	.15	.20	.25	.30	.35	.40	.45
n			- 107	1060	1074	0563	.0282	.0135	.0060	.0025
10	_			FAAD	2752	2440	.1493	0000	.010	
c = 1	_				~770		30/0	2010		
<b>→</b>	3	.9990	.9872	.9500	.8791	7759	.6496	.5138	.3823	.2660
										n # I

# Question Three

(30 Marks)

A company wants to have a single sampling plan that will not accept, more than 10% of the time, material that is 8% defective or worse. In the meantime, this company would like to have at least 95% of chance to accept a submitted lot with 1% or less nonconforming.  $AQL = p_1 = 1\%$ , Producer's risk, 5% -RQL =  $p_2$  = 8%, Consumer's risk, 10%



B -	Draw the	OC curve	associated	with t	he selected	plan
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(b2)	(	15	Ma	ırks	,

(a2)	(	15	Marks	)
/	-			1

c acceptance level	<i>p</i> <sub>1</sub> <i>n</i> (Pa=0.95)	<b>p</b> <sub>2</sub> <b>n</b> (Pa=0.10)	<i>p</i> √ <i>p</i> <sub>1</sub>
0	0.051	2.30	45.10
1	0.355	3.89	10.96
2	0.818	5.32	6.50
3	1.366	6.68 =	4.89

#### **Question Four**

#### (20 Marks)

A manufacturer receives large batches of components daily and decides to institute an acceptance sampling scheme. Three possible plans are considered, each of which requires a sample of 30 components to be tested:

Plan A: Accept the batch if no non-conforming components are found, otherwise reject.

Plan B: Accept the batch if not more than one non-conforming component is found, otherwise reject.

Plan C: Accept the batch if two or fewer non-conforming components are found, otherwise reject.

- A -For each plan, calculate the probability of accepting a batch Containing (i) 2% non-conforming (ii) 8% non-conforming. (a1) (b2) (10 Marks)
- B Without further calculation sketch on the same axes the operating characteristic of each plan. (a1) (5 Marks)
- C Which plan would be most appropriate in each of the circumstances listed below? (b7) (c4) (5 Marks)
- (i) There should be a high probability of accepting batches containing 2% non-conforming.
- (ii) There should be a high probability of rejecting batches containing 8% non-conforming.
- (iii) A balance is required between the risk of accepting batches containing 8% defective and the risk of rejecting batches containing 2% non-conforming.

#### Members of course examination committee.

Prof. Dr.. Mohamed Fattouh -

Course coordinator

Associ. Prof. Dr. M. Sharaf - Assist. Prof Dr. Amal Mongeda

Assist. Prof Dr. Omyma Nada

#### With our best wishes

		This exa	m me	asure	s the foll	owing I	LOs		
Question Number	Q1-A ,Q2-B, Q4-A,B	Q1-B, Q3-B,			Q1-A,B Q2-B Q3-A,Q4-A	,Q4-C		Q2-A	Q4-C
Skills	a1	a2	a3	b1	b2	b7		C3	C4
	Knowledge	&Understa Skills	anding	Intellectual Skills			Professional Skills		