	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF MATHEMATICS		
	EXAMINATION FOR JUNIORS (THIRD YEAR) STUDENTS OF ZOOLOGY		
COURSE TITLE:	BIOSTATISTICS		COURSE CODE:ST3202
DATE:29 DEC, 2020	TERM: FIRST	TOTAL ASSESSMENT MARKS: 50	TIME ALLOWED: 2 HOURS

Answer the Following Questions: **Total Mark: 50**

Q1. After a nuclear accident, government scientists measured radiation levels at 20 randomly chosen sites in a small area. The measuring instrument used is calibrated to measure the ratio of present radiation to the previous known average radiation. The measurements are summarized by:

$$\sum x = 22.8 \ , \qquad \sum x^2 = 27.55$$

Test at $\alpha = 0.05$, Is there an increase in radiation in that area? **(12 Mark)**

Q2. A study was conducted to determine if a new anti-hypertensive agent could lower the diastolic blood pressure in normal individuals. Initial clinical results are presented in the following table:

Before	68	83	72	75	79	71	65	76	78	68	85	74
After	66	80	67	74	70	77	64	70	76	66	81	68

At level of significance $\alpha = 0.05$, *Did the new drug lower the blood pressure?* **(12 Mark)**

Q3. A quality control manager of a company that operate 4-shifts want to test is there a dependency between the quality of the production (accept or not accept) and which the shift is produced? The data collected is as follows. Test at $\alpha = 0.01$, is there a dependency between them? **(13 Mark)**

	Shift 1	Shift 2	Shift 3	Shift 4
Acceptable	10	10	15	5
Not acceptable	15	5	5	35

Q4. The following is sample information. Test the hypothesis that the treatment means are equal.

Use $\alpha = 0.05$. **(13 Mark)**

Treatment 1	Treatment 2	Treatment 3
8	3	3
6	2	4
10	4	5
9	3	4

You May Use: $\chi^2_{(0.01,3)} = 11.34$, $\chi^2_{(0.01,8)} = 20{,}09$, $t_{0.05,11} = 1.796$, $t_{0.025,11} = 2.201$,

$t_{0.05,4} = 2.132$, $F_{0.05,2,9} = 4.26$, $t_{(0.05,19)} = 1.729$, $t_{(0.025,19)} = 2.093$, $F_{0.05,2,12} = 3.89$.

With all My Best Wishes

Dr. Wafaa Anwar Abd El Latif

4. **The figure below shows a dynamic programming scoring matrix for two sequences:**

	0	T	A	C	T	A	A
0	0	-2	-4	-6	-8	-10	-12
T	-2	1	-1	-3	-5	-7	-9
A	-4	-1	2	0	-2	-4	-6
A	-6	-3	0	1	-1	-1	-3
T	-8	-5	-2	-1	2	0	-2
A	-10	-7	-4	-3	0	3	1

A. Determine the scoring scheme for match, mismatch and gap used to construct this matrix. **(6 Marks)**

B. Explain what the arrows in the figure indicate. **(5 Marks)**

C. Is this a global or local alignment? **Why?** **(6 Marks)**

D. Explain how you would proceed to find the optimal alignment. **(8 Marks)**

D. How many optimal alignments could be obtained? Explain. **(5 Marks)**

With my best wishes

EXAMINERS	PROF. DR. REDA GAAFAR	

Tanta University Faculty of Science – Department of Mathematics and Statistics		
Final Examination (Level Three - Statistics Branch)		
Course Title: Inventory Theory		Corse code: ST3105

Date: Sunday 7/3/2021	Term: First 2020 - 2021	Total Assessment Marks: 150	Time Allowed: 2:00 Hour

Answer the following questions:

Q1 - A company stocks an item that is consumed at the rate of *50* units per day. It costs the company *20* pounds each time an order is placed. An inventory unit held in stock for a week will cost *0.35* pounds. Determine:

a - The optimum inventory policy, assuming lead time of *1* week.

b - The optimum number of orders per year (based on *365* days per year).

Q2 - Using inventory graph to obtain the inventory policy and the total cost of the economic production quantity model under the optimal policy. Then show that the policies of this model reduce to those given for Harris model.

Q3 - If $d = 400$ units per unit time, $C_o = \$20$ per period, $C_h = \$0.1$ per unit time and the average inventory level is $50\sqrt{3}$ units per unit time. Prove that $D = 100$ *or* 300 units per unit time and whichever is the optimal solution that minimizes the inventory total cost.

Q4 - Determine the optimal inventory policy of Harris's EOQ model and if we doubled the ordering and the holding costs, prove that the model sensitivity is affected by hundred percent of the original minimum total cost.

Q5 - What do you understand by stock out, lead time, safety stock, inventory graph and demand's classifications?

With best of luck and success

Dr. K. A. M. Kotb

	Tanta University-Faculty of Science Department of Mathematics			
	Final examination paper (third level) of Statistics			
	Course Title:	**Experimental Design** تصميم تجارب		Course Code: ST3103
Date:	14-March-2021	First semester	Marks: 150	Time Allowed: 2 hours

Question 1. (30 marks)

a) In short statement, define Treatments and Blocks in an experiment such that you show the difference between them.
b) Show diagram example for an experiment with blocks.

Question 2. (30 marks)

a) In short description, show the difference between one-way ANOVA, two-way ANOVA, Latin Square Design.
b) State the general steps of an experiment.

Question 3. (20 marks)

Write the column of degree of freedom (d.f. of treatments, blocks, error and total) in the Anova table of nested design with 3 treatments and 2 blocks, each block has 4 units.

Question 4. (35 marks)

The following data set is for an experiment that involves two levels of temperature and three levels of material. Investigate if there is a difference in temperature levels or not, same for material. Check if there is an interaction between temperature and material?
$(F_{0.05,2,18} = 3.5546, F_{0.05,1,18} = 4.4139)$

I	T_2M_2 19	T_2M_1 34	T_1M_1 30	T_2M_3 44	T_1M_3 40	T_1M_2 26
II	T_2M_1 24	T_2M_2 22	T_2M_3 20	T_1M_2 33	T_1M_1 45	T_1M_3 31
III	T_1M_2 18	T_1M_1 23	T_2M_1 41	T_1M_3 30	T_2M_3 41	T_2M_2 34
IV	T_1M_3 29	T_2M_2 15	T_2M_3 15	T_2M_1 75	T_1M_2 42	T_1M_1 70

Please turn the sheet for Question 5

Question 5. (35 marks)

In an experiment where we used 6 rats (Columns) and 6 mazes (Rows) to see if different kinds of drugs (I, II, III, IV, V, VI) can make rats smarter by finishing the mazes in shorter times. The following data are the times taken by rats to finish the mazes. Check if there are difference between the different kinds of drugs. Also verify if we could cancel the effect of having different rats and different mazes. ($F_{0.05,5,20} = 2.71$).

Rats

Mazes

III 7.9	V 8.7	IV 7.4	I 7.4	VI 7.1	II 8.2
IV 6.1	II 8.2	VI 7.7	V 7.1	III 8.1	I 5.9
I 7.5	III 8.1	V 6	VI 6.4	II 6.2	IV 7.5
VI 6.9	I 8.5	III 6.8	II 7.7	IV 8.5	V 8.5
II 6.7	IV 9.9	I 7.3	III 6.4	V 6.4	VI 7.3
V 7.3	VI 8.3	II 7.3	IV 5.8	I 6.4	III 7.7

Best wishes & good luck

Examiner: Dr. Ahmed AboZaid Elbanna

TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF MATHEMATICS

EXAMINATION FOR PROSPECTIVE STUDENTS (.... YEAR) STUDENTS OF STATISTICS

COURSE TITLE: probability 2			COURSE CODE: ST3121	
DATE 2-2-2021	JAN,...	TERM:FIRST	TOTAL ASSESSMENT MARKS:150	TIME ALLOWED: 2 HOURS

Answer the following questions(each question of 15 marks):

1- If the moment generating function of the random variables X and Y is :

$$M(s,t) = e^{(s+3t+2s^2+18t^2+12st)}$$

deduce the covariance of X and Y.

2- If $Var(X+Y)=3$, $Var(X-Y)=1$, $E(X)=1$ and $E(Y)=2$, find $E(XY)$ ..

3- Let X and Y be discrete random variables with joint probability density function:

$$f(x,y) = \frac{1}{18}(x+2y) \text{ for } x=1,2; \quad y=1,2$$

find the correlation coefficient X , Y.

4- Suppose that the joint p.d.f of the r.v's X and Y is given by :

$$f(x,y)=4y(x-y)e^{-x-y} \quad , \quad 0 \le x \le \infty \ , \ 0 \le y \le x$$

Compute the conditional variance $Var(x|y)$.

5- Let the joint p.d.f of the discrete r.v's X and Y be:

$$p(x,y)=q^2 p^{y-2} \quad , \quad x=1,2,\dots,y-1 \ , y=2,3,\dots \text{ and } 0 \le p \le 1, \ q=1-p$$

prove that $p(x,y)$ is joint p.d.f and find the cumulative distribution function $P(2.4)$.

6- If $f(x|y) = \frac{3x^2}{y^3}$, $y > x > 0$ and $f_2(y) = 5y^4$, $0 < y < 1$, find $E(x)$.

7- If X and Y are r.v.'s with the joint p.d.f. given by:

$$f(x,y) = e^{-x-y} \ , x \ge 0, \ y \ge 0,$$

then calculate: (i) $p(X > 2 / Y > 1)$, (ii) $p(X > Y / 2X > Y)$.

8- If the r.v's X and Y have $\mu_x = 2, \mu_y = -3, \mu_z = 4, \sigma_x^2 = 1, \sigma_y^2 = 5, \sigma_z^2 = 2. \text{cov}(x,y) = -2$

$, \text{cov}(x,z) = -1$ and $\text{cov}(y,z) = 1$, find the mean and the variance of $W = 2X - Y + 3Z$, and the covariance of W and $U = 3X + Y - Z$.

9- Define : i- Covariance ii- Characteristic function iii-Independent .

10- Deduce the moment generating function $M(s,t)$, $E(x)$ and $Var(x)$ for the bivariate binomial distribution which has the p.d.f:

$$p(x,y) = \frac{n!\, p_1^x\, p_2^y (1-p_1-p_2)^{n-x-y}}{x!\,y!\,(n-x-y)!} \quad , \quad x, y = 0, 1, \dots, n.$$

EXAMINERS	PROF. DR./	DR/ ADEL EDRESS
	DR/	DR/

With my best wishes