



قسم الرياضيات

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UNIVERSITY
OF SCIENCE
OF MATHEMATICS

The Second Semester 2015-2016

Systems

Course Code: 3204

150 Marks

Time Allowed: 2 Hours

الاختبار من ورقتين

arrive for execution at the times indicated.
of time listed. (40 marks)

time	Burst time
	12
2	8
4	7
5	3
7	4

- the average waiting time for these processes with:
- FCFS;
 - Non-preemptive SJF;
 - Preemptive SJF;
 - RR with $q = 4$.

- Explain how the operating system makes sure that each process has a separate memory space. (10 marks)

QUESTION 2: [Total marks: 50]

- Compare between each of the following pairs according to the items listed. (20 marks)

Items	Contiguous memory allocation	Paging
Idea		
Memory utilization		
Fragmentation		

Items	FCFS	SJF	RR
Idea			
Starvation			
Preemption			
Convoy effect			

- Consider the memory in the figure below. Assume that page size = 4 bytes and physical memory of 32 bytes, then compute the physical addresses for the following logical ones: (30 marks)

0	a
1	b
2	c
3	d
4	e
5	f
6	g
7	h
8	i
9	j
10	k
11	l
12	m
13	n
14	o
15	p

0	1
1	2
2	5
3	6

page table

logical memory

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TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF MATHEMATICS

EXAMINATION FOR PROSPECTIVE STUDENTS (3RD YEAR) STUDENTS OF
MATHEMATICS

COURSE TITLE: TOPOLOGY(1)

COURSE CODE: MA 3204

DATE: 31/5/2016

TERM:2

TOTAL ASSESSMENT MARKS:150

TIME ALLOWED: 2 H

Answer the following questions:

First question: (50 marks)

- 1- Prove that $\tau = \{\emptyset, N, E_n = \{n, n+1, n+2, \dots\} : n \in \mathbb{N}\}$ is a topology on \mathbb{N} ?
find the closed sets? If $A = \{1, 10\}$ find $A^c, \bar{A}, A^\circ, b(A), Ext(A)$? (29 marks)
- 2- Prove that in a space X $a - A$ is closed iff $A = \bar{A}$, (7 marks)
 $b - \{A^\circ, A^b, A^{ext}\}$ is a partition on X ? (7 marks)
 $c - \bar{A} = A \cup A'$? (7 marks)

Scand question: (50 marks)

- 1- Let β be a class of subsets of a non empty set X . Prove that β is a base for some topology on X iff it has the following two properties
a- $X = \cup\{B : B \in \beta\}$
b- For any $B, B^* \in \beta$, then $B \cap B^*$ is a union of member of β ? (20 marks)
- 2- Show that if (X, τ) is a topological space and $Y \subseteq X$, then $A \subseteq Y$ is τ_y closed iff $A = Y \cap F$, where F is closed in X ? (15 marks)
- 3- Let f be a function from a space X into a space Y , then f is an open function if $f(A^\circ) \subseteq (f(A))^\circ$ for every $A \subseteq X$? (15 marks)

Thread question: (50 marks)

- 1- Let f be a function from a space X into a space Y , then the following statement are equivalent
a- f is a continuous function?
b- $f(\bar{A}) \subseteq \overline{f(A)}$ for every $A \subseteq X$?
c- $\overline{f^{-1}(B)} \subseteq f^{-1}(\bar{B})$ for every $B \subseteq Y$? (20 marks)
- 2- Define and give an example for
a- A subbase for the topology (5 marks) b- A neighbourhood system (5 marks)
c- A relative topology (5 marks) d- A homeomorphism (5 marks)
- 3- Show that if N_p is the neighborhood system of a point p in a space X , then the intersection of any two members of N_p belongs to N_p ? (10 marks)

EXAMINERS	PROF. DR/ ABD EL-MONEAM M. KOZAE
	DR/ MOHAMMED. M. EL-SHARKASY

With my best wishes

Answer the following questionsQUESTION 1:

(i) Use the linear stability analysis as well as a graphical argument to classify the critical points of the system $\dot{x} = \sin x$.

(ii) Determine the maximal interval of existence for the problem $\dot{x} = x^4$, $x(0) = 1$.

(iii) Find the Hamiltonian and then make an approximate sketch for the following system:

$$\dot{x} = y + x^2 - y^2, \quad \dot{y} = -x - 2xy.$$

QUESTION 2:

(i) Define trajectories, phase portrait, isoclines and nullclines. Find the manifolds, isoclines and sign of $\frac{dy}{dx}$ in different regions of the plane, then sketch a phase portrait for the system:

$$\dot{x} = -2x, \quad \dot{y} = -4x - 2y.$$

(ii) State the Poincaré–Bendixson theorem, and then use it to prove that the following system has a limit cycle in the annulus $A = \{r: \frac{1}{2} \leq r \leq 2\}$:

$$\dot{x} = y + x(1/2 - x^2 - y^2), \quad \dot{y} = -x + y(1 - x^2 - y^2).$$

QUESTION 3:

(i) Sketch a phase portrait for the system $\dot{x} = x - y$, $\dot{y} = y - x$.


(ii) Discuss the classification (type and stability) of critical points for the system $\dot{X} = AX$, using the trace τ and determinant Δ of the matrix A .

(iii) Prove that none of the following systems have any limit cycles:

$$(a) \dot{x} = 2xy - 2y^4, \quad \dot{y} = x^2 - y^2 - xy^3; \quad (b) \dot{x} = xe^{-x}, \quad \dot{y} = 1 + x + y^2.$$

(iv) Rewrite the equation $\ddot{x} - \dot{x} + x^3 = 0$ as a planar system, then investigate the stability of the origin for this system using the Lyapunov function $V(x, y) = ax^4 + by^2 + cxy + dy^2$.

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 1969	Tanta University Faculty of Science Department of Mathematics		
	Final term exam for the second semester 2015-2016		
	Course title:	Optimal Control (1)	Course code: MA3210
	Date: 9/6/2016	Total Marks: 150	Time allowed: 2 Hours

Answer all the following questions:

First question: (30 Marks)

(a) Show that the set $S = \{x : |x| \leq 2\} \subset R$ is convex set ?

(b) Find a necessary condition for a function to be an extremal for the

functional $J(x) = \int_{t_0}^{t_f} F(x(t), x'(t), t) dt$, where $t_0, x(t_0), x(t_f)$ and t_f are specified.

(c) Show that the functional $\int_0^1 (xt + x^2 - 2x^2 x') dt$, $x(0) = 1, x(1) = 2$ cannot have any stationary function.

Second question: (40 Marks)

(a) Find the extremals and the stationary function of the functional

$J[x(t)] = \int_0^2 (4 - 3x^2 - 16x' - 4x'^2) e^{-t} dt$ subject to the boundary conditions

$$x(0) = -\frac{8}{3}, x(2) = \frac{1}{3}.$$

(b) Solve the problem $\min J[x_1, x_2] = \int_0^{\frac{\pi}{2}} (x_1'^2 + x_2'^2 + 2x_1 x_2) dt$


such that $x_1(0) = x_2(0) = 0$ and $x_1\left(\frac{\pi}{2}\right) = 1, x_2\left(\frac{\pi}{2}\right)$ is free.

Third question: (40 Marks)

(a) Find the second variation of the functional $J(x) = \int_0^1 [tx^2 + x'^3] dt$.

(b) Optimize $J(x) = \int_0^1 (13t - 3x'^2 + 36xt) dt$, subject to $x(0) = 2, x(1) = 4$.

1431

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF MATHEMATICS			
	EXAMINATION FOR JUNIORS (THIRD YEAR) STUDENTS OF STATISTICS			
	COURSE TITLE: ORDER STATISTICS		COURSE CODE: ST3206	
DATE: JUNE, 2016	TERM: SECOND	TOTAL ASSESSMENT MARKS: 150	TIME ALLOWED: 2 HOUR	

Answer the following questions:

1-(a) If X_1, X_2, X_3, X_4, X_5 is a random sample of size 5 from the uniform distribution on $(0, b)$, then find probability density function (p.d.f.) of the sample median and the mean of the sample median. (20 Marks)

(b) Let Y_1, Y_2, Y_3, Y_4 denote the order statistics of a random sample of size 4 from a population with a p.d.f.

$$f(x) = 2x, \quad 0 < x < 1,$$

find the p.d.f. of Y_3 and $p(Y_3 > 0.5)$. (15 Marks)

(c) If Y_1, Y_2, \dots, Y_6 is an order sample of size 6 from the exponential distribution with parameter λ , then find the joint p.d.f. of Y_1, Y_2, \dots, Y_6 and the joint p.d.f. of Y_1 and Y_6 . (15 Marks)

2- (a) Define: population, order statistics, parameter, statistic, midrange, random sample. (15 Marks)

(b) Find the mean and the variance of $F_n(x)$, where $F_n(x)$ is the cumulative distribution function of the random sample of size n from a population with a cumulative distribution function (C.D.F.) $F(x)$. (20 Marks)

(c) Deduce the C.D.F. of the maximum and the C.D.F. of the minimum of the random sample X_1, X_2, \dots, X_n . (15 Marks)

3-(a) If Y_1, Y_2, \dots, Y_n is an order sample from the uniform distribution on $(0,1)$, then find the p.d.f. of the random variable $\frac{Y_1}{Y_2}$ and the mean and the variance of it. (25 Marks)

(b) If X_1, X_2, X_3 is a random sample of size 3 from the uniform distribution on $(0,1)$, then find the p.d.f. of the sample range. (25 Marks)

EXAMINERS	PROF. DR./AHMED E. ABOU-ANBER	DR/ HAMDY M. ABOU-GABAL
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TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF MATHEMATICS

EXAMINATION FOR JUNIORS (THIRD YEAR) STUDENTS OF ZOOLOGY, BIO-CHEMISTRY

COURSE TITLE:	BIOSTATISTICS			COURSE CODE:ST3202
DATE:29 MAY, 2016	TERM: SECOND	TOTAL ASSESSMENT MARKS: 50	TIME ALLOWED: 2 HOURS	

Answer the Following Questions:

Total Mark: 50

Q1. Calculate the mean, the median, the mode and the standard deviation for the following data

Weight	57-	63-	69-	75-	81-	87-93
Frequency	8	18	26	33	11	4

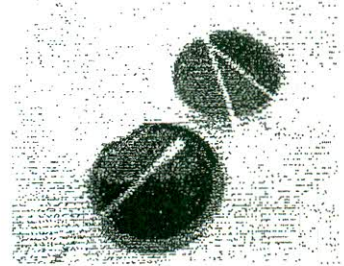
(15 Mark)

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: Four streams are sampled to determine if they differ in their microbiological community structure. In particular, the presence or absence of two species are recorded for each stream, one species being pollution tolerant, and one not. If the streams differ in their proportion of pollution-tolerant species. Test at $\alpha = 0.01$, whether the streams are independent of the pollution-tolerant organisms.



	Stream 1	Stream 2	Stream 3	Stream 4
Tolerant	14	9	17	10
Intolerant	6	26	13	5

(11 Mark)

Q4: For the following data :

X	2	4	7	5	3	5	6	4	7	3
Y	3	5	9	7	4	6	7	6	8	5

(i) Calculate Pearson correlation coefficient (r). (ii) Find the regression line $y = a + bx$.

(iii) Estimate the value of y at $x = 7$. **(12 Mark)**

$$\chi^2_{(0.01,3)} = 11.34, \chi^2_{(0.01,8)} = 20.09, t_{0.05,11} = 1.796, t_{0.025,11} = 2.201, t_{0.05,12} = 1.782$$

EXAMINERS

PROF.DR. MEDHAT EL-DEMSESY

DR. WAFAA ANWAR ABD EL-LATIF

With all Our Best Wishes

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		TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF MATHEMATICS			
		EXAMINATION FOR JUNIORS (THIRD YEAR) STUDENTS OF ZOOLOGY, BIO-CHEMISTRY			
COURSE TITLE:		BIOSTATISTICS		COURSE CODE:ST3202	
DATE:29	MAY, 2016	TERM: SECOND	TOTAL ASSESSMENT MARKS: 50	TIME ALLOWED: 2 HOURS	

Answer the Following Questions:

Total Mark: 50

Q1. Calculate the mean, the median, the mode and the standard deviation for the following data

Weight	57-	63-	69-	75-	81-	87-93
Frequency	8	18	26	33	11	4

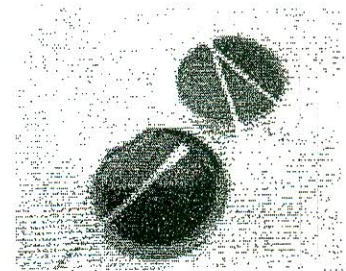
(15 Mark)

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

Q3: Four streams are sampled to determine if they differ in their microbiological community structure. In particular, the presence or absence of two species are recorded for each stream, one species being pollution tolerant, and one not. If the streams differ in their proportion of pollution-tolerant species. *Test at $\alpha = 0.01$, whether the streams are independent of the pollution-tolerant organisms.*



	Stream 1	Stream 2	Stream 3	Stream 4
Tolerant	14	9	17	10
Intolerant	6	26	13	5

(11 Mark)

Q4: For the following data :

X	2	4	7	5	3	5	6	4	7	3
Y	3	5	9	7	4	6	7	6	8	5

(i) Calculate Pearson correlation coefficient (r). (ii) Find the regression line $y = a + bx$.

(iii) Estimate the value of y at $x = 7$.


(12 Mark)

$$\chi^2_{(0.01,3)} = 11.34, \chi^2_{(0.01,8)} = 20.09, t_{0.05,11} = 1.796, t_{0.025,11} = 2.201, t_{0.05,12} = 1.782$$

EXAMINERS	PROF.DR. MEDHAT EL-DEMSESY	DR. WAFAA ANWAR ABD EL-LATIF
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With all Our Best Wishes

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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF MATHEMATICS			
	EXAMINATION FOR JUNIORS (THIRD YEAR) STUDENTS OF STATISTICS			
	COURSE TITLE: CORRELATION THEORY 2		COURSE CODE: ST3210	
DATE: JUNE, 2016	TERM: SECOND	TOTAL ASSESSMENT MARKS: 150	TIME ALLOWED: 2 HOUR	

Answer the following questions:

1-(a) Given the two random variables X and Y with the joint distribution

	y	- 4	2	7
x				
1		1/8	1/4	k
5		1/4	1/8	1/8

(i) Find: $K, Cov(X, Y)$.

(ii) Find the correlation coefficient of X and Y . (25 Marks)

(b) Consider an experiment of tossing a fair coin three times. Let (X, Y) be a bivariate random variable, where X is the number of heads that occurs in the first two tosses and Y is the number of tails that occurs in the second and third tosses. Find $Cov(X, Y)$ and the correlation coefficient of X and Y . (25 Marks)

2-(a) Given the two random variables X and Y which have the joint p. density function

$$f(x, y) = \begin{cases} \frac{4}{5}(x + 3y)e^{-(x+2y)}, & \text{for } x > 0 \text{ and } y > 0 \\ 0, & \text{elsewhere} \end{cases}$$

find the regression equation of Y on X . (25 Marks)

(b) If X and Y are random variables, then prove that (i) $\rho(aX, bY) = \rho(X, Y)$,

(ii) $\rho(X, Y) = \rho(X', Y')$ where a and b are constants, $X' = X - a$ and $Y' = Y - b$. (25 Marks)

3-(a) If X and Y are random variables, then prove that $|\rho(X, Y)| \leq 1$. (20 Marks)


(b) In a study of reaction times, the time to respond to a visual stimulus (x) and the time to respond to an auditory stimulus (y) were recorded for each of 10 subjects. Times were measured in ms. The results are presented in the following table:

X	161	203	235	176	201	188	228	211	191	178
y	159	206	241	163	197	193	209	189	169	201

(i) Find a 95% confidence interval for the correlation between the two reaction times,

(ii) Would you say that the variables X and Y are independent? Why? Use $\alpha = 0.05$ and $Z_{0.025} = 1.96$. (30 Marks)

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	Tanta University Faculty of Science Department of Mathematics		
Examination for :		Level Three – Mathematics	
Course Title: Elasticity		Course Code: MA3216	
Time: 14/ 6/ 2016	Term: Second	Total Assessment Marks: 150 M	Time Allowed: 2H

Answer the following questions:

First question: (35 Marks)

- (a) Define the following: Homogeneous and Isotropic materials – Elasticity and Plasticity materials.
- (b) Discuss with graphics Mohr's circles, and the maximum shearing stresses.

Second question: (40 Marks)

(a) The stress state at any point in continuous media in the Cartesian coordinates is given by:

$$\tau = \begin{pmatrix} 3xy & 5y^2 & 0 \\ 5y^2 & 0 & 2z \\ 0 & 2z & 0 \end{pmatrix}.$$

- (i) Find the stress vector at the point p (2, 1, $\sqrt{3}$) on the plane, tangential to the cylindrical surface $x^2 + y^2 = 9$ at p.
- (ii) By using Hook's law, find the corresponding strain tensor at p, if $E = 1$, $\nu = 2$.

(b) Show that the strain energy for plane stress: $W = (\sigma_x^2 + \sigma_y^2 - 2\nu\sigma_x\sigma_y + 2(1+\nu)\tau_{xy}^2) / 2E$.

Third question: (35 Marks)

- (a) Drive the relation between displacement components vector (u, v, w) and strain tensor ϵ_{ij} .
- (b) Deduce the differential equations of plain strain problem $u = u(x, z)$, $v = 0$, $w = w(x, z)$.

Forth question: (40 Marks)

- (a) Drive the Michell's equations for solving the elasticity problem in terms of stresses.
- (b) Discuss the problem of pure bending of a prismatical bar and determine its displacement components.


With best wishes

Prof. Dr. Magdy Serwah

and

Dr. Kh. El-Morabie

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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF MATHEMATICS		
	EXAMINATION FOR PROSPECTIVE STUDENTS (3RD YEAR) STUDENTS OF MATHEMATICS		
	COURSE TITLE: QUANTUM MECHANICS I		COURSE CODE: MA3206
DATE: 19/6/2016	TERM: SECOND	TOTAL ASSESSMENT MARKS:	TIME ALLOWED: TOW HOURS

[1] [A] For a particle with a wave function $\Psi_n = A \sin \frac{n\pi}{a} x$, $0 \leq x \leq a$:

iii) Find the probability density $P(x, t)$ and the probability current density $J(x, t)$.

iv) Find the expectation values of position and momentum.

[B] Prove that $\frac{d}{dt} \langle A \rangle = \langle \frac{\partial A}{\partial t} \rangle + \frac{1}{i\hbar} \langle [H, A] \rangle$ where A is a physical quantity and H is

Hamiltonian and prove that $\frac{d\langle P \rangle}{dt} = -\langle \nabla V \rangle$ for particle of mass m moving in a potential $V(r)$

[2] [A] Find the energy levels of a one-dimension harmonic oscillator potential $V = k^2 x^2 / 2$.

[B] Find the **normalized** constant of the one-dimension harmonic wave functions

$\Psi_n(x) = N_n \cdot e^{-\xi^2/2} \cdot H_n(\xi)$, $\xi = \sqrt{\alpha} x$, since H_n is generated from

$$S(\xi, s) \equiv e^{\xi^2 - (s-\xi)^2} \equiv \sum_{n=0}^{\infty} \frac{H_n(\xi)}{n!} s^n.$$

[3] [A] Prove that $[L_x, L_y] = i\hbar L_z$ and $[P_x, L_y] = i\hbar P_z$.

[B] Show that L_y can be expressed in spherical polar coordinates as

$$L_y = i\hbar \left[\cos \varphi \frac{\partial}{\partial \vartheta} + \cot \vartheta \sin \varphi \frac{\partial}{\partial \varphi} \right],$$

[4] If the particle of mass m collision with the potential $V(x) = \begin{cases} 0 & \text{for } 0 > x > a \\ V_0 > 0 & \text{for } 0 < x < a \end{cases}$

Prove that $J(x) = \begin{cases} v(1 + |B|^2) \\ v|C|^2 \end{cases}$, v is the speed of particle.

EXAMINERS	PROF. DR./	DR/
	DR/	DR/

With my best wishes



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Final Term Exam for the Second Semester 2015-2016

Course Title: Automata

Third year- Computer Science

Course Code: CS3202

Date: 19/6/2016

Total Mark: 150 Marks

Time Allowed: 2 Hours

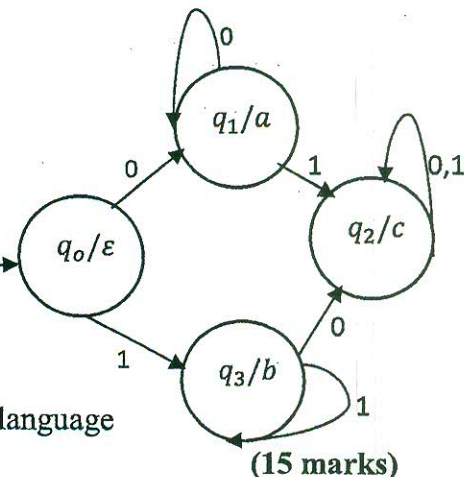
1969

Answer the following questions

Question 1: (30 marks)

a) Consider the following diagram of an automata

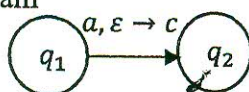
- (i) What is the type of this automata? (5 marks)
- (ii) Construct the table of its transition function. (5 marks)
- (iii) Convert it to equivalent automata of another type. (5 marks)



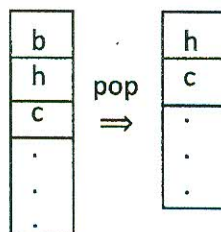
b) State the Pumping Lemma and use it to investigate the regularity of the language $L = \{a^n b^n : n \geq 0\}$. (15 marks)

Question 2: (50 marks - every item has 5marks) Mark true or false, justify your answer:

- a) The grammar $G = (\{S, A, B\}, \{a, b\}, S, P)$ where $P = \{S \rightarrow aB/ab, A \rightarrow aAB/a, B \rightarrow ABb/b\}$ is ambiguous.
- b) The productions in CFG have the form $(V \cup T)^* \rightarrow (V \cup T)^+$.
- c) The regular language $L = \{0, 1, 10, 100, 1000, 10000, \dots\}$ correspondence to a regular expression $(0 + 10^*)$.
- d) The automata of the complement language of a given language is obtained by creating new start and final states.
- e) In Moor machine the outputs depend on the inputs and states, but in Mealy machine the outputs depend only on the states.
- f) Two regular expression (0^*1^*) and $(0 + 1)^*$ are equivalent.
- g) In pushdown automata the diagram



means that a is an input and



h) If $u = a^2ba^3b^2$ and $v = bab^2$ then $v^2 = ba^2ab^2$ and $\|uv\| = \|vu\| = 10$.

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2016



Tanta University
Faculty of Science
Mathematics Department
(Computer Science Deviation)



Systems Analysis and Design (3rd year)

2015-2016

Second Term

Time Allowed: 2 Hours

Attempt all the following questions

Question No: 1



- Draw Data Flow Diagram for Train Ticket Reservation System. Create a context level diagram to identifying the entities in the system. Create a level 0 diagram and sub levels to identifying the logical subsystems that may exist.
- Use Structure English, Decision Table and Decision Tree to make process specification for Train Ticket Reservation System mentioned in the previous point.
- Use data dictionary to describe data elements in the DFD.
- Draw ERD for the system.
- Use normalization forms to obtain the final relations of the system.

Question No: 2

- Draw Data Flow Diagram for Student Course Registration System. Create a context level diagram to identifying the entities in the system. Create a level 0 diagram and sub levels to identifying the logical subsystems that may exist.
- Use Structure English, Decision Table and Decision Tree to make process specification for Student Course Registration System mentioned in the previous point.
- Use data dictionary to describe data elements in the DFD.
- Draw ERD for the system.
- Use normalization forms to obtain the final relations of the system.

Good luck

216

	<p style="text-align: center;">Tanta University Faculty of Science Mathematics Department (Computer Science Deviation)</p>	
Systems Analysis and Design (3rd year)		
2015-2016	Second Term	Time Allowed: 2 Hours

Attempt all the following questions

Question No: 1


- a. Draw Data Flow Diagram for Train Ticket Reservation System. Create a context level diagram to identifying the entities in the system. Create a level 0 diagram and sub levels to identifying the logical subsystems that may exist.
- b. Use Structure English, Decision Table and Decision Tree to make process specification for Train Ticket Reservation System mentioned in the previous point.
- c. Use data dictionary to describe data elements in the DFD.
- d. Draw ERD for the system.
- e. Use normalization forms to obtain the final relations of the system.

Question No: 2

- a. Draw Data Flow Diagram for Student Course Registration System. Create a context level diagram to identifying the entities in the system. Create a level 0 diagram and sub levels to identifying the logical subsystems that may exist.
- b. Use Structure English, Decision Table and Decision Tree to make process specification for Student Course Registration System mentioned in the previous point.
- c. Use data dictionary to describe data elements in the DFD.
- d. Draw ERD for the system.
- e. Use normalization forms to obtain the final relations of the system.

Good luck

251

 <p style="text-align: center;">TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF MATHEMATICS</p>				
EXAMINATION FOR JUNIORS (THIRD YEAR) STUDENTS OF STATISTICS				
COURSE TITLE:		Statistical Methods		COURSE CODE: ST3212
DATE: 2	JUNE, 2016	TERM: SECOND	TOTAL ASSESSMENT MARKS: 150	TIME ALLOWED: 2 HOURS

Answer the Following Questions:

Total Mark: 150

Q1. 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? (30 Mark)

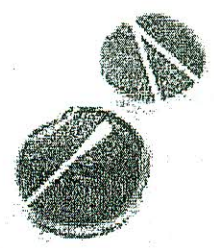
Q2: A researcher believes that in recent years women have been getting taller. She knows that 10 years ago the average height of young adult women living in her city was 63 inches. She randomly samples 8 young adult women currently residing in her city and measures their heights. The following data are obtained:



64	66	68	65	60	67	65	63
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At level of significance $\alpha = 0.05$, Do you think that the researcher is correct in her believe? (30 Mark)

Q3: Four streams are sampled to determine if they differ in their microbiological community structure. In particular, the presence or absence of two species are recorded for each stream, one species being pollution tolerant, and one not. If the streams differ in their proportion of pollution-tolerant species. Test at $\alpha = 0.01$, whether the streams are independent of the pollution-tolerant organisms.

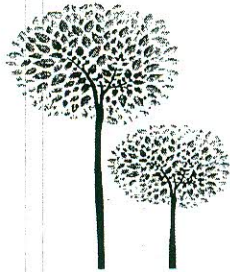


	Stream 1	Stream 2	Stream 3	Stream 4
Tolerant	14	9	17	10
Intolerant	6	26	13	5

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(30 Mark)

Q4: Some leaves of a certain tree are collected to extract a drug from them. A study is done to determine if there is a correlation between the height of the leaves and the concentration of the drug.



Test at $\alpha = 0.05$,

(i) Is there a significant positive correlation between the height and the concentration?

(ii) Find the least square regression model $Y = a + bX$ and test the null hypothesis $H_0: b = 0$ against $H_1: b \neq 0$ using t-test if the sample data are as follows:

Height (X)	2	4	7	5	3	5	6	4	7	3
Concentration(Y)	3	5	9	7	4	6	7	6	8	5

(40 Mark)

Q5: A random sample of 80 observations on X is summarized below;

x	0	1	2	≥ 3
Frequency	14	30	17	19

Test at $\alpha = 0.05$, is X has Poisson distribution with mean = 1.6.

(20 Mark)

Note that:

$$\chi^2_{(0.01,3)} = 11.34, \chi^2_{(0.01,8)} = 20.09, t_{0.025,8} = 2.306, t_{0.05,11} = 1.796, t_{0.05,12} = 1.782,$$

$$t_{0.05,8} = 1.860, t_{0.05,7} = 1.895, Z_{0.05} = 1.64, \chi^2_{(0.05,3)} = 7.81$$

WITH ALL OUR BEST WISHES

EXAMINERS

PROF.DR. HALA FERGANY

DR. WAFAA ANWAR ABD EL-LATIF