



FOUNTAIN UNIVERSITY OSOGBO, NIGERIA

P.M.B.4491, OSOGBO, OSUN STATE.

COLLEGE OF NATURAL AND APPLIED SCIENCES DEPARTMENT OF MATHEMATICAL AND COMPUTER SCIENCES 2021/2022 FIRST SEMESTER EXAMINATION

MAT203: SET, LOGIC, AND ALGEBRA

Time Allowed: 2hrs

INSTRUCTION(s): Answer ANY 4 THE QUESTIONS

Credit Unit/Status: 3 (C)

21/03/2022

1. (a) Define the following:
(i) Power set, $P(A)$, of a non empty set A .
(ii) Cartesian product of sets X and Y .
(b) If $A = \{p, q, r, s\}$ find $P(A)$.
(c) For the sets $A = \{1, 2, 3\}$; $B = \{3, 5\}$; $C = \{3, 5\}$; $D = \{4, 6\}$.
Find (i) $(A \times C) \cup (B \times D)$ (ii) $(A \cup B) \times (C \cup D)$. (15Marks)

2. (a) What do you understand by the following:
(i) Equivalence relation? (ii) Equivalence class?
(b) State the generalized principle of mathematical induction.
(c) Use Mathematical induction to prove that $4^{2n} - 1$ is divisible by 5 for all $n \in \mathbb{N}$ (15Marks)
- 18/3/2022
23/3/2022

3. (a) What do you understand by the following?
(i) mapping (ii) domain of a mapping, (iii) codomain of a mapping, (iv) image set of a mapping, (v) surjective mapping, (vi) injective mapping, (vii) bijective mapping, (viii) identity mapping (ix) inverse of a mapping (x) composition of mappings (15Marks)

4. (a) Consider the set I of ordered pairs
 $I = \{(m, n) : m, n \text{ are natural numbers}\}$.
An operation \oplus is defined on I by
(a, b) \oplus (c, d) = (a + c, b + d);
Show that this operation is commutative and associative.
(b) Two binary operations \oplus and \otimes over the universal set s are defined by
 $A \oplus B = A \cup B \quad A \otimes B = A \cap B \quad \forall A, B \in s$.
Show that
(i) \oplus is both commutative and associative.
(ii) \oplus is distributive over \otimes . (15Marks)

5. (ai) Give the definition of a relation
(aii) State the properties of a relation in a set.
(b) The operation $*$ defined over \mathbb{R} the set of real number by:

$$P * Q = P + Q - \frac{1}{2}PQ$$

- (i) Show that $*$ is commutative and associative.
(ii) Find the identity element for the operation $*$. (15Marks)

6. (a) Define the following (i) a groupoid (ii) a semigroup (iii) a monoid (iv) a group (v) an abelian group
(b) Show that the identity element in a group is unique.
(c) Show that the inverse of every element in a group is unique. (15Marks)



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COLLEGE OF NATURAL AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICAL AND COMPUTER SCIENCES

2021/2022 FIRST SEMESTER EXAMINATION

CPS 203: DATA PROCESSING & WEB DESIGN

Credit Unit/Status: 2 (C)

Time Allowed: 2.00Hours

27/03/2022

INSTRUCTION(s): Attempt ALL Questions in Section A & Any Two (2) Questions in Section B.

SECTION A

Question 1

Assuming Fountain University is proposing a Faculty of Computing and Informatics that will house three main Departments, namely Department of Computer Science, Department of Information System and Department of Cybersecurity. You have been asked to provide a web site that will promote the programmes of these Departments. You are to do the following:

- a. Create a detailed sketch of the website [5marks]
- b. Implement (using HTML) the home page of your site. [10marks]

Question 2

- a. Write short note on the terms: [10 marks]
 - (i) Markup languages (ii) HTML5 (iii) CSS
 - (iv) PHP (v) Site Map
- b. Write PHP codes to display your personal details to display your personal details to include Matriculation Number, Address, Email Address, Department, Year of study and your favorite quotes. [5marks]

SECTION B

Question 1

- a. Using suitable examples, describe the purpose of the following HTML elements. [10marks]
 - (i) Head (ii) Body (iii) Blockquote
 - (iv) Structural elements (v) Phrase elements
- b. As a web programmer, why would you use POST Method to send your data, rather than the GET method? [3marks]
- c. Differentiate between Web Programming and any other type of programming that you know? [2marks]

Question 2

- a. Describe the various ways of passing variables from page to page. [7½marks]
- b. Give three (3) reasons why you must use CSS on your web page. [2 ½marks]
- c. Describe a reason to use external styles. Explain where external styles are placed and how web pages indicate that they are using external styles. [5marks]

Question 3

- a. Explain why it is good practice to place the e-mail address on the web page and within the anchor tag when creating an e-mail link. [2½marks]
- b. Design and implement a personal registration form for prospective applicants of Developers Students' Club. [5 marks]
- c. Differentiate between the following terms: [7½marks]
 - i. Web and Internet
 - ii. Block level elements and Inline elements
 - iii. Ordered lists and Unordered lists.
 - iv. Relative Hyperlinks and Absolute hyperlinks
 - v. Embedded Style Sheet and External Style sheet.



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COLLEGE OF NATURAL AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICAL AND COMPUTER SCIENCES

2021/2022 FIRST SEMESTER EXAMINATION

CPS 205: COMPUTER HARDWARE Credit Unit/Status: 2 (C)

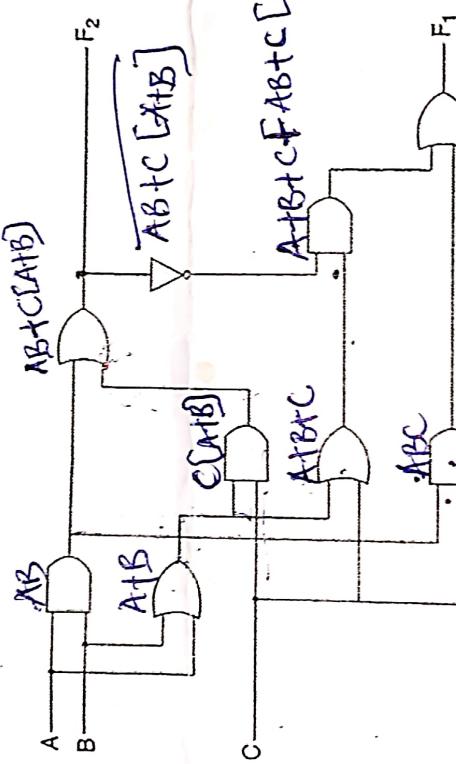
Time Allowed: 2.00 Hours.

INSTRUCTION(s): ATTEMPT ALL QUESTIONS IN SECTION A AND ONLY ONE (1) QUESTION IN SECTION B.

SECTION A

Question 1

- Explain the following terms in relation to Computer Hardware Design. [12½marks]
 - Logic Gates.
 - Integrated Circuits.
 - Combinational Circuits
 - Sequential Circuits
 - Karnaugh maps.
- Enumerate the types of Integrated Circuits and their applications. [5marks]
- Why must System Designer strive to build less complex circuits?
- Analyze the two-output combinational circuits shown in Figure below.
 - Derive the truth table of the circuit and obtain the Boolean functions for the two outputs (F_1 & F_2) of the circuit operation. [4marks]



- Find the value of F_1 and F_2 if $A = 1$, $B = 0$ and $C = 1$. [1mark]

Question 2

- Write short note on the following devices: [12 ½ marks]
 - Peripheral devices
 - Printers
 - Primary Memory
 - Magnetic devices
 - Character recognition device.
 - Among the selling points of microcomputers are:
 - The size of the RAM;
 - The speed of the processor.
 - The size of the hard disk.
- Write an essay of not more than 70 words to justify each of the selling points. [5marks]

- c) Highlight the factors to consider when you want to buy an appropriate printer. [2 ½ marks]

SECTION B

Question 1

- a) Assuming the FUO management is planning to install an Alarm Bell in the Server room, to protect it from unauthorized entry. The sensor device provides the following logic signal: $C=1$ when the Control system is active; $D=1$ if the Door is closed; $M=1$ if there is a Motion in the room; and $Q=1$ if the motion is open to the public. Design a digital circuit that will be used to control the Alarm bell.
- b) Differentiate between the following devices:
- i. Primary and Secondary Storage.
 - ii. Hard disks and Magnetic Tapes.
 - iii. DRAM and MPUs.
 - iv. Combinational circuits and Sequential circuits.
 - v. Laser and Inkjet printers.

Question 2

- a) With the aid of an illustration, describe how Computer components interact to make a functional computing system.
- b) A 4-bit binary number is applied to a circuit on four lines **A**, **B**, **C**, and **D**. The circuit has a single output, '**O**', which is true if the number is in the range 3-12, inclusive.
- i. Draw a truth table for this problem, and obtain a simplified expression for **O** in terms of the inputs.
 - ii. Implement the circuits in terms of logic gates.



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P.M.B. 4491, OSOGBO, OSUN STATE.

COLLEGE OF MANAGEMENT & SOCIAL SCIENCES

GENERAL STUDIES UNIT

FIRST SEMESTER EXAMINATION | 2020/2021 SESSION

COURSE CODE: FUC 201
TIME: 45 MINUTES

COURSE TITLE: FOUNTAIN UNIVERSITY FIQH CLASS
CREDIT UNIT/STATUS: 0

Name: ADELEKE TATIATH ATOMIDE

Department: CPS

Level: 200 Level

Matric. No: FUC/200379 College CONAS

INSTRUCTION: Answer all the questions by TICKING the correct options; any alteration in ticking will be cancelled.

1. Which of the following concepts is better interpreted as God-consciousness?

(A) Taqwa

(B) Niyyah

(C) Ikhlaas

(D) Sidq

2. Who narrated the hadith: "The distance between the shoulders of the kaafir [in Hell] will be that of three days' swift travelling"?

A. Ibn Abbaas

B. Abu Hurayrah

C. Mu'aadh ibn Jabal

D. Umar

3. The aim and the hope of every Muslim is -----

4. Ahl-al-Kitab refers to People of the book.

5. The food of the people of the scripture is not allowed for a Muslim. True or false?

6. Punishment for theft depends on the following EXCEPT

A. Age of the thief

B. The amount stolen

C. Reasons for stealing

D. Time of stealing

7. If a Christian says tasleem to a Muslim correctly, the Muslim has to respond with the same or better. True or false?

8. The fact that everything is preordained implies than human struggle is needless. True or false?

9. The verse "...it is possible that you dislike a thing which is good for you and that you love a thing that is bad for you. Allah knows while you do not know" emphasizes the importance of

(A) Qada' or Qadr

Quran 2:216

(B) Taqwa

(C) Ikhlas

(D) Haqq

10. The phrase "Inna illahi, wa inna ilayhi raji'un" means Indeed we are from God and indeed to him we shall return.

11. Submission to the will of Allah (Islam) implies that the Muslim loses his freedom to choose between right and wrong. True or False?

12. Allah uses the plural we for Himself in the Quran to show that God is not a person but a all embracing Power that can't be defined.

13. The conditions for an acceptable dress of a Muslim include the following EXCEPT

A. It should be loose

B. It must not be transparent

C. It should cover the mawat

14. In Islam, men are not allowed to wear complete silk or gold. True or False?

15. The prophetic tradition "*Whoever performs an action not in accordance with our affairs is rejected*" prohibits----

A. Invention

B. Innovation in the matters of the Deen

C. General innovation D. Disbelief

16. Islam prohibits tobacco smoking. True or False?

17 ----- means Allah's decree, implying His complete final control over the outcome of events

(A) Qada' or Qadr

(B) Taqwa

(C) Ikhlas

(D) Haqq

18. The knowledge of Allah is complete while ours is

(A) limited and partial

(B) Comprehensive

(C) Superior

(D) Inferior

19. Allah (SWT) is described as *Al-Wadood* which means -----

(A) The Loving and Kind

(B) Ungrateful

(C) Limitless

(D) The powerful

20. A man's "awrah" extends from the while a woman's "awrah" is the whole body with the exception of the face, feet & hand.

21. The four (4) types of divorce recognized in Islam are , , , and

22. One who denies the truth is termed

(A) Kafir

(B) Muhsin

(C) Mu'min

(D) Soodiq

23. The type of ritual birth which a woman takes after her monthly circles is

(A) Guslu Janaba

(B) Gusl Haid

(C) Gusl nifaas

(D) Gusl Islam

24. The crescent-moon and star have no religious implications nor are they part of the fundamentals or basic teachings of Islam. True or False?

25. The word Munatiq refers to

A. Wrongdoer

(B) Hypocrite

C. Non-believer

D. Pious Muslim

26. The following are prohibited forms of clothing EXCEPT?

A. Clothing that reveals the private parts

B. Clothing that involves dressing like or imitating the opposite sex:

C. Clothing that involves imitation of the dress traditionally worn by non-Muslims

(D) Clothing involving multiple colours

27. Except in case of an emergency, it is highly discouraged to travel alone or with less than two people. True or False?

28. The following are among the etiquettes of travelling EXCEPT

A. choosing a good company

B. Selecting a leader

C. Informing the family of the arrival time

(D) Traveling early in the morning

29. Before entering the toilet, we say *Alhamdulillah* *Inni fakharu min kurti wal khraf*

30. When performing the ritual bath, the first thing to do is

(A) Make an intention

B. Say 'Bismillah' [meaning: (I begin) in the name of Allah]

C. Wash both hands three times.

D. Wash the genitalia with the left hand.

② - Divorce pronounced by the husband
- Divorce by mutual consent but pronounced by the husband
- Tahla



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DEPARTMENT OF MATHEMATICAL AND COMPUTER SCIENCES
FIRST SEMESTER EXAMINATIONS 2021/2022 SESSION

CPS 207: FOUNDATION OF SEQ. PROG. LANG.

Time Allowed: 2hrs

Credit Unit/Status: 2 [C]

23/03/2022

INSTRUCTION(s): ANSWER ALL QUESTION IN SECTION A AND ANY OTHER TWO (2) QUESTIONS IN SECTION B

SECTION A: Answer all (30 Marks)

- 1 What are constants? [2 Marks]
- 2 Give two examples each of Integer constant, Character and String constant. [3 Marks]
- 3 Write instructions to evaluate the arithmetic expression $5 + (6-2)$ leaving the result in register ax using. [3 Marks]
- 4 Explain the following stating their functions:
 - a. The Address Bus
 - b. The data bus
 - c. The control bus [3 Marks each]
- 5 The number, size, and types of registers vary from one microprocessor to another, list four basic microprocessor registers. [4 Marks]
- 6 What is the difference between the single chip microcomputer and a microprocessor chip? [3 Marks]
- 7 List and explain the three (3) segment of an assembly language. [6 Marks]

SECTION B: Answer any other two (2) questions

Question 1

- a) Explain briefly with an appropriate example, 4 types of statements in an Assembly Programming Language. [4 Marks]
- b) Write an Assembly language instructions format and explain each part with appropriate examples. [6 marks]
- c) Write an Assembly language program to find the Sum of all numbers 1 to 10 starting from the rear and divide by 5. It then stores the result in AX. [5 Marks]

Question 2

- a) Explain briefly the Logic components of a single chip microprocessor. [9 Marks]
- b) List 3 examples each of 16bits, 32bits, and 64bits registers. [6 Marks]

Question 3

- a) Discuss three (3) mode of execution in computer high level programming. [3 Marks]
- b) Differentiate between Assembly Language and High-Level Language. [3 Marks]
- c) Explain how processor performs its function or execute instructions. [9 Marks]

Question 4

- a) Consider the following line of code, explain the funtion of each line

```
;TITLE Add and Subtract      (AddSubAlt.asm)
; This program adds and subtracts 32-bit integers
.686
.MODEL flat,stdcall
.STACK 4096
; No need to include Irvine32.inc
ExitProcess PROTO, dwExitCode: DWORD
.code
main PROC
    mov eax,10000h          ; EAX = 10000h
    add eax,40000h          ; EAX = 50000h
    sub eax,20000h          ; EAX = 30000h
    push 0
    call ExitProcess        ; to terminate program
main ENDP
END main
```

[15 Marks]



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COLLEGE OF NATURAL AND APPLIED SCIENCES DEPARTMENT OF MATHEMATICAL AND COMPUTER SCIENCES FIRST SEMESTER EXAMINATION 2021/2022

MAT201: Mathematical Method I

Time Allowed: 2hrs

INSTRUCTION(s): Answer ANY 4 QUESTIONS

Credit Unit/Status: 3 (C)

28/03/2022

QUESTION ONE

(a) Evaluate the following limits;

(i) $\lim_{x \rightarrow -1} (3x^3 + 2x^2 - 3x - 4)$

(ii) $\lim_{x \rightarrow 2} \frac{2x^2 - 4}{x^2 - 5x + 2}$

(b) Differentiate the following functions

(i) $x^3 - 4x^2 + 8$

(ii) $\frac{x^4}{3x^2 - 4x - 2}$

(c) Find the Maclaurin Series of e^x

(d) If $w = x^2y^2 + 3xy^2 + xy^2 - 6xy + x^2 + y^2 - 6$.

Find ; (i) $f_x(w)$; (ii) $f_y(w)$; (iii) $f_{xx}(w)$; (iv) $f_{yy}(w)$; (v) $f_{xy}(w)$; (vi) $f_{yx}(w)$ (15 Marks)

QUESTION TWO

(a) Find the Derivate of:

(i) $g(x) = -8/x^{3/2}$

(ii) $g(x) = 4x - 2x^{-3}$

(iii) $h(x) = x^{-2} + 2\sqrt{x}$

(iv) $f(x) = 8x^{-3/2} - 4x^{1/2} + x^{-1/2}$

(b) Solve $(3x^3 - 2x^2 + 4x - 11)(\frac{1}{3}x^3 + 4x^2 - \frac{1}{2}x + 4)$

(c) Differentiate $(3x^2 + 4 / 3x^3 - 2x)$

(d) If $z = f(x, y)$

$Z = 2x^2 + y^2$. Find the first Partial Derivative

(15Marks)

QUESTION THREE

(a) State Taylor's Theorem.

(b) Use Taylors's Theorem to obtain the first four terms in the expansion of

$$f(x) = \frac{1}{1-x} \quad \text{about } a = 0:$$

(c) Consider $f(x) = x^3 + 3x^2$; $-5 \leq x \leq 1$.

Find the number c such that $c \in (-5, 1)$ that satisfies the mean value theorem. (15 Marks)

QUESTION FOUR

(a) If $f(x) = \frac{x-1}{x+1}$ find;

(i) $f(0)$

(ii) $f(-2)$

(iii) show that $f\left(\frac{1}{x}\right) = -f(x)$

(b) Evaluate the expression $\frac{f(x+h)-f(x)}{h}$ for the following function f ;

(i) $f(x) = 3x - x^2$

(ii) $f(x) = \sqrt{2}$

(c) Given that $U = (1 - 2xy + y^2)^{-1/2}$

Show that;

$$x \frac{du}{dx} - y \frac{du}{dy} = y^2 u^3$$

(15 Marks)

QUESTION FIVE

(a) Find d^2y/dx^2 at the point $(x, y) = (-1, 1)$ of the curve $x^2y + 3y - 4 = 0$.

(b) Integrate the following;

(i) $5x^4 + 3x^2 - 1/x^2$

(ii) $x^4 / (4-x)^2$

(c) A particle starts from rest with an acceleration of $(10 - 2t)\text{m/sec}^2$ with at any time (t) where and when will it come to rest.

(d) Consider $f(x) = x^3 + 3x^2$ on the interval $-5 \leq x \leq 1$. Find the number $C \in (-5, 1)$ that satisfies MVT.

(15 Marks)

QUESTION SIX

X (a) Find $\frac{d^2y}{dx^2}$ at the point $(x, y) = (-1, 1)$ of the curve $x^2y + 3y - 4 = 0$

(b) Integrate the following:

(i) $5x^4 + 3x^2 - 1/x^2$

(ii) $\frac{x^4}{(4-x^2)}$

(c) Given $Z = f = (x,y) = 8x^2 - 12xy + 6y^2$ 11

Find the following:

(i) $f(0,2)$

(ii) The Ordered triples with $x = -2$ and $y = 1$ that satisfies $f(x,y)$

(iii) Find f_x and f_y



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STA201: Statistical Methods

Time Allowed: 2hrs

Credit Unit/Status: 3 (C)

INSTRUCTION(s): Answer ANY FOUR QUESTIONS

Monday 28/03/2022

QUESTION ONE

- (a) Distinguish between the following pair(s) as used in statistical hypothesis;
- (i) The null and Alternative hypothesis (1.5Mark)
 - (ii) Simple and Composite hypothesis (1.5Mark)
 - (iii) Type I and Type II errors (1.5Mark)
 - (iv) One-tail and Two-tail Test (1.5Mark)
- (b) A population of size five (5) consists of ages of five patients in the children's ward who are receiving group psychotherapy in a mental health clinic. The ages are $x_1 = 3$, $x_2 = 5$, $x_3 = 8$, $x_4 = 11$, $x_5 = 13$. If sampling is with replacement;
- (i) List all the possible sample of size two that can be drawn from this Population (2Marks)
 - (ii) Find the mean of the population. (1Mark)
 - (iii) Find the standard deviation of the population. (3Marks)
 - (iv) Find the mean of sampling distribution of means. (3Marks)

QUESTION TWO

- (a) Differentiate between regression analysis and correlation coefficient. (3Marks)
- (b) The following data were obtained during laboratory experiment of muscular contraction of a rabbit intestine. The height of the curve was considered as the response to the drug.

Dosage(mcg)	0.3	0.4	0.6	0.8	0.9	1.2
Response (mm)	54	59	60	65	70	75

Calculate the correlation coefficient and interpret your result. (6Marks)

- (c) An experiment was conducted to study the effect on sleeping time of increasing the dosage of a certain barbiturate. Three readings were made at each of three dose levels.

Dosage (M/kg)	3	3	3	10	10	10	15	15	15
Sleeping Time (Hrs)	4	6	5	9	8	7	13	11	9

. Perform linear regression analysis.

(6Marks)

QUESTION THREE

- (a) In a length of hospitalization study conducted by several cooperating hospitals a random sample of 164 peptic ulcer patients was drawn from a list of all peptic ulcer patients ever admitted to the participating hospitals and the length of hospitalization per admission was for each. The mean length of hospitalization was found to be 18.25 days. If the population standard deviation is known to be 9 days, Find 90% confidence interval for μ .
- (7Marks)
- (b) Write short note on the following;
- (i) Simple Random Sampling (2Marks)
 - (ii) Stratified Sampling (2Marks)
 - (iii) Cluster Sampling (2Marks)
 - (iv) Systematic Sampling (2Marks)

QUESTION FOUR

- (a) List and explain any FOUR properties of a good estimator. (5Marks)
- (b) To study the average effect of fish on human cholesterol level (in blood), a researcher randomly selects 500 males of 25 years of age who have never taken fish more than once a week and measures their cholesterol level. The researcher then serves all the individuals eight ounces of fish everyday for one year. After a year, the researcher measured the cholesterol level of each individual again, and calculates the difference with year before value (difference = pre-diet level minus post-diet level). Determine the;
- (i) Population (2.5Marks)
 - (ii) Sample (2.5Marks)
 - (iii) Variable under study (2.5Marks)
 - (iv) Parameter of interest (2.5Marks)

QUESTION FIVE

- (a) Write short note on the three principles of Experimental Design. (6Marks)
- Four brands of cereal are compared to see if they produce significant weight gain in rats. Four groups of seven rats each were given a diet of the respective cereal brand. At the

end of the experimental period, the rats were weighed and the weight was compared to the weight just prior to the start of the cereal diet. The data are provided in the table below;

Brand A	9	7	8	8	7	8	8
Brand B	5	4	6	4	5	7	3
Brand C	2	1	1	2	2	3	2
Brand D	3	8	5	9	2	7	8

Determine whether each brand has a statistically significant effect on the amount of weight gain.

(9Marks)

QUESTION SIX

- (a) The results of a study suggest that the initial electrocardiogram (ECG) of a suspected heart attack victim can be used to predict in-hospital complications of an acute nature. The study included 469 patients with suspected myocardial infarction (heart attack). Each patient was categorized according to whether their initial ECG was positive or negative and whether the person suffered life-threatening complications subsequently in the hospital. The results are summarized in the following table.

Subsequent In-Hospital Life-Threatening Complications			
ECG	No	Yes	Total
Negative	166	1	167
Positive	260	42	302
Total	426	43	469

Is there sufficient evidence to indicate that whether or not a heart attack patient suffers complications depends on the outcome of the initial ECG? Test using $\alpha = .05$ (10Marks)

- (b) To test a manufacturer claim that his fruit juice contains 60 mg of vitamin C per 100ml, a quality controller analysts takes six randomly selected samples with the following results: 65, 58, 62, 57, 62, 65. Is the manufacturer's claim justified (sample mean = 61.5; sample standard deviation $s = 3.39$)? (5Marks)

NOTE: You may find the following useful;

$$\begin{aligned}
 Z_{0.05} &= 1.64, Z_{0.025} = 1.96, Z_{0.005} = 2.58, F_{0.05(3,9)} = 3.86, F_{0.05(6,9)} = 3.37, t_{0.025,5} = 2.571, \\
 t_{0.025,6} &= 2.447, t_{0.05,5} = 2.015, F_{0.05(3,6)} = 4.76, F_{0.05(4,10)} = 3.48, F_{0.025(3,8)} = 5.42, F_{0.025(4,9)} = 4.72, \\
 F_{0.025(4,10)} &= 4.47, F_{0.05(3,24)} = 3.01, F_{0.025(3,24)} = 2.87, \chi^2_{0.025,1} = 3.84, \chi^2_{0.025,2} = 5.99, \\
 \chi^2_{0.025,3} &= 5.02, \chi^2_{0.025,4} = 7.38
 \end{aligned}$$