



INTI
International College Subang

LAUREATE INTERNATIONAL UNIVERSITIES'

FINAL
Examination Paper

(COVER PAGE)

Session : April 2015

Programme : Diploma In Information And Communication Technology
(DICTN/DICTI)

Course : ICT2101 /CSC2101 : Computer Organisation

Date of Examination : August 4, 2015

Time : 5:00pm – 7:00pm Reading Time: Nil

Duration : 2 Hours

Special Instructions :

Answer any **FOUR (4)** questions.

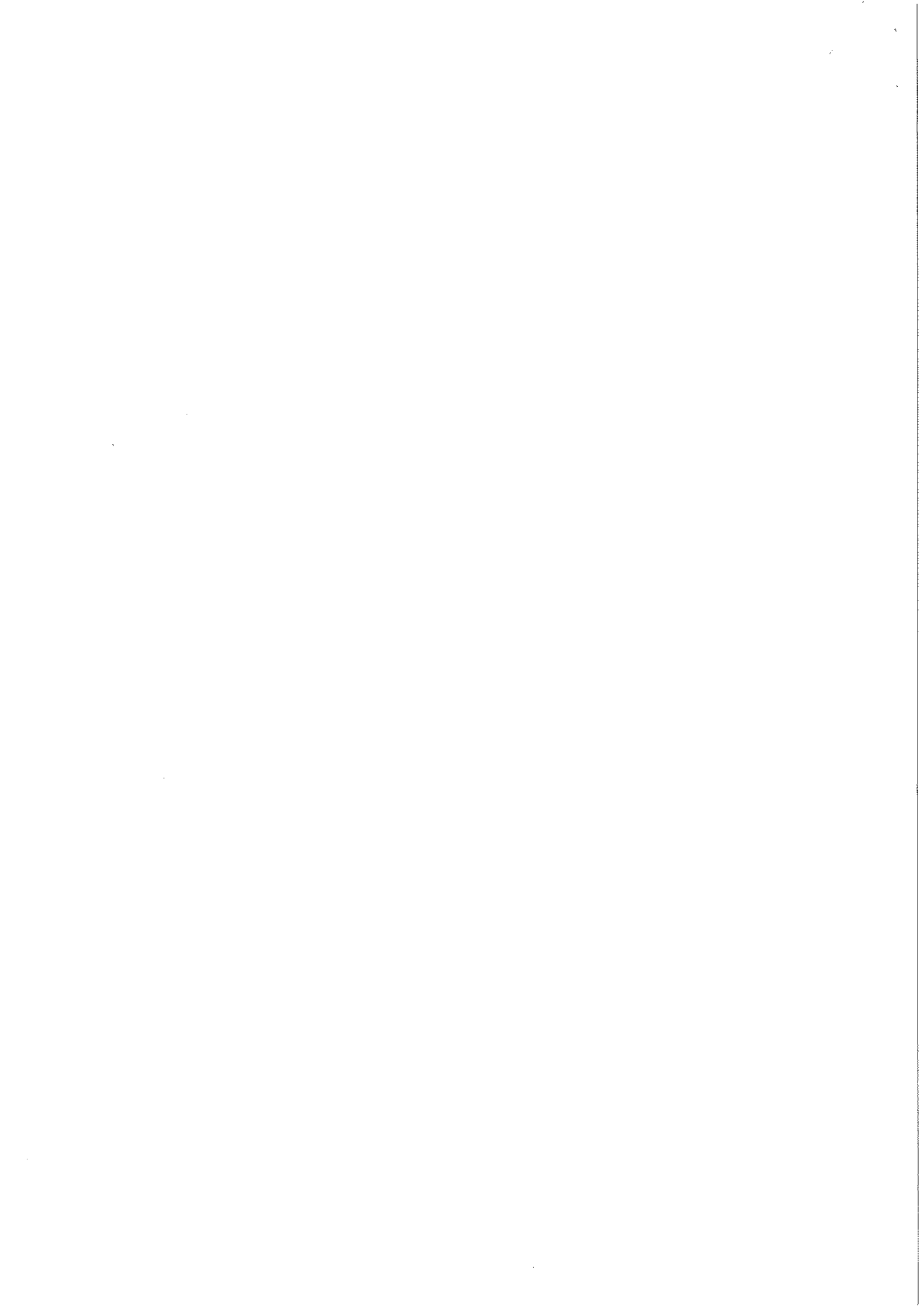
Materials permitted : Nil

Materials provided : Nil

Examiner (s) : Mr. Yap Soo Har, Pradeep Isawasan.

Moderator : Mr. Mohammad Faizal Bin Alias

This paper consists of 4 printed pages, including the cover page.



INTI INTERNATIONAL COLLEGE SUBANG

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY
(DICTN/DICTI)ICT2101/CSC2101: COMPUTER ORGANIZATION
FINAL EXAMINATION: APRIL 2015 SESSION

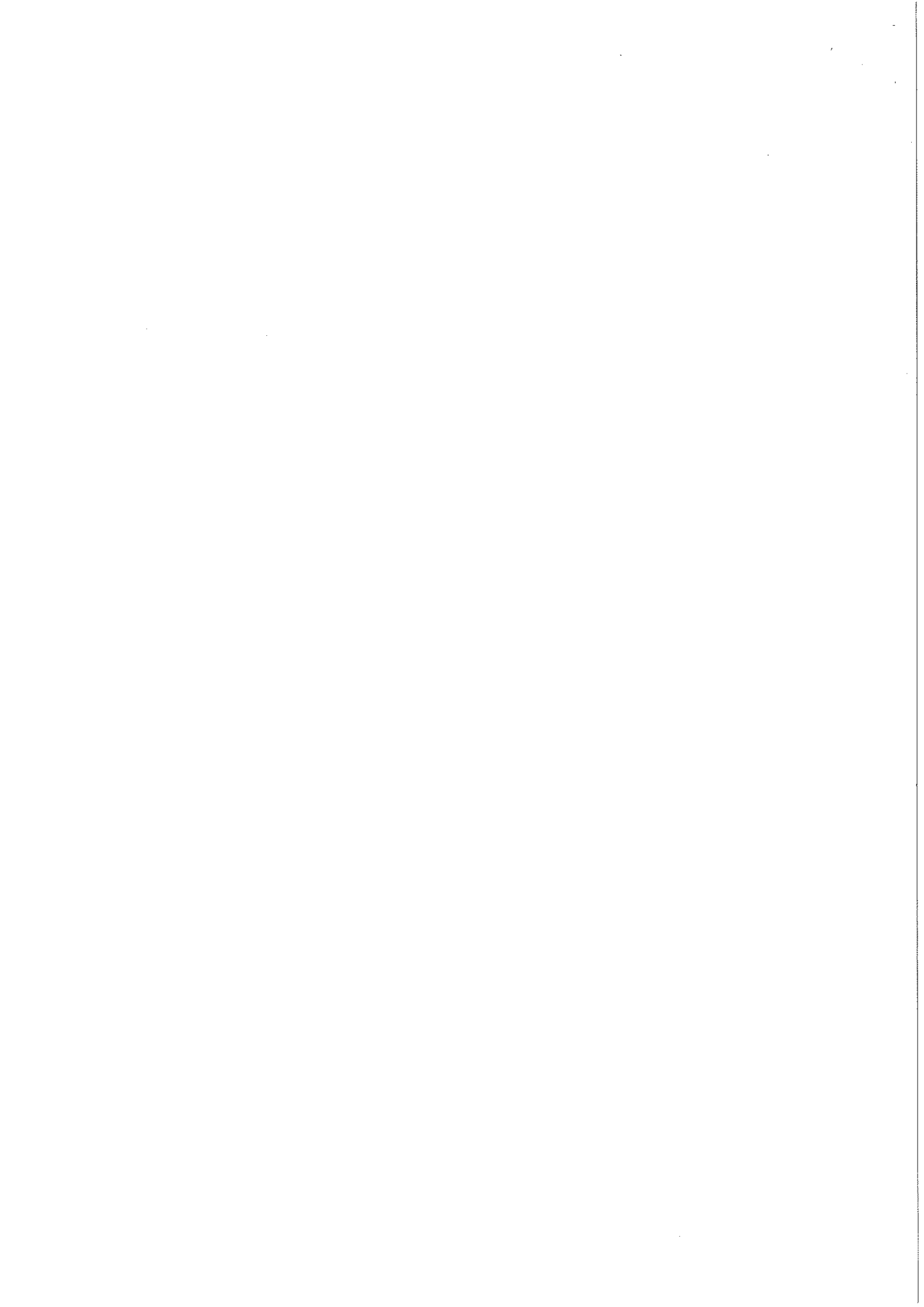
This paper consists of **SIX (6)** questions. Answer ANY **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

- a) i) Convert the decimal 1124.625 to binary. (2 marks)
 ii) Convert the hexadecimal 1AF6 to decimal. (2 marks)
 iii) Show the subtraction of the decimals $(87 - 47)$ in a computer system using binary and two's complement. (4 marks)
 iv) In an 8 bit computer, would there be an overflow in the addition of decimals $(37 + 30)$? Show the steps to your answer. (4 marks)
- b) Write the floating point representation of the decimal 42.5 in a normalized 14-bit format using a bias 16. The exponent is represented by 5 bits and the mantissa 8 bits with a 1 bit sign. (8 marks)
- c) Construct the truth table for $(x + y)(x + z)(\bar{x} + z)$. (5 marks)

Question 2

- a) Write the Register Transfer Language (RTL) for the assembly code LOAD X in MARIE. (6 marks)
- b) One of the most important considerations in understanding the performance capabilities of a modern processor is the memory hierarchy. Discuss the different memory types in a computer system. (9 marks)
- c) Name any **FIVE (5)** items within the computer system using the Von Neumann architecture and briefly explain their functions. (10 marks)



Question 3

- a) Describe **THREE (3)** methods used to represent the positive and negative integers that can be represented in a 16-bit computer. (12 marks)
- b). The truth table for a half adder is as follows

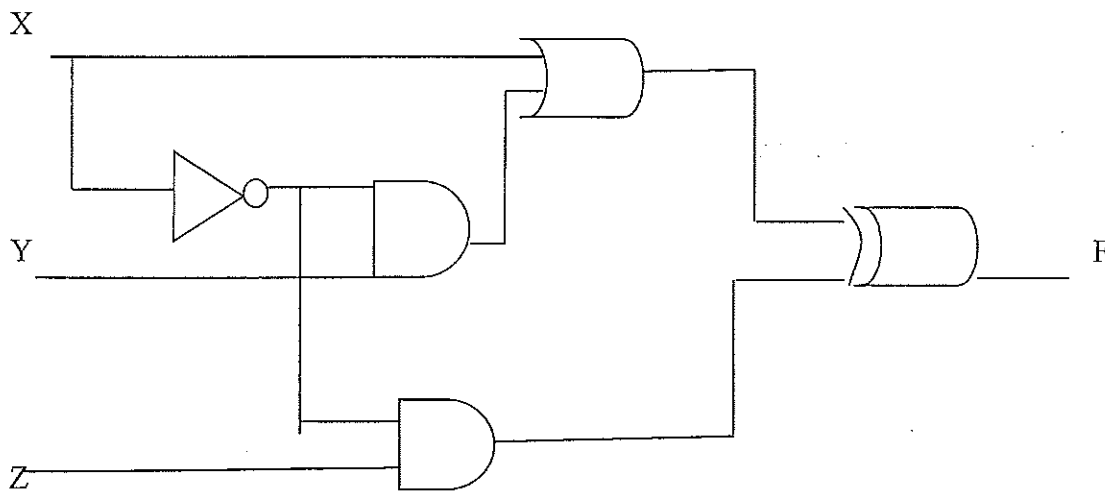
Inputs		Outputs	
x	y	Sum	Carry
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

Draw the logic diagram for this half adder.

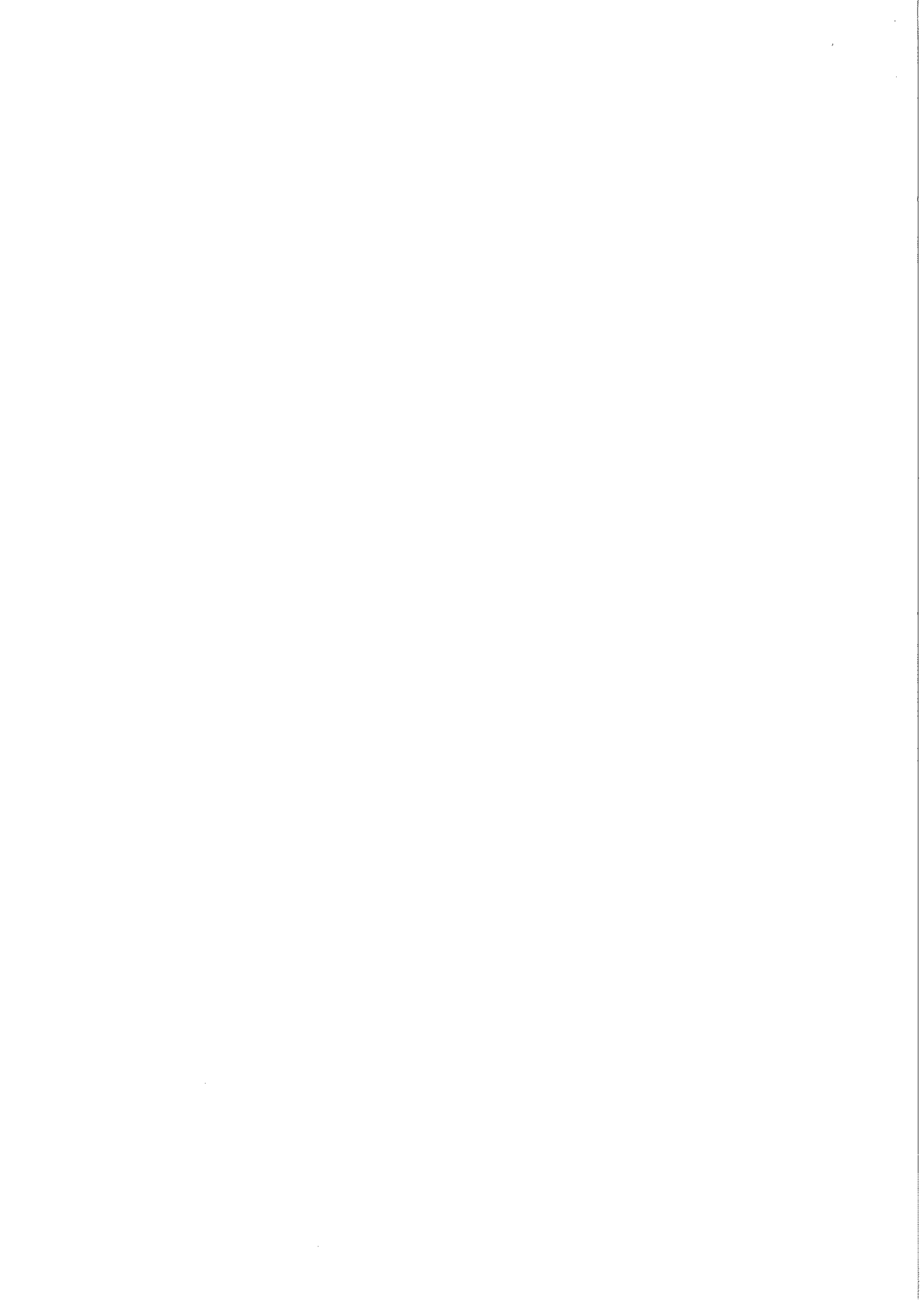
- c) Using the distributive law, show the equation $x + \bar{x}.y = x + y$. (8 marks)
- (5 marks)

Question 4

- a) Find the truth table that defines the following circuit.



- (8 marks)
- b) Interrupts are events that alter or interrupt the normal flow of execution in the system. Describe **FOUR (4)** methods by which an interrupt can be triggered. (12 marks)
- c) Explain byte addressable and word addressable memory. In a 16-bit byte addressable computer system, what is the minimum number of bits necessary to address the 37000th byte? (5 marks)



Question 3

- a) Describe **THREE (3)** methods used to represent the positive and negative integers that can be represented in a 16-bit computer. (12 marks)
- b) The truth table for a half adder is as follows

Inputs		Outputs	
x	y	Sum	Carry
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Draw the logic diagram for this half adder.

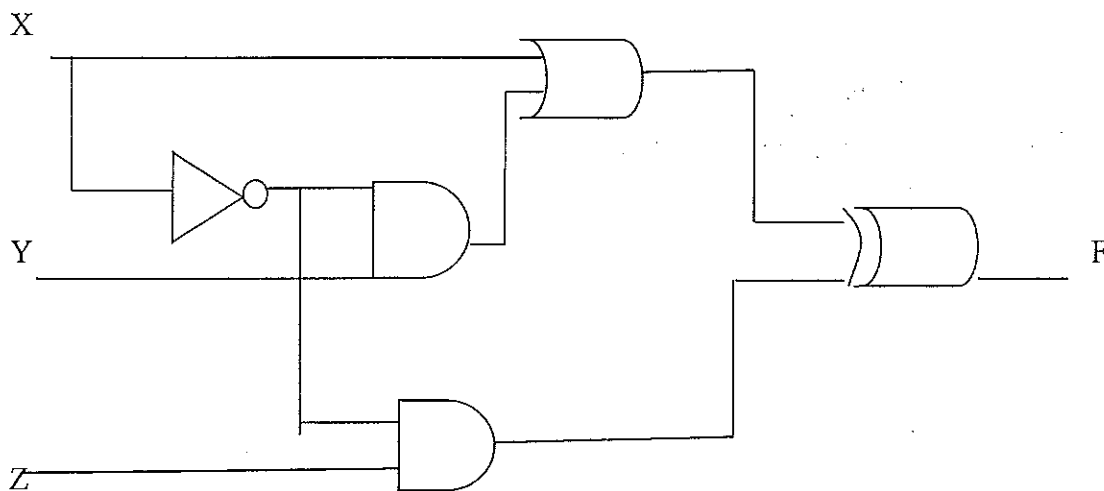
- c) Using the distributive law, show the equation $x + \bar{x}.y = x + y$.

(8 marks)

(5 marks)

Question 4

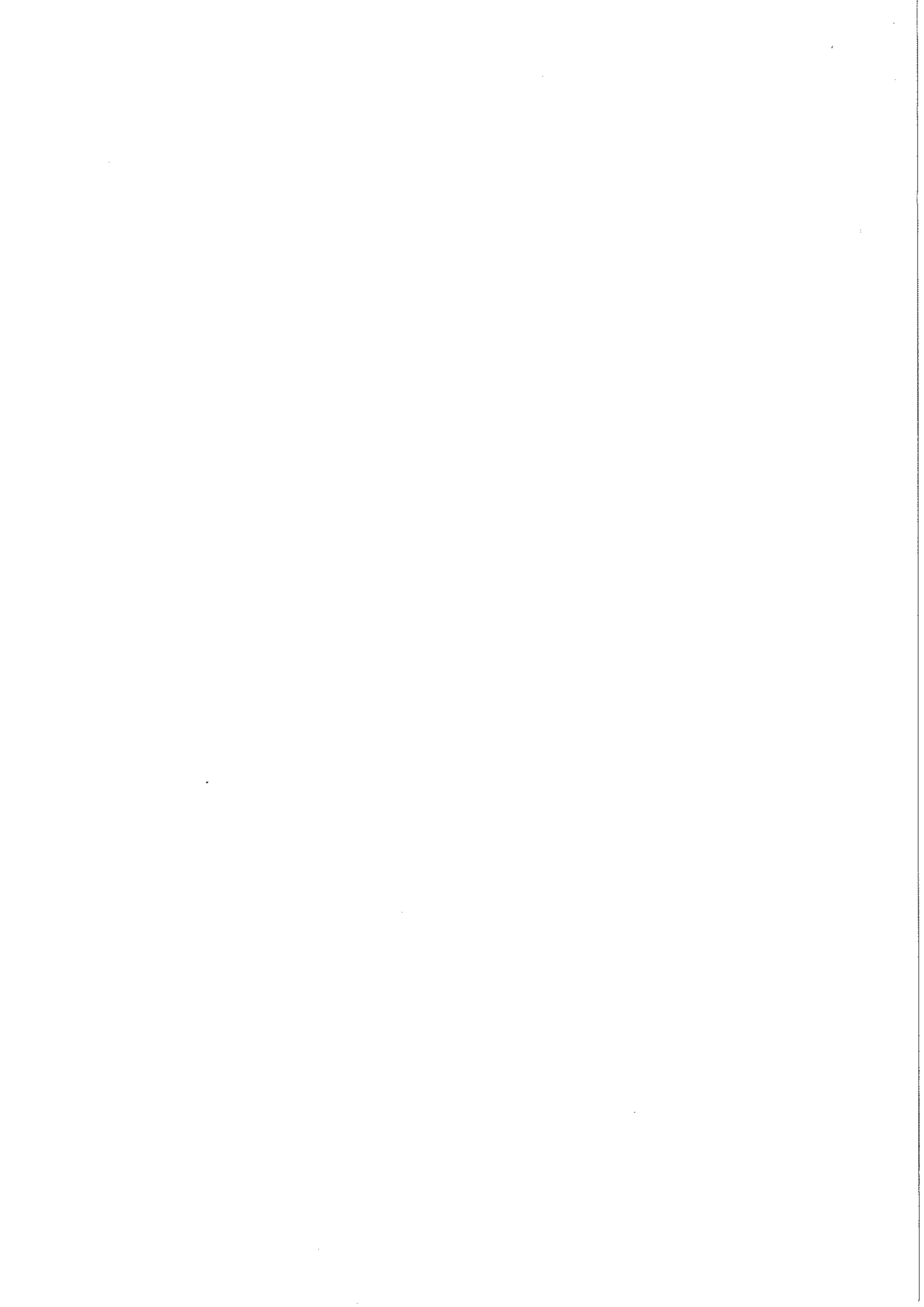
- a) Find the truth table that defines the following circuit.



(8 marks)

- b) Interrupts are events that alter or interrupt the normal flow of execution in the system. Describe **FOUR (4)** methods by which an interrupt can be triggered. (12 marks)
- c) Explain byte addressable and word addressable memory. In a 16-bit byte addressable computer system, what is the minimum number of bits necessary to address the 37000th byte?

(5 marks)



Question 5

- a) Registers are storage locations within the CPU. Name and describe the usage of the following registers in a typical computer system:
- i) AC
 - ii) MAR
 - iii) PC
 - iv) IR
- (12 marks)
- b) What are the acronyms RISC and CISC stands for and briefly explain the difference in their design.
- (6 marks)
- c) In the fetch-decode-execute cycle, each pulse of the computer's clock is used to control one step in the sequence. To speed up this process, pipelining is used. Describe this pipelining process.
- (7 marks)

Question 6

- a) A computer system has the following assembler code instructions:
- Load X – Load the contents of address X into AC
 - Store X – Store the contents of AC at address X
 - Add X – Add the contents of address X from AC and store the result in AC
 - Sub X – Subtract the contents of address from AC and store the result in AC
 - Halt – Terminate the program
- Write the assembler program to add two numbers store in X and Y. Keep the result in Z.
- (6 marks)
- b) Suppose to upgrade the CPU of your PC will make it one and half times faster, but to upgrade the disk drive will make it two and half times faster. In your case you spent 70% of the time running the processor and only 30% of the time waiting for disk service. Calculate using Amdahl's law which option would you choose?
- (10 marks)
- c) Describe **THREE (3)** ways that I/O can be controlled.
- (9 marks)

