

REGENT UNVIERSITY
COLLEGE OF SCIENCE AND TECHNOLOGY



EXAMINATION PAPER

**END OF SEMESTER EXAMINATIONS,
JANUARY 2007**

COURSE: SICS 15: Foundations of Computer Science

TIME: TWO HOURS THIRTY MINUTES

LECTURER: Chris Quist

ATTEMPT ALL QUESTIONS IN SECTION A AND TWO FROM SECTION

B

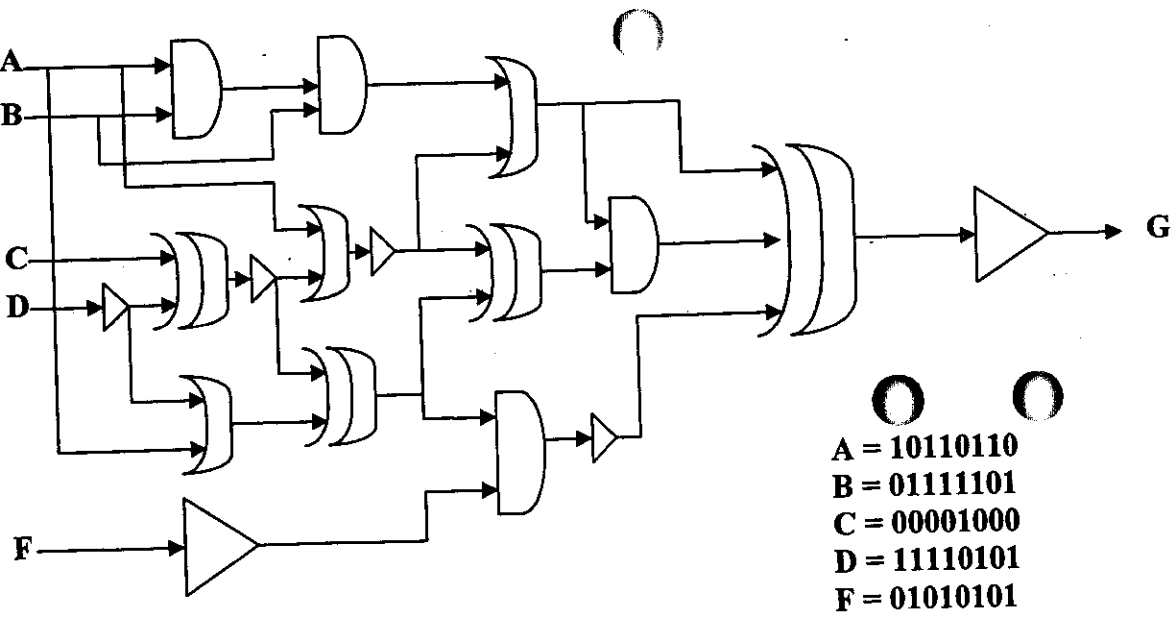
SECTION A: ATTEMPT ALL QUESTIONS

1. a. What is a computer [2marks]
 b. Discuss any 3 disadvantages of using computers and 2 advantages. [5marks]
2. State and briefly explain the parts of the computer system [5marks]
3. State any five parts of the microcomputer and briefly discuss their use. [5marks]
4. What is the range of numbers that can represent in an n-bit signed magnitude number representations system (Give an example using 3-bits) [5marks]
5. Discuss how the computer works using the Von Neumann model [5marks]
6. State two differences and one similarity between Analogue and Digital computers [3marks]
7. Discuss the three programming constructs [3marks]
8. a. Discuss any two memory types [4marks]
 b. Explain how the computer memory reads and writes data. [3marks]
9. Discuss the process of programming [6marks]
10. Discuss the two types of errors [4marks]

SECTION B: ANSWER ANY TWO

11. a. Assuming you have a computer with the following allowable operation: **INCREASE A NUMBER BY 1, DECREASE A NUMBER BY 1, CHECK IF A NUMBER IS ZERO, ACCEPT A NUMBER, ASSIGN A NUMBER TO A VARIABLE, STORE A NUMBER, OUTPUT A VARIABLE**, write pseudo code to program this computer to be able to compute $A + 3B$ (that is twice the first number added to the second number eg. If you enter 7 for A and 5 for B then the result should be $7 + 3*5 = 7 + 15 = 22$) [12marks]
 b. Draw a flowchart for your pseudo code [8marks]

12. a. Given that the allowable operation for a computer is **ADD, SUBTRACT, MULTIPLY, DIVIDE, CHECK IF A NUMBER IS ZERO, ACCEPT A NUMBER, ASSIGN A NUMBER TO A VARIABLE, STORE A NUMBER, OUTPUT A VARIABLE**. Write a pseudo code to program a computer such that if a number is entered it checks if it is even or odd. If the number say A is even then it should compute $A^2 \times (A - 1)$ on the other hand if the number is odd then it should compute $(A+1) \times A^2$ [12marks]
 b. Draw a flowchart for your pseudo code [8marks]
13. a. Given that a Digital Memory has to represent only the symbols listed below, what is the minimum number of bits for the memory necessary to accommodate all the symbols and how many symbols can that memory represent and why?
 $A - Z a - z 0 - 9 ! @ \# \$ \% \wedge \& * () _ + = ; , . < > \backslash \sim$ [5marks]
 b. Work the following conversions and computations
 a. Convert to base 10: i. 1111011_2 ii. 2354_8 iii. $AD02_{16}$
 b. Convert to Floating Point representation: i. $23^{1/16}$
 $67^{2/5}$
 c. Convert the Floating Point Representation to Decimal:
 i. 10111100011110101001000000000000
 ii. 00000111100000000111011111111100
 d. Compute i. $ABC_{10} \times AB$ ii. $45BDCE / C$ [14marks]
14. a. State the De Morgan's Law [2marks]
 b. Find G



[18 Marks]