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 construct **[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 are **ADDTION, SUBTRACTION, INTEGER DIVISION, MULTIPLICATION AND CHECKING IF A NUMBER IS ZERO, ACCEPTING A NUMBER, ASSIGNING A NUMBER TO A VARIABLE, STORING A NUMBER, OUTPUT A VARIABLE**. Write a pseudo code to program this computer such that if a number is entered it checks if the number **even** or **odd.** If the number say **A** is **even** then is 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 below, what is the minimum number of bits for the Memory necessary to accommodate all the symbols and how many more symbol(s) can that memory represent and why?

    A – Z a – z 0 – 9 ! @ # $ % ^ & * ( ) _ + = - " ' : ; , . < > ` ~ [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.** $23^1/_{16}$ **ii.** $67^2/_5$

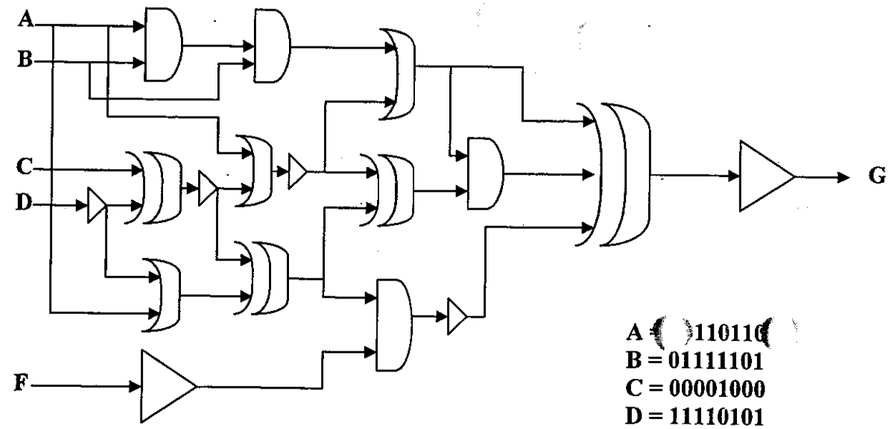
    c. Covert the Floating Point Representation to Decimal:

    i. 10111100011110101001000000000000

    ii. 00000111100000000111011111111100

    d. Compute **i.** ABC10 **x** AB **ii.** 45BDCE **/** C **[15 Marks**

14. a. State the De Morgan's Law **[2 Marks]**
    b. Find G



A = 110110
B = 01111101
C = 00001000
D = 11110101
F = 01010101

[18 Marks]