



STAMFORD COLLEGE

SCHOOL OF COMPUTER SCIENCES DIPLOMA IN INFORMATION TECHNOLOGY

STC104 : COMPUTER ORGANISATION

Date : 3 November 2006 (Friday)

Time : 9.30 a.m. – 11.30 a.m.

Duration: 2 hours

Instructions to Candidates

Answer ALL questions.

Please ensure that this examination paper contains FOUR questions on TWO printed pages before you start the examination.

Books, papers and other written materials are not allowed to be brought into the examination hall. A candidate who violates the examination rules of Stamford College or commits a malpractice will be disqualified from the examination.

Candidates may use calculators provided the calculators give no printout, have no work display facilities, are silent and cordless.

Write your Examination Index Number on each page of your answer booklet.

Answer **ALL** questions.

Question 1

Convert the given numbers to the indicated bases:

- (a) $FB.B_{16}$ to Octal and Binary
- (b) 32.2_8 to Decimal
- (c) 244.6_{16} to Hexadecimal and Octal
- (d) 484 to BCD
- (e) 1110111.101_2 to Decimal, Octal and Hexadecimal.
- (f) 100000000001 BCD to Decimal
- (g) 45.75 to Binary, Octal and Hexadecimal

(25 marks)

Question 2

- (a) Register R1 contains 8 ones, ($R1 \leftarrow 1111\ 1111$). There are several different ways of representing the contents of the register R1. What is the value of R1 if the number is stored in:
 - (i) Sign Magnitude
 - (ii) Unsigned binary
 - (iii) 1's Complement
 - (iv) 2's Complement

(8 marks)

- (b) Perform the arithmetic operation in binary using the 1's complement and 2's complement.
 - (i) $30 - 15$
 - (ii) $(-30) + 15$

(12 marks)

- (c) Represent the following numbers in the given floating-point format:

1signbit	7bits exponent	24bits mantissa
0		31

- (i) -25.25

(5 marks)
(Total = 25 marks)

Question 3

(a) Draw symbol and truth tables for the following logic gates:

- (i) NAND
- (ii) NOR

(5 marks)

(b) Prepare a truth table for the following Boolean expression.

$$F = ABC + AB + A$$

(8 marks)

(c) Draw the logic diagrams corresponding to the following Boolean expressions.

i) $F = BC + AD$

ii) $F = (A+B)(\overline{C+D})$

(12 marks)

Question 4

- (a) Simplify the following Boolean function in SOP and POS using Kmap. Draw a logic circuit for SOP and POS.

$$F(X,Y,Z) = \prod (1,2,3,6,7)$$

(10 marks)

- (b) Simplify the following Boolean function together with “Don’t Care” conditions:

$$f(A,B,C,D) = \sum (1,3,4,6,9,11)$$

$$d(A,B,C,D) = \sum (8,12,14)$$

- (i) Sum of Product
(ii) Product of Sum
(iii) Draw a logic circuit for SOP using NAND gates and POS using NOR gates.

(15 marks)

(Total = 25 marks)

- END OF PAPER -