COLÁISTE MHUIRE GAN SMÁL
– Ollscoil Luimnigh –

MARY IMMACULATE COLLEGE
– University of Limerick –

MID-SEMESTER ASSESSMENT PAPER

MODULE CODE:	MH4718	SEMESTER / YEAR:	Autumn 2010 / '11
MODULE TITLE:	Numerical Methods and Computing	DURATION OF EXAM:	45 minutes
LECTURER:	Dr. P.O'Sullivan	PERCENTAGE OF TOTAL MARKS:	20 %
EXTERNAL EXAMINER:	Professor Duncan Lawson	AUTHORISED MATERIALS:	Calculator Mathematical tables

INSTRUCTIONS TO CANDIDATES: Answer **one** of these two questions.

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1. (a) An **int** type variable is assigned the value -1649 . Determine the contents of each of the four bytes (in binary notation) used to store the value of this variable.

(6 marks)

(b) What is the value of the **float** stored in the following bytes?

01000011 10010110 00000000 00000000

Express your answer in base ten place value representation.

(6 marks)

(c) A **float** type variable is assigned the smallest possible positive value. What are the contents of the four bytes (in binary notation) used to store the value of this variable? (4 marks)
Determine the value of this variable expressed as a power of 2 in base ten notation. (4 marks)

2. (a) A **float** type variable is assigned the value 0.3 in a C++ program. Determine the value of what is actually stored.

(10 marks)

(b) What value will the variable y have after the following lines of a C++ program are executed. Explain your answer:

```
float x= pow(2.0,24); //2^24=16777216
float y = x+3;
```

(6 marks)

(c) `=5^22` is entered into a cell in an Excel spreadsheet.
The cell is formatted to dispay a number with 0 decimal places.
The value displayed is 2384185791015620.
Explain how we know that the number displayed is not equal to 5^{22} without using any other calculating device and explain why Excel does not display the exact value. (4 marks)