Ponce	Martin	10371381	Date 08/10/2014
Family name	Given name	Student number	

ENS1161 Computer Fundamentals

Test 9

10/10

(a) How many 8-bit binary numbers begin with 11?

$2^6 = 64$ ✓ 1

(b) How many 4-permutations are there of the letters of DYNAMO?

P(6, 4)
= 6! / (6 – 4)!
= 720 / 2!
= 720 / 2
= 360 ✓ 2

(c) How many 3-subsets are there of the set {a, b, c, d, e, f}?

${}^6C_3$
= 6! / (3! * (6 – 3)!)
= 6! / (3! * 3!)
= 720 / (6 * 6)
= 720 / 36
= 20 ✓ 2

(d) Consider the one million 6-digit decimal numbers (from 000000 to 999999).

(i) How many begin with 55?

6 – 2 = 4
$10^4 = 10000$ ✓

(ii) How many end with 777?

6 – 3 = 3
$10^3 = 1000$ ✓

(iii) How many begin with 55 and end with 777?

6 – 2 – 3 = 1
$10^1 = 10$ ✓

4

(iv) How many begin with 55 or end with 777, or both?

10000 + 1000 – 10 = 10990 ✓

(e) Solve the congruence $7w \equiv 8 \pmod 9$

$w \equiv 5$ ✓

1.

[1 + 2 + 2 + 4 + 1 = 10 marks]