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Family name Given name Student number

**ENS1161 Computer Fundamentals**

**Test 9**

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

26 = 64

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

P(6, 4)

= 6! / (6 – 4)!

= 720 / 2!

= 720 / 2

= 360

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

6C3

= 6! / (3! \* (6 – 3)!)

= 6! / (3! \* 3!)

= 720 / (6 \* 6)

= 720 / 36

= 20

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

1. How many begin with 55?

6 – 2 = 4

104 = 10000

1. How many end with 777?

6 – 3 = 3

103 = 1000

1. How many begin with 55 and end with 777?

6 – 2 – 3 = 1

101 = 10

1. How many begin with 55 or end with 777, or both?

10000 + 1000 – 10 = 10990

(e) Solve the congruence 7w ≡ 8 (mod 9)

w ≡ 5

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