**PERTH MODERN SCHOOL**

**Tick your teacher**

* Miss Cheng
* Dr. Pearce
* Ms Rimando
* Miss Sindel



**YR11 MATHEMATICS SPECIALIST – 2018**

**TEST 2 – Counting (8%)**

**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE:** Wednesday 4/4/2018

[To achieve full marks and to allow assessment of outcomes, working and reasoning should be shown.]

[A maximum of 2 marks will be deducted for incorrect rounding, units, etc.]

 **This is a *Calculator Assumed* Assessment Mark\_\_\_\_\_\_\_\_\_/37**

Reading: 5 minutes Working: 40 minutes

1. A committee of four students are to be formed from five boy candidates and six girl candidates. How many ways that this can be done if [6 marks = 1, 2, 3]
2. there is no restriction.
3. it contains same number of students from both genders.
4. it contains at least one student from each gender.
5. [7 marks = 4, 3]

(a) Find the value for ***m*** if **9C*m* = 4** $×$ **7C*m* – 1.**

(b) Prove that .

1. Fifty-three students’ names are printed on a list. Explain the reason why at least three names begin with the same letter. [2 marks]
2. Three-digit numbers are constructed using digits 0, 1, 2, 3, 4, 5. Each digit is used at most once. How many such numbers are [6 marks = 2, 2, 2]
3. constructed?
4. Even numbers?
5. Multiples of 5?
6. A bag contains 17 identical cubes except for their colour, with four coloured orange, six coloured blue and seven coloured white. [6 marks = 2, 2, 2]

(a) How many different arrangements of coloured cubes are possible when three cubes are drawn from the bag and placed in a line? [2 mark]

(b) How many different combinations of coloured cubes are possible when three cubes are drawn from the bag? [2 marks]

(c) Determine the least number of cubes that should be removed from the bag to ensure that the resulting selection contains at least three cubes of one colour. Justify your answer. [2 marks]

1. **[6 marks = 2, 4]**
2. A triangle *PQR* has sides $\vec{QP}=a,\vec{ QR}=b$. Determine the vector  where  is the midpoint of side.
3. Two forces are applied to a body. One has magnitude 200 N and acts due south. Another has magnitude 240 N and acts on a bearing of 65º. Draw a diagram to demonstrate this scenario and find the magnitude and resultant of the two forces. [4 marks]
4. Fifteen dots are evenly spaced on the circumference of a circle. How many combinations of three dots can we pick from these 15 that do *not* form an equilateral triangle? [3 marks]