1. The number of words of length 10 in the letters $a, b, c$ in which $a$ occurs 5 times, $b$ occurs 3 times and $c$ occurs 2 times is:
   a) $^{10}C_5 \cdot 5C_3$
   b) $^{10}C_8$
   c) $^8C_3 \cdot 5C_2$
   d) $10!$

2. The total number of sequences of length 10 containing zeros and ones is:
   a) $^{10}C_2$
   b) $10!$
   c) $2^{10}$
   d) None of the above

3. A bag contains a large number of balls of each of 4 colours (Red, Blue, Green, Yellow). The number of ways of choosing 10 balls from this bag such that at least one red ball is chosen is
   a) $^{13}C_3$
   b) $^{12}C_3$
   c) $4^{10}$
   d) $4^9$

4. Let $a =$ number of monomials of degree 4 in 7 variables and $b =$ number of monomials of degree 6 in 5 variables. Then
   a) $a < b$
   b) $a > b$
   c) $a = b$
   d) None of the above

5. A sequence which only consists of zeros and ones is called a 0-1 sequence.
   Recall also that the Fibonacci numbers $F_n, n \geq 1$ are defined by
   $F_1 = 1, F_2 = 1, F_n = F_{n-1} + F_{n-2}$ where $n \geq 3$. The number of 0-1 sequences of length $n$ which do not contain two successive zeros is:
   a) $F_{n+2}$
   b) $F_{n-1}$
6. The number of 0–1 sequences of length \( n \) which contain at least one pair of successive ones is
   a) \( \binom{n}{2} \)
   b) \( 2^n - F_{n+2} \)
   c) \( F_n \)
   d) none of the above

7. The number of 0–1 sequences of length \( n \) in which a 1 never occurs after a 0 is
   a) \( n + 1 \)
   b) \( F_{n+2} \)
   c) \( 2^n - F_{n+2} \)
   d) none of the above

8. The number of 0–1 sequences containing 3 zeros and 7 ones in which no two zeros occur successively is
   a) \( F_{12} \)
   b) \( ^7C_3 \)
   c) \( ^8C_3 \)
   d) none of the above