BINA BANGSA SCHOOL
AY 2022-2023

SECONDARY 3 ACCELERATED
TOPICAL TEST:
C13 PERMUTATION/COMBINATION & C5 BINOMIAL THEOREM

NAME: …… DATE: ……...

Answer all questions on a foolscap paper. Show necessary working.

1. A lock can be opened using only the number 4351. State whether this is a permutation or a combination of digits, giving a reason for your answer. [1]

2. An art gallery displays 10 paintings in a row.
Of these paintings, 5 are by Picasso, 4 by Monet and 1 by Turner.

Find the number of different ways the paintings can be displayed if

(a) there are no restrictions, [1]

(b) the paintings by each of the artists are kept together, [3]

(c) one of Picasso's paintings must be first and one of Monet's paintings must be at the end. [2]

3. A committee of 6 members is to be created by selecting from 6 senior students and 5 junior students.
Find the number of committees that this can be done if

(a) there are no restrictions, [1]

(b) there are 4 senior students and 2 junior students in a committee [2]

(c) there are more senior students than junior students in a committee [3]

4. Simplify, by showing complete working.

(a) $\frac{6!}{2!3!}$ **(b)** $\frac{(n+1)!\,7!}{(n-1)!\,5!}$ [4]

5. The expansion of $\left(2x - \frac{1}{8}\right)^{11}$ in descending powers of x is $2048x^{11} - 1408x^{10} + hx^9 + kx^8 + \ldots$
Calculate the values of h and k [3]

6. In the expansion of $(a - x)^8$ in ascending powers of x, where a is a rational number, the sixth term is -7. Find the value of a. [3]

7. Given that the coefficient of x^2 in the expansion of $(2 + kx + 3x^2)(1 - 2x)^8$ is 163, find the value of k. [5]

8. Expand $(x + y)^5$.
Hence, use the binomial theorem to evaluate $(\sqrt{5} + \sqrt{2})^5$. [5]

9. Find the coefficient of x^{-5} in the expansion of $\left(x^3 - \frac{2}{x^2}\right)^{10}$. [3]

10. Choose and answer only 1.

EITHER

In the expansion of $(3 + 4x)^n$, the coefficients of x^4 and x^5 are in the ratio 5 : 16. Find the value of n. [4]

OR

Given that $45 \times {}^nC_4 = (n + 1) \times {}^{n+1}C_5$. [4]