

SYBSc
SEMESTER III
MATHS III
SAMPLE QUESTIONS

1. For any integer $n \geq 2$, in S_n , the number of even permutations is

- (a) n (b) $\frac{n}{2}$
 (c) $\frac{n!}{2}$ (d) $\frac{n!}{4}$

2. If $\sigma = (123)(23)$ then σ^{-1} is

- (a) $(3\ 2\ 1)(3\ 2)$ (b) $(1\ 2)$
 (c) $(2\ 3)$ (d) $(1\ 3)$

3. Consider the recurrence relation $a_n = 2a_{n-1}$ with initial conditions $n \geq 1$ and $a_0 = 3$. Which of the following is an explicit solution to this recurrence relation?

- (a) $a_n = 3 \cdot 2^n$ (b) $a_n = 2 \cdot 3^n$
 (c) $a_n = 3 \cdot 2$ (d) None of these

4. In how many ways can we draw a heart or a spade from an ordinary deck of playing cards?

- (a) 169 (b) 26 (c) 52 (d) None of these

5. The number of ways to pick first a vowel and then a consonant from the word MATHEMATICS is

- (a) 56 (b) 15 (c) 4 (d) None of these

6. Let $S(n, k)$ denote Stirling number of second kind on n -set into k -disjoint nonempty unordered subsets, then $S(n, n)$ is

- (a) 0 (b) 1 (c) n (d) None of these

7. What is the minimum number of students required in a discrete mathematics class to be sure that at least six will receive the same grade, if there are five possible grades, A, B, C, D, and F?

- (a) 25 (b) 26 (c) 5 (d) None of these

8. In how many ways can 15 billiard balls be arranged in a row if 3 are red, 4 are white and 8 are black?

- (a) 12 (b) 18 (c) 96 (d) None of these

9. If n and k be positive integers with $n \geq k$, then $S(n, k)$ has recurrence formula

- (a) $S(n, k) = S(n-1, k-1) + kS(n, k)$
 (b) $S(n, k) = S(n-1, k-1) + kS(n-1, k)$
 (c) $S(n, k) = S(n-1, k-1) + kS(n, k-1)$
 (d) None of these

10. How many positive integers not exceeding 1000 are divisible by 7 or 11?

(a) 232 (b) 220 (c) 244 (d) None of these