ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

FOR GOD AND COUNTRY

WORKSHEET-11

SUBJECT – MATHEMATICS

1st - Term

Chapter: ALGEBRA **Class: XI**

Topic: Mathematical Induction **Date: 27.07.2020**

Choose the correct option (1 x 15=15)

1. The Sum of first n natural numbers is –
   a. n
   b. $\frac{n(n+1)}{2}$
   c. n^2
   d. $\frac{n^2}{2}$

2. The Sum of the squares of the first n natural numbers is –
   a. n^2
   b. $\frac{1}{6}n(n+1)(2n+1)$
   c. $\frac{1}{6}(n+1)(2n+1)$
   d. $\frac{1}{6}n(n+1)(2n+3)$

3. The Sum of the cubes of the first n natural numbers is –
   a. n^3+1
   b. $\left(\frac{n(n+1)}{2}\right)^2$
   c. n^3
   d. $None\ of\ these.$

4. $1+3+5+\cdots+(2n-1)=\ ?$
   a. n^3 b. n^4 c. n^2 d. n^5
5. $\forall n \in \mathbb{N}$, $5^{(2n+2)}-24n-25$ is divisible by – a. 567 b. 576 c. 756 d. 675

6. $\forall n \in \mathbb{N}$, $3^{(2n+2)} - 8n - 9$ is divisible by – a. 67 b. 76 c. 46 d. 64
7. $\forall n \in \mathbb{N}$ and $n \geq 0$, $3^{(4n+1)} + 2^{(2n+2)}$ is a multiple of - a. 5 b. 6 c. 7 d. 8
8. $\forall n \in \mathbb{N}$ and $n \geq 1$, $(3^{2^n} - 1)$ is always divisible by - a. 5 b. 6 c. 7 d. 8
9. Which of the followings is false ?
   a. $n < 2^n$
   b. $3^n > 2^n$
   c. $3^n < n^3$, *where* $n \geq 4$
   d. None of these.

10. $\forall n \in \mathbb{N}$, $4^n + 15n - 1$ is a multiple of – a. 9 b. 7 c. 5 d. 13
11. $\forall n \in \mathbb{N}$, $2^{3n} - 1$ is divisible by – a. 6 b. 7 c. 5 d. 3
12. $\forall n \in \mathbb{N}$, $15^{(2n-1)} + 1$ is divisible by – a. 11 b. 13 c. 15 d. 16
13. $\forall n \in \mathbb{N}$, $12^n + 25^{(n-1)}$ is divisible by – a. 11 b. 13 c. 15 d. 16
14. $1 \cdot 2 + 2 \cdot 3 + 3 \cdot 4 + \cdots + n(n+1) = ?$
   a. n^2
   b. $\frac{1}{3}n(n+1)(n+2)$
   c. $\frac{1}{6}(n+1)(2n+1)$
   d. $\frac{1}{6}n(n+1)(2n+3)$

15. $1^2 + 3^2 + 5^2 + \cdots + (2n-1)^2 = ?$
   a. $\frac{n}{3}(4n^2 - 1)$
   b. $\frac{1}{3}(4n^2 - 1)$
   c. $\frac{n}{5}(4n^2 - 1)$
   d. $\frac{n}{3}(n^2 - 1)$

Prepared By –

Mr. Sukumar Mandal (SkM)