Chapter 08
MATHEMATICAL INDUCTION AND BINOMIAL THEOREM

1) $1 + 2 + 3 \ldots\ldots + n =$

A) $\frac{n^2(n+1)^2}{4}$
B) $\frac{n(n+1)}{2}$
C) $\frac{n(n+1)(2n+1)}{6}$
D) $\frac{n^2}{2}$

Answer : B

2) The number of terms in the expansion of $(2x + y)^6$ are

A) 6
B) 7
C) 8
D) 14

Answer: B

3) $1^2 + 2^2 + 3^2 + \ldots\ldots n^2 =$

A) $\frac{n(n+1)}{2}$
B) $\frac{n(n+1)(2n+1)}{6}$
C) $\frac{n^2(n+1)^2}{4}$
D) $\frac{n^2}{2}$

Answer: B

4) $1^3 + 2^3 + 3^3 + \ldots\ldots n^3 =$

A) $\frac{n^2}{2}$
B) $\frac{n(n+1)(2n+1)}{6}$
C) $\frac{n(n+1)}{2}$
D) $\frac{n^2(n+1)^2}{4}$

Answer: D

5) $1^2 + 2^2 + 3^2 + \ldots + 15^2 =$

A) 1248
B) 1245
C) 1246
D) 1240

Answer: D

6) A powerful method of proof frequently used in mathematics is mathematical _____.

A) methods
B) induction
C) investigation
D) analysis

Answer: B

7) n! ____ 2^n , for all integral values of $n \geq 4$.

A) $<$
B) $>$
C) $\geq$
D) $\leq$

Answer: B

8) $a^{2n} - b^{2n}$ is always divisible by (a+b) for all values of $n \geq$ _____.

A) 1
B) 2
C) 4
D) None of these

Answer: A

BINOMIAL THEOREM PORTION

1) The number of terms in the expansion of $(a+b)^n$ are _____.

A) (n-1)
B) (n+1)
C) n
D) none of these

Answer: B

2) In a successive terms, index of 'a' decreases by _____ & index of b increases by _____.

A) two
B) three
C) one
D) zero

Answer: C

3) In the expansion of binomial theorem, the sum of two indices of 'a' & 'b' is always _____.

A) n+1
B) n
C) n-1

D) 2n

Answer: B

4) The coefficients of each term of binomial expansion are known as _____.

A) coefficient
B) number
C) numbers
D) binomial coefficient

Answer: D

5) If x is so small that its square and higher powers be neglected then $(1 + 3x)^{-2}$ =

A) 1 + 9x
B) 1 – 9x
C) 1 + 6x
D) 1 – 6x

Answer: D

6 In the expansion of $(a+b)^n$, the general term T_n can be found by the formula.

A) $T_{r+1} = \binom{n}{r} a^{n-r} b^r$
B) $T_{r+1} = \binom{n}{r} a^r b^r$
C) $T_{r+1} = \binom{n}{r} a^n b^{r+1}$
D) $T_{r+1} = \binom{n}{r} ab$

Ans: A

7 When we expand $(a + 2b)^5$ then we get

A) $a^5 + 10a^4b + 40a^3b^2 + 80a^2b^3 + 80ab^4 + 32b^5$
B) $a^5 + a^4b + a^3b^2 + a^2b^3 + ab^4 + b^5$
C) $5a^5 + 4a^4b + 3a^3b^2 + 2a^2b^3 + 1ab^4 + b^5$
D) None of above

Ans: A

8 The term involving x^4 in the expansion of $(3 – 2x)^7$ is

A) 120
B) 1512
C) 1250
D) 15120

Ans: D

9 if $1 + \frac{1}{4} + \frac{1.3}{4.8} + \frac{1.3.5}{4.8.12} +$ ..... +R is

A) $\sqrt{2}$
B) $\sqrt{3}$
C) $\sqrt{5}$
D) $\sqrt{7}$

Ans: A

10 If n is odd, then number of middle term(s) in the expansion of $(a+b)^n$ is/are.

A) two
B) one
C) three
D) none of these

Ans: B

11 $(a + x)^n = \sum_{r=0}^{n} \binom{n}{r} a^{n-r}$ where a and x are:

A) imaginary
B) Rational
C) Irrational
D) Real numbers

Ans: D

12 The last term in the expansion of $(3x + 3y)^7$ is.

A) $7y^7$
B) $2187y^7$
C) $21y^7$
D) y^7

Ans: B

13 The p^{th} term in the expansion of $(x + y)^{p-1}$ is.

A) $(p-1)y^p$
B) $x.p^{y-1}$
C) py^p
D) y^{p-1}

Ans: D

14 ${}^nC_2$ = exists when n is _____

A) $n > 2$
B) $n \leq 2$
C) $n < 2$
D) $n \geq 2$

Ans: D

15 1^{st} four terms of the expansion $(1 – X)^{-2}$ are

A) $1 + 2x + 3x^2 + 4x^3$
B) $3x^2 + 2x + 1$
C) $1 + 3x + 4x^2 + 5x^3$
D) None of these

Ans: A

16) For $|x| <1$, $(1 + x)^{-1}$ = _____.

A) $1 –x+x^2- \ldots$
B) $1 + x + x^2 + \ldots$
C) $- 1 + x – x^2 + \ldots$
D) None of these

Answer: A

17) Given that $(1 + ax)^n = 1 - 12x + 63x^2 + \ldots .$, the values of a & n are.

A) $-\frac{3}{2}, 8$
B) $\frac{3}{2}, 8$
C) $\frac{3}{2}, 12$
D) $- 3,8$

Answer: A