MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 71

Total Marks : 48

Max. Time : 48 min.

Topic : Binomial Theorem

Type of Questions	**M.M., Min.**
Single choice Objective (no negative marking) Q.1, to12 and 15,16 (3 marks, 3 min.)	**[42, 42]**
Assertion and Reason (no negative marking) Q.13,14 (3 marks, 3 min.)	**[6, 6]**

SPECIAL DPP ON BINOMIAL THEOREM (QUESTION ASKED IN AIEEE)

1. The coefficient of x^5 in $(1 + 2x + 3x^2 + ...)^{-3/2}$ is :

(1) 21 (2) 25 (3) 26 (4) none of these

2. The number of integral terms in the expansion of $\left(\sqrt{3}+\sqrt[8]{5}\right)^{256}$ is :

(1) 32 (2) 33 (3) 34 (4) 35.

3. If x is positive, the first negative term in the expansion of $(1+x)^{\frac{27}{5}}$ is :

(1) 7th term (2) 5th term (3) 8th term (4) 6th term.

4. The coefficient of the middle term in the binomial expansion in powers of x of $(1 + \alpha x)^4$ and of $(1 - \alpha x)^6$ is the same, if α equals :

(1) $-\frac{5}{3}$ (2) $\frac{10}{3}$ (3) $-\frac{3}{10}$ (4) $\frac{3}{5}$

5. The coefficient of x^n in the expansion of $(1 + x)(1 - x)^n$ is-

(1) $(n - 1)$ (2) $(-1)^n (1 - n)$ (3) $(-1)^{n-1}(n - 1)^2$ (4) $(-1)^{n-1} n$

6. If $s_n = \sum_{r=0}^{n} \frac{1}{{}^nC_r}$ and $t_n = \sum_{r=0}^{n} \frac{r}{{}^nC_r}$, then $\frac{t_n}{s_n}$ is equal to-

(1) $\frac{n}{2}$ (2) $\frac{n}{2} - 1$ (3) $n - 1$ (4) $\frac{2n-1}{2}$

7. If the coefficients of r^{th}, $(r + 1)^{th}$ and $(r + 2)^{th}$ terms in the binomial expansion of $(1 + y)^m$ are in AP, then m and r satisfy the equation :

(1) $m^2 - m(4r - 1) + 4r^2 + 2 = 0$. (2) $m^2 - m(4r + 1) + 4r^2 - 2 = 0$.

(3) $m^2 - m(4r + 1) + 4r^2 + 2 = 0$. (4) $m^2 - m(4r - 1) + 4r^2 - 2 = 0$.

8. The value of ${}^{50}C_4 + \sum_{r=1}^{6} {}^{56-r}C_3$ is :

(1) ${}^{56}C_4$ (2) ${}^{56}C_3$ (3) ${}^{55}C_3$ (4) ${}^{55}C_4$

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9. If x is so small that x^3 and higher powers of x may be neglected, then $\frac{(1+x)^{3/2}-\left(1+\frac{1}{2}x\right)^3}{(1-x)^{1/2}}$ may be approximated as :

(1) $\frac{x}{2}-\frac{3}{8}x^2$ (2) $-\frac{3}{8}x^2$ (3) $3x+\frac{3}{8}x^2$ (4) $1-\frac{3}{8}x^2$

10. If the expansion in powers of x of the function $\frac{1}{(1-ax)(1-bx)}$ is $a_0 + a_1x + a_2x^2 + a_3x^3 + ...$, then a_n is :

(1) $\frac{a^n-b^n}{b-a}$ (2) $\frac{a^{n+1}-b^{n+1}}{b-a}$ (3) $\frac{b^{n+1}-a^{n+1}}{b-a}$ (4) $\frac{b^n-a^n}{b-a}$

11. For natural numbers m, n if $(1 - y)^m (1 + y)^n = 1 + a_1y + a_2y^2 + ...$ and $a_1 = a_2 = 10$, then (m, n) is :

(1) (35, 20) (2) (45, 35) (3) (35, 45) (4) (20, 45)

12. The sum of the series $^{20}C_0 - {}^{20}C_1 + {}^{20}C_2 - {}^{20}C_3 + ... + {}^{20}C_{10}$ is

(1) $-{}^{20}C_{10}$ (2) $\frac{1}{2}\,{}^{20}C_{10}$ (3) 0 (4) $^{20}C_{10}$

13. **Statement-1 :** $\sum_{r=0}^{n}(r+1)\,{}^nC_r = (n + 2)\,2^{n-1}$

Statement-2 : $\sum_{r=0}^{n}(r + 1)\,{}^nC_r\,x^r = (1 + x)^n + nx\,(1 + x)^{n-1}$

(1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
(2) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1
(3) Statement-1 is True, Statement-2 is False
(4) Statement-1 is False, Statement-2 is True

14. Let $S_1 = \sum_{j=1}^{10} j(j-1)\,{}^{10}C_j$, $S_2 = \sum_{j=1}^{10} j\,{}^{10}C_j$ and $S_3 = \sum_{j=1}^{10} j^2\,{}^{10}C_j$.

Statement -1 : $S_3 = 55 \times 2^9$.
Statement -2 : $S_1 = 90 \times 2^8$ and $S_2 = 10 \times 2^8$.
(1) Statement -1 is true, Statement-2 is true ; Statement -2 is not a correct explanation for Statement -1.
(2) Statement-1 is true, Statement-2 is false.
(3) Statement -1 is false, Statement -2 is true.
(4) Statement -1 is true, Statement -2 is true; Statement-2 is a correct explanation for Statement-1.

15. The coefficient of x^7 in the expansion of $(1 - x - x^2 + x^3)^6$ is :

(1) 144 (2) – 132 (3) – 144 (4) 132

16. If n is a positive integer, then $\left(\sqrt{3}+1\right)^{2n} - \left(\sqrt{3}-1\right)^{2n}$ is :

(1) an irrational number
(2) an odd positive integer
(3) an even positive integer
(4) a rational number other than positive integers

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Answers Key

1. (4)	**2.** (2)	**3.** (3)	**4.** (3)
5. (2)	**6.** (1)	**7.** (2)	**8.** (1)
9. (2)	**10.** (3)	**11.** (3)	**12.** (2)
13. (1)	**14.** (2)	**15.** (3)	**16.** (1)

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