

Maxprap. Chapter wise Series Class 11th – Binomial Theorem

Class : 11th

Subject: Mathematics

Max. Marks : 60

Duration : 2 Hrs

Sections: A (MCQs), B (Short Answer-I), C (Short Answer-II), D (Long Answer I), E (Long Answer II).

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 31 questions divided into five Sections A, B, C, D and E.
- (iii). Section A comprises of 10 MCQs of 1 mark each. Section B comprises of 8 questions of 1 marks each. Section C comprises of 5 questions of 2 marks each. Section D comprises of 4 question of 3 marks each and Section E comprises of 4 Questions of 5 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted.

Section A

Questions 1 to 10 carry 1 mark each

1. The 7th term in the expansion of $(\sqrt{x} + \sqrt{y})^{10}$ is
a) $210 x^3 y^4$ b) $120 x^2 y^2$ c) $120 xy^2$ d) $210 x^2 y^3$
2. The total number of terms in the expansion of $(x + a)^{51} - (x - a)^{51}$ after simplification is
a) 25 b) 26 c) 102 d) 27
3. The number of terms in the expansion of $(3x - \frac{5}{y})^{10}$ is
a) 9 b) 11 c) 8 d) 10
4. The term independent of x in the expansion of $(x - \frac{1}{x})^{12}$ is
a) 693 b) 924 c) 462 d) 231
5. The number of terms in the expansion of $\{(x + a)^{16} + (x - a)^{16}\}$ is
a) 7 b) 8 c) 17 d) 9
6. The middle term in the expansion of $(\frac{2x^2}{3} + \frac{3}{2x^2})^{10}$ is
a) 251 b) 250 c) 249 d) 252
7. If the coefficients of 2nd, 3rd and 4th terms in the expansion of $(1 + x)^n$, $n \in \mathbb{N}$ are in A.P., then $n =$
a) 14 b) 7 c) 2 d) 5
8. Find the number of terms in the expansion of $\left[(\sqrt{x} + \sqrt{y})^{11} + (\sqrt{x} - \sqrt{y})^{11}\right]$
a) 5 b) 12 c) 6 d) 4

Assertion(A)/Reason(R) Based (9-10): In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

9. Assertion (A): The expansion of $(1 + x)^n = n_{c_0} + n_{c_1}x + n_{c_2}x^2 \dots + n_{c_n}x^n$.

Reason (R): If $x = -1$, then the above expansion is zero.

10. Assertion (A): Number of terms in the expansion of $\left(2x - \frac{4}{x^2}\right)^{10}$ is 11.

Reason (R): Number of terms in the expansion of, $(x + a)^n$ is $n + 1$.

SECTION – B

Questions 11 to 18 carry 1 marks each

11. Write the middle term in the expansion of $\left(x + \frac{1}{x}\right)^{10}$.
12. Find the middle term in the expansion of $\left(\frac{2}{3}x^2 - \frac{3}{2x}\right)^{20}$.
13. Evaluate: $(3 + \sqrt{2})^5 - (3 - \sqrt{2})^5$.
14. Evaluate: $(1 + 2\sqrt{x})^5 + (1 - 2\sqrt{x})^5$.
15. Find the 10th term in the expansion of $\left(2x^2 + \frac{1}{x}\right)^{12}$.
16. Which term is greater $(1.2)^{4000}$ or 800?
17. Find the 11th term from the end in the expansion of $\left(2x - \frac{1}{x^2}\right)^{25}$.
18. Using binomial theorem evaluate: $(98)^5$.

SECTION – C

Questions 19 to 23 carry 2 marks each

19. Show that $9^{n+1} - 8n - 9$ is divisible by 64 whenever n is a positive integer.
20. Using binomial theorem, prove that $6^n - 5n$ always leaves remainder 1 when divided by 25.

21. Show that the middle term in the expansion of $(1 + x)^{2n}$ is $\frac{1 \cdot 3 \cdot 5 \dots (2n-1)}{n!} 2^n x^n$, where n is a positive integer.

22. If n is a positive integer, prove that $3^{3n} - 26n - 1$ is divisible by 676.

23. If the coefficients of $(r - 5)^{th}$ and $(2r - 1)^{th}$ terms in the expansion of $(1 + x)^{34}$ are equal, find r .

SECTION – D

Questions 24 to 27 carry 3 marks each

24. Using binomial theorem, expand: $\left(x^2 - \frac{2}{x}\right)^7$.

25. Simplify $(x + 2y)^8 + (x - 2y)^8$

26. Using binomial theorem, expand: $(3x + 2y)^5$

27. Write the number of terms in the expansion of $(\sqrt{2} + 1)^5 + (\sqrt{2} - 1)^5$.

SECTION – E

Questions 28 to 31 carry 5 marks each

28. If the coefficients of 2nd, 3rd and 4th terms in the expansion of $(1 + x)^{2n}$ are in AP, show that $2n^2 - 9n + 7 = 0$.

29. Find the two middle terms in the expansion of $\left(3x - \frac{x^3}{6}\right)^9$.

30. Evaluate: $(2 + \sqrt{3})^7 + (2 - \sqrt{3})^7$

31. The coefficients of three consecutive terms in the expansion of $(1 + a)^n$ are in the ratio 1 : 7 : 42. Find n .

Binomial Theorem Paper Details – Analysis

Objective Questions

MCQ	1 marks x 8 question = 8	
Assertion Reason	1 marks x 2 question = 2	

Subjective

Short type I	1 marks x 8 question = 8	
Short type II	2 marks x 5 question = 10	
Long Type I	3 marks x 4 question = 12	
Long Type II	5 marks x 4 question = 20	

Total = 60 marks Your Score =