CLASS XI – MATHEMATICS (041)
CHAPTER 7 : BINOMIAL THEOREM
PRACTICE PAPER (SESSION 2026–27)

Maximum Marks: 40 **Time Allowed: 1½ Hours**

General Instructions:

Read the following instructions very carefully and strictly follow them:

1. This question paper contains 23 questions. All questions are compulsory.
2. This question paper is divided into five Sections – A, B, C, D and E.
3. In Section A, Questions 1 to 12 are Multiple Choice Questions (MCQs) and Questions 13 and 14 are Assertion–Reason based questions of 1 mark each.
4. In Section B, Questions 15 to 18 are Very Short Answer (VSA) type questions, carrying 2 marks each.
5. In Section C, Questions 19 to 21 are Short Answer (SA) type questions, carrying 3 marks each.
6. In Section D, Question 22 is a Long Answer (LA) type question, carrying 5 marks.
7. In Section E, Question 23 is a case study based question, carrying 4 marks.
8. There is no overall choice. However, an internal choice has been provided in 2 questions of Section B (Q17, Q18), 2 questions of Section C (Q20, Q21), in Q22 of Section D and in one sub-part of Q23 of Section E.
9. Draw neat and clean figures wherever required. Use of calculators is not allowed. Use the binomial theorem wherever the question asks for it.

SECTION – A **(14 × 1 = 14)**

This section comprises of 12 multiple choice questions (Q1–Q12) and 2 assertion–reason based questions (Q13–Q14) of 1 mark each.

No.	Questions	Marks
Q1.	Fig. 1 lists the terms of the expansion of $(a + b)^6$, with the third term hidden. The third term is	**1**

Expansion of $(a + b)^6$

Term no.	Term
1	a^6
2	$6a^5b$
3	?
4	$20a^3b^3$
5	$15a^2b^4$
6	$6ab^5$
7	b^6

Fig. 1

(A) $15a^4b^2$ (B) $6a^4b^2$

(C) $30a^4b^2$ (D) $20a^4b^2$

Q2. The bar chart in Fig. 2 shows the binomial coefficients in the expansion of $(a + b)^n$. The sum of all the binomial coefficients shown is **1**

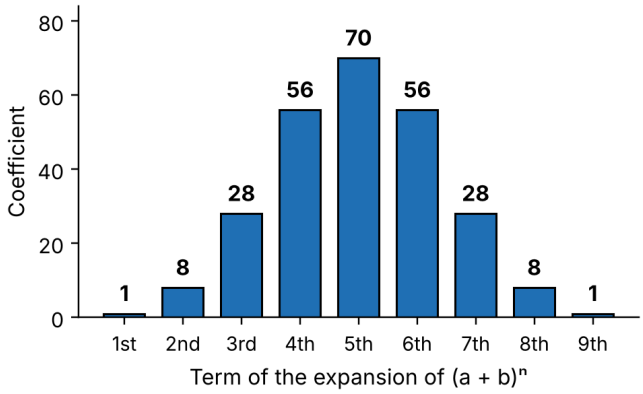


Fig. 2

(A) 128 (B) 512

(C) 256 (D) 64

Q3. The number of terms in the expansion of $(2x - 3y)^9$ is **1**

(A) 9 (B) 10

(C) 11 (D) 8

Q4. The coefficient of x^2 in the expansion of $(1 + 2x)^5$ is **1**

(A) 10 (B) 20

(C) 80 (D) 40

Q5. The value of ${}^7C_0 - {}^7C_1 + {}^7C_2 - {}^7C_3 + {}^7C_4 - {}^7C_5 + {}^7C_6 - {}^7C_7$ is **1**

(A) 0 (B) 1

(C) 128 (D) –1

Q6. $(x + 1)^4 - (x - 1)^4$ is equal to **1**

(A) $8x^3 + 4x$ (B) $4x^3 + 8x$

(C) $8x^3 + 8x$ (D) $8x^4 + 8x$

Q7. The value of $(101)^3$ is **1**

(A) 1030201 (B) 1030301

(C) 1003001 (D) 1330301

Q8. Fig. 3 shows the first seven rows of Pascal's triangle with one entry of the row of index 6 hidden. The hidden number is **1**

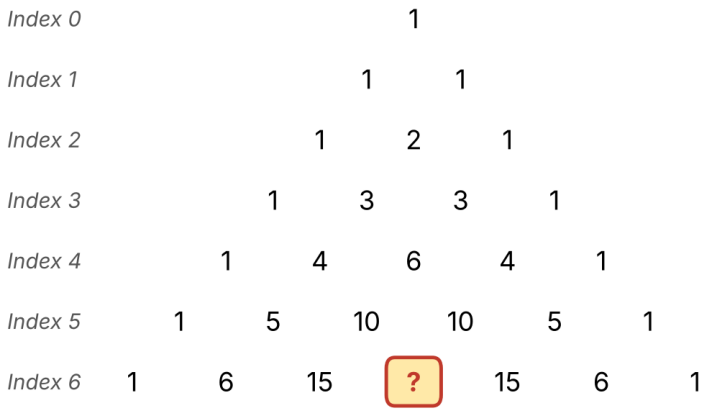


Fig. 3

(A) 15 (B) 10

(C) 30 (D) 20

Q9. For every positive integer n, the number $11^n - 10n - 1$ is divisible by **1**

(A) 100 (B) 10

(C) 1000 (D) 121

Q10. The sum of all the coefficients in the expansion of $(3x - 2)^4$ is **1**

(A) 16 (B) 0

(C) 1 (D) 81

Q11. Using the binomial theorem, $(1.1)^{10}$ is **1**

(A) less than 2 (B) equal to 2

(C) impossible to compare with 2 (D) greater than 2

Q12. The number of terms in the expansion of $(x + y)^6 + (x - y)^6$ is **1**

(A) 7 (B) 4

(C) 6 (D) 3

Assertion–Reason Based Questions

Directions: Question numbers 13 and 14 are Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer from the options (A), (B), (C) and (D) as given below:
(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

Q13. **Assertion (A):** The expansion of $(a + b)^n$ has n terms. **1**
Reason (R): In every term of the expansion of $(a + b)^n$, the sum of the indices of a and b is n.

Q14. **Assertion (A):** The sum of all the binomial coefficients in the expansion of $(1 + x)^8$ is 256. **1**
Reason (R): ${}^nC_0 + {}^nC_1 + {}^nC_2 + \ldots + {}^nC_n = 2^n - 1$.

SECTION – B (4 × 2 = 8)

This section comprises of 4 very short answer (VSA) type questions of 2 marks each.

Q15. Fig. 4 shows the first six rows of Pascal's triangle in which three numbers have been replaced by p, q and r. **2**

Index 0					1					
Index 1				1		1				
Index 2			1		2		1			
Index 3		1		3		3		1		
Index 4	1		p		q		4		1	
Index 5	1		5		r		10		5	1

Fig. 4

(i) Find the values of p, q and r. **[1]**

(ii) Using the row of index 5, expand $(1 - x)^5$. **[1]**

Q16. Expand $(x - 2/x)^4$, $x \neq 0$. **2**

Q17. **(A)** Using the binomial theorem, evaluate $(99)^4$. **2**

OR

(B) Using the binomial theorem, show that $(1.03)^{200}$ is greater than 7.

Q18. **(A)** Find $(a + b)^4 - (a - b)^4$. Hence evaluate $(\sqrt{5} + 1)^4 - (\sqrt{5} - 1)^4$. **2**

OR

(B) The sum of all the binomial coefficients in the expansion of $(a + b)^n$ is 512. Find n and the number of terms in the expansion.

SECTION – C (3 × 3 = 9)

This section comprises of 3 short answer (SA) type questions of 3 marks each.

Q19. Fig. 5 shows a square of side (x + 3) units divided into four parts. **3**

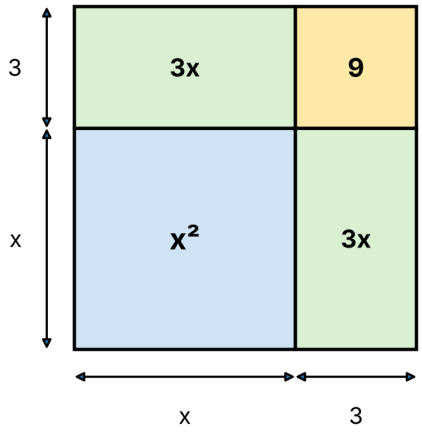


Fig. 5

(i) Write the area of each of the four parts and, by adding them, express the area of the whole square as a polynomial in x. **[1]**

(ii) Verify the result of part (i) by expanding $(x + 3)^2$ with the binomial theorem. **[1]**

(iii) Using the binomial theorem, evaluate $(103)^3$. **[1]**

Q20. **(A)** Expand $(3x - 1/x)^5$, $x \neq 0$. **3**

OR

(B) Using the binomial theorem, evaluate $(102)^4$.

Q21. **(A)** Using the binomial theorem, prove that $7^n - 6n - 1$ is divisible by 36 for every positive integer n. **3**

OR

(B) Find $(x + y)^4 + (x - y)^4$. Hence evaluate $(\sqrt{3} + 1)^4 + (\sqrt{3} - 1)^4$.

SECTION – D (1 × 5 = 5)

This section comprises of 1 long answer (LA) type question of 5 marks.

Q22. **(A)** Expand $(1 + 2x)^5 + (1 - 2x)^5$. **[3]** Hence evaluate $(1.02)^5 + (0.98)^5$. **[2]** **5**

OR

(B) Using the binomial theorem, prove that (i) ${}^nC_0 + 2 \times {}^nC_1 + 2^2 \times {}^nC_2 + \ldots + 2^n \times {}^nC_n = 3^n$, **[2]** (ii) hence find the value of ${}^5C_0 + 2 \times {}^5C_1 + 4 \times {}^5C_2 + 8 \times {}^5C_3 + 16 \times {}^5C_4 + 32 \times {}^5C_5$, **[1]** (iii) ${}^nC_0 - 2 \times {}^nC_1 + 2^2 \times {}^nC_2 - \ldots + (-2)^n \times {}^nC_n = (-1)^n$. **[2]**

SECTION – E (1 × 4 = 4)

This section comprises of 1 case study based question of 4 marks with sub-parts (i), (ii), (iii) of marks 1, 1, 2 respectively.

Q23. **Case Study:** Meera deposits ₹10,000 in a bank that pays 1% compound interest per year, so her money is multiplied by 1.01 every year. Fig. 6 shows her amount at the start and at the end of each of the first three years; the amount at the end of Year 4 is not shown. **4**

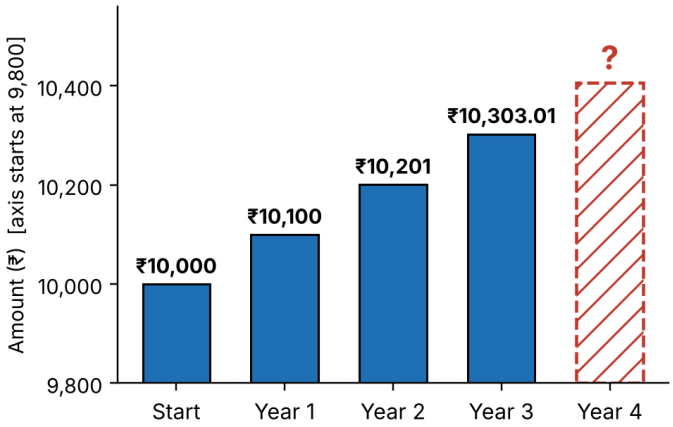


Fig. 6

Based on the given information, answer the following questions:

(i) Write $(1.01)^3$ as $(1 + 0.01)^3$ and expand it to verify the amount shown for Year 3. **[1]**

(ii) Find the amount at the end of Year 4. **[1]**

(iii) **(a)** Using the binomial theorem, show that $(1.01)^{100} > 2$, i.e. that Meera's money more than doubles in 100 years. **[2]**

OR

(b) If instead a quantity falls by 1% every year, its value after 5 years is $(0.99)^5$ times the original. Find an approximate value of $(0.99)^5$ using the first three terms of its expansion. **[2]**

— End of Question Paper —