UNIQUE STUDY POINT

AMITESH NAGAR, INDORE

PRACTICE PAPER 04 (2026-27)

CHAPTER 06 NUMBER PLAY

Prepared by: SUMEET SAHU | Website : Click Here | WhatsApp Channel : Click Here

Class : VII **Subject :** Mathematics **Time :** 1 hr 30 min **M.M. :** 40

General Instructions :

- This question paper contains **21** questions divided into **four** sections A, B, C and D.
- **Section A** has 10 multiple choice questions of 1 mark each.
- **Section B** has 5 short answer questions of 2 marks each.
- **Section C** has 4 short answer questions of 3 marks each.
- **Section D** has 2 case based questions of 4 marks each.
- All questions are compulsory. Use of a calculator is **not** permitted.

SECTION – A

This section consists of 10 multiple choice questions of 1 mark each.

1. The sum of an even and an odd number is always **1**

(A) odd (B) even (C) prime (D) a multiple of 3

2. A number is divisible by 6 only if it is divisible by **1**

(A) 2 or 3 (B) both 2 and 3 (C) 6 and 1 (D) neither 2 nor 3

3. Which entry is in the centre of the Lo Shu magic square ? **1**

(A) 1 (B) 3 (C) 5 (D) 9

4. The 10th term of the Virahanka sequence 1, 2, 3, 5, 8, ... is **1**

(A) 55 (B) 34 (C) 144 (D) 89

5. How many ways can 2 be written as a sum of 1s and 2s ? **1**

(A) 1 (B) 2 (C) 3 (D) 4

6. A number is divisible by 10 if **1**

(A) it ends in 0 (B) it ends in 5 (C) its digit sum is 10 (D) it is even

7. If every entry of a magic square is doubled, the new magic sum is **1**

(A) the same (B) tripled (C) halved (D) doubled

8. Which of the following is divisible by 9 ? **1**

(A) 12345 (B) 23456 (C) 34569 (D) 45679

Directions (Q. 9 and Q. 10) : In each of the following questions, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option : **(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 sum of the first n natural numbers is $n(n+1)/2$. **1**
Reason (R) : $1+2+3+...+n$ can be paired as $(1+n)+(2+(n-1))+...$ Each pair sums to $(n+1)$, giving $n/2$ pairs.

10. **Assertion (A) :** In a 3×3 magic square, the sum of all 9 entries equals 3 times the magic sum. **1**
Reason (R) : The 3 rows together cover all 9 entries exactly once, and each row sums to the magic sum.

SECTION – B

This section consists of 5 questions of 2 marks each.

11. State the parity and give a reason : (i) 13 + 17 + 19 (ii) 4 × 6 × 5 × 3 (iii) 100 + 101 + 102. **2**

12. Check divisibility for 34,569 : (i) by 3 (ii) by 9 (iii) by 6 (iv) by 4. **2**

13. A 3×3 magic square has magic sum 30. (i) What is the centre number ? (ii) Write the 9 entries if they are m−4 to m+4. **2**

14. List all ways to write 4 as a sum of 1s and 2s. How many ways ? What is the connection to the Virahanka sequence ? **2**

15. The number 4_2,3_8 has two missing digits (marked by _). It is divisible by both 9 and 4. Find all possible pairs of missing digits. **2**

SECTION – C

This section consists of 4 questions of 3 marks each.

16. A generalised 3×3 magic square has entries m−4, m−3, m−2, m−1, m, m+1, m+2, m+3, m+4 arranged so that all rows, columns and diagonals sum to 3m. (i) Show that the sum of all 9 entries is 9m. (ii) If the magic sum is 3m=60, find m and write the complete grid. (iii) Verify one row and one diagonal of your grid. **3**

17. Ravi writes a 4-digit number 6_78 (one digit missing). Find the missing digit if the number is divisible by 9. Also check divisibility by 3. **3**

18. Find the parity of : (i) 1+2+3+...+20 (ii) 1×2×3×...×20 (iii) 1+3+5+7+...+19 (sum of first 10 odd numbers). **3**

19. Show that the number of ways to write n as a sum of 1s and 2s satisfies the Virahanka recurrence. Verify for n=4 by listing all ways and checking ways(4)=ways(3)+ways(2). **3**

SECTION – D

This section consists of 2 case based questions of 4 marks each.

20. A number game using divisibility. **4**

(i) Write the smallest 5-digit number divisible by 9.

(ii) Write the largest 4-digit number divisible by both 4 and 9.

(iii) A number leaves remainder 0 when divided by 2, 3, 4 and 6. What is the smallest such 2-digit number ?

(iv) A 3-digit number ABC satisfies A+B+C=18 and BC (the 2-digit number) is divisible by 4. Find two possible values of the number ABC.

21. Students create and explore magic squares. **4**

(i) Create a magic square with magic sum 24. Write all 9 entries.

(ii) What is the centre number of this magic square ?

(iii) Find the sum of all 9 entries in your magic square.

(iv) If you add 1 to the centre entry only (not all entries), is it still a magic square ? Why ?

————— All the Best —————

UNIQUE STUDY POINT

AMITESH NAGAR, INDORE

PRACTICE PAPER 04 (2026-27) — MARKING SCHEME

CHAPTER 06 NUMBER PLAY

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SECTION – A (Answer Key)

Q	1	2	3	4	5	6	7	8	9	10
Ans	(A)	(B)	(C)	(D)	(B)	(A)	(D)	(C)	(A)	(A)

SECTION A – Detailed Answers (1 mark each)

1. *The sum of an even and an odd number is always* **1**

(A) odd (B) even (C) prime (D) a multiple of 3

Ans (A) : even+odd=(2m)+(2n+1)=2(m+n)+1=odd.

2. *A number is divisible by 6 only if it is divisible by* **1**

(A) 2 or 3 (B) both 2 and 3 (C) 6 and 1 (D) neither 2 nor 3

Ans (B) : 6=2×3. Divisible by 6 requires divisibility by both its prime factors 2 and 3.

3. *Which entry is in the centre of the Lo Shu magic square ?* **1**

(A) 1 (B) 3 (C) 5 (D) 9

Ans (C) : In Lo Shu (4,9,2/3,5,7/8,1,6), the centre position is 5.

4. *The 10th term of the Virahanka sequence 1, 2, 3, 5, 8, ... is* **1**

(A) 55 (B) 34 (C) 144 (D) 89

Ans (D) : Sequence: 1,2,3,5,8,13,21,34,55,**89**. 10th term=89.

5. *How many ways can 2 be written as a sum of 1s and 2s ?* **1**

(A) 1 (B) 2 (C) 3 (D) 4

Ans (B) : Ways to write 2: {1+1} and {2}. Two ways = 2nd Virahanka number.

6. *A number is divisible by 10 if* **1**

(A) it ends in 0 (B) it ends in 5 (C) its digit sum is 10 (D) it is even

Ans (A) : A number divisible by 10 ends in 0.

7. *If every entry of a magic square is doubled, the new magic sum is* **1**

(A) the same (B) tripled (C) halved (D) doubled

Ans (D) : Each of 9 entries doubles, each row sum doubles: magic sum doubles.

8. *Which of the following is divisible by 9 ?* **1**

(A) 12345 (B) 23456 (C) 34569 (D) 45679

Ans (C) : 34569: 3+4+5+6+9=27=9×3. Divisible by 9.

9. *Assertion (A) : The sum of the first n natural numbers is n(n+1)/2.* **1**
Reason (R) : 1+2+3+...+n can be paired as (1+n)+(2+(n−1))+... Each pair sums to (n+1), giving n/2 pairs.

Ans (A) : Both true and R correctly explains A with the pairing argument giving n(n+1)/2.

10. *Assertion (A) : In a 3×3 magic square, the sum of all 9 entries equals 3 times the magic sum.* **1**
Reason (R) : The 3 rows together cover all 9 entries exactly once, and each row sums to the magic sum.

Ans (A) : Both true and R correctly explains A: the 3 rows partition the 9 entries, total=3×magic sum.

SECTION B – Short Answer (2 marks each)

11. *State the parity and give a reason : (i) 13 + 17 + 19 (ii) 4 × 6 × 5 × 3 (iii) 100 + 101 + 102.* **2**

Solution : (i) 13+17+19: three odds=**odd**. (ii) 4×6×5×3: contains 4 (even), so **even**. (iii) 100+101+102=303, **odd**.

12. *Check divisibility for 34,569 : (i) by 3 (ii) by 9 (iii) by 6 (iv) by 4.* **2**

Solution : 34,569: digit sum=3+4+5+6+9=27. (i) div by 3 ✓ **Yes**. (ii) 27=9×3, div by 9 ✓ **Yes**. (iii) 34569 is odd, so NOT div by 2, hence **No** for div by 6. (iv) last 2 digits=69; 69÷4=17.25, **No**.

13. *A 3×3 magic square has magic sum 30. (i) What is the centre number ? (ii) Write the 9 entries if they are m−4 to m+4.* **2**

Solution : (i) 3m=30 → m=**10**. (ii) Entries: 6,7,8,9,10,11,12,13,14.

14. *List all ways to write 4 as a sum of 1s and 2s. How many ways ? What is the connection to the Virahanka sequence ?* **2**

Solution : 1111; 211; 121; 112; 22. **5 ways**. This equals the 5th Virahanka number (=5).

15. *The number 4_2,3_8 has two missing digits (marked by _). It is divisible by both 9 and 4. Find all possible pairs of missing digits.* **2**

Solution : Number: 4d1,3e8. Div by 4: last two digits e8; e8÷4 needs e8 div by 4: 08,28,48,68,88. So e∈{0,2,4,6,8}. Div by 9: 4+d+1+3+e+8=16+d+e div by 9. 16+d+e=18 → d+e=2; or 27 → d+e=11. With e even: d+e=2: (d,e)=(2,0),(0,2). d+e=11: (d,e)=(3,8),(5,6),(7,4),(9,2). Valid pairs: **(d,e)=(2,0),(0,2),(3,8),(5,6),(7,4),(9,2)**.

SECTION C – Short Answer (3 marks each)

16. *A generalised 3×3 magic square has entries m−4, m−3, m−2, m−1, m, m+1, m+2, m+3, m+4 arranged so that all rows, columns and diagonals sum to 3m. (i) Show that the sum of all 9 entries is 9m. (ii) If the magic sum is 3m=60, find m and write the complete grid. (iii) Verify one row and one diagonal of your grid.* **3**

Solution : (i) Sum = (m−4)+(m−3)+...+(m+4) = 9m. ✓ (ii) m=20. Entries: 16,17,18,19,20,21,22,23,24. Grid (Lo Shu pattern): 16,23,21/22,20,18/24,17,19. (iii) Row 1: 16+23+21=60 ✓. Diagonal: 16+20+24=60 ✓.

17. *Ravi writes a 4-digit number 6_78 (one digit missing). Find the missing digit if the number is divisible by 9. Also check divisibility by 3.* **3**

Solution : Digit sum=6+d+7+8=21+d. For div by 9: 21+d=27 → d=**6**. Number: 6678. Also div by 3 since 27 is div by 3. ✓

18. *Find the parity of : (i) 1+2+3+...+20 (ii) 1×2×3×...×20 (iii) 1+3+5+7+...+19 (sum of first 10 odd numbers).* **3**

Solution : (i) 1+2+...+20=20×21/2=210. **Even**. (ii) Contains factor 2: **even**. (iii) Sum of 10 odd numbers = 10^2=100. **Even**.

19. *Show that the number of ways to write n as a sum of 1s and 2s satisfies the Virahanka recurrence. Verify for n=4 by listing all ways and checking ways(4)=ways(3)+ways(2).* **3**

Solution : ways(4)=5=ways(3)+ways(2)=3+2=5. ✓ Ways: 1111; 211; 121; 112; 22. Each way either starts with 1 (then arrange rest in ways(3) ways) or starts with 2 (then arrange rest in ways(2) ways). ways(3)=3: 111,21,12. ways(2)=2: 11,2. Total=3+2=5. ✓

SECTION D – Case Based (4 marks each)

20. *A number game using divisibility.* **4**

(i) Write the smallest 5-digit number divisible by 9.

Ans : Smallest 5-digit number div by 9: 10000 (digit sum=1, need 9). Next: 10008 (sum=9). **10008**.

(ii) Write the largest 4-digit number divisible by both 4 and 9.

Ans : Largest 4-digit div by 9: 9999 (9+9+9+9=36=9×4) □. Also div by 4? 99÷4=24.75. No. Try 9996: 9+9+9+6=33, not div 9. 9972: 9+9+7+2=27 div 9 □; 72÷4=18 □. **9972**.

(iii) A number leaves remainder 0 when divided by 2, 3, 4 and 6. What is the smallest such 2-digit number ?

Ans : Divisible by LCM(2,3,4,6)=12. Smallest 2-digit multiple of 12=**12**.

(iv) A 3-digit number ABC satisfies A+B+C=18 and BC (the 2-digit number) is divisible by 4. Find two possible values of the number ABC.

Ans : A+B+C=18; BC div by 4. BC: 12,16,20,... but single digits. B,C single digits: BC values div by 4: 12,16,20,24,28,32,...,96. With B,C≤9: 12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,96. A=18−B−C. Try B=1,C=2: A=15 too big. B=4,C=8: A=6. 648: 6+4+8=18 □, 48/4=12 □. **648**. B=7,C=2: A=9. 972: 9+7+2=18 □, 72/4=18 □. **972**.

21. *Students create and explore magic squares.* **4**

(i) Create a magic square with magic sum 24. Write all 9 entries.

Ans : Magic sum=24, centre=8. Entries 4 to 12 (Lo Shu+3): 7,12,5 / 6,8,10 / 11,4,9. Verify row 1: 7+12+5=24 □

(ii) What is the centre number of this magic square ?

Ans : Centre = **8**.

(iii) Find the sum of all 9 entries in your magic square.

Ans : Sum of all 9 entries = 9×8=**72**.

(iv) If you add 1 to the centre entry only (not all entries), is it still a magic square ? Why ?

Ans : No. Changing only the centre breaks the rows and diagonals through it. E.g. if centre becomes 9, the two diagonals now sum to 25, but rows through centre sum to 25, while rows not through centre still sum to 24. Not a magic square.