UNIQUE STUDY POINT

By Sumeet Sahu

www.uniquestudyonline.com

Unique Study Point, Amitesh Nagar, Indore, MP | Contact: 8103405051

Class: VIII	**Subject:** Mathematics	**Session:** 2025-26
Chapter: 05 - Prime Time	**Time:** 1½ Hours	**Max. Marks:** 40

General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five sections A, B, C, D and E.
3. Section A contains 10 MCQs of 1 mark each.
4. Section B contains 4 questions of 2 marks each.
5. Section C contains 3 questions of 3 marks each.
6. Section D contains 1 question of 5 marks.
7. Section E contains 2 Case Study Based questions of 4 marks each.

SECTION A - Multiple Choice Questions (1 mark each)

1. The only even prime number is:

(a) 0
(b) 1
(c) 2
(d) 4

2. Which of the following numbers has exactly three factors?

(a) 8
(b) 9
(c) 10
(d) 12

3. The LCM of two co-prime numbers 5 and 7 is:

(a) 1
(b) 5
(c) 7
(d) 35

4. A number is divisible by 4 if:

(a) Last digit is divisible by 4
(b) Last two digits are divisible by 4
(c) Last three digits are divisible by 4
(d) Sum of digits is divisible by 4

5. How many consecutive composite numbers are there between 90 and 96?

(a) 3
(b) 4
(c) 5
(d) 6

6. The prime factorization of 1000 is:

(a) $2 \times 5 \times 100$
(b) $10 \times 10 \times 10$
(c) $2^3 \times 5^3$
(d) $2^2 \times 5^5$

7. Which number between 20 and 30 has the most factors?

(a) 24
(b) 25
(c) 27
(d) 28

8. If a number is divisible by both 2 and 3, it must be divisible by:

(a) 5
(b) 6
(c) 8
(d) 9

9. The smallest number that has both 12 and 18 as factors is:

(a) 6
(b) 36
(c) 72
(d) 216

10. Which of the following pairs are NOT co-prime?

(a) 8 and 15
(b) 11 and 13
(c) 21 and 35
(d) 17 and 19

SECTION B - Short Answer Questions (2 marks each)

11. Find all multiples of 9 between 50 and 80.

12. Is 256 divisible by 8? Check using the divisibility rule.

13. Write the prime factorization of 150.

14. Find three prime numbers between 60 and 80.

SECTION C - Short Answer Questions (3 marks each)

15. In the idli-vada game, children play with numbers from 1 to 100. If multiples of 3 are 'idli' and multiples of 7 are 'vada':

(a) How many times will 'idli' be said?
(b) How many times will 'idli-vada' be said?

16. Find whether the following pairs are co-prime using prime factorization:

(a) 121 and 1331
(b) 343 and 216

17. A three-digit number has 2, 3, and 7 as its prime factors. Find three such numbers.

SECTION D - Long Answer Question (5 marks)

18. Guna has 48 red marbles, 72 blue marbles, and 96 green marbles. He wants to pack them in boxes such that:

- Each box has the same number of marbles
- Each box contains only one color
- Maximum number of marbles are packed in each box

(a) How many marbles should be in each box? (2 marks)
(b) How many boxes of each color will he need? (2 marks)
(c) What is the total number of boxes? (1 mark)

SECTION E - Case Study Based Questions (4 marks each)

19. Case Study 1: The Traffic Light System

At a busy intersection, three traffic lights change at different intervals. The red light changes every 48 seconds, the yellow light every 72 seconds, and the green light every 108 seconds. All three lights change together at 6:00 PM.

(a) After how many seconds will all three lights change together again? (2 marks)
(b) How many times will all three lights change together between 6:00 PM and 7:00 PM? (2 marks)

20. Case Study 2: The Classroom Arrangement

A teacher wants to arrange 42 students in rows for a group activity. She wants each row to have the same number of students with at least 2 students but not more than 10 students in a row.

(a) List all possible arrangements (number of rows × students per row). (2 marks)
(b) Which arrangement will create the most rows? Which will create the least rows? (2 marks)

DETAILED ANSWER KEY - PAPER 03

SECTION A - Answers to MCQs

1. (c) 2

2 is the only even prime number. All other even numbers are divisible by 2, making them composite.

2. (b) 9

9 = 3 × 3, so factors are 1, 3, 9 (exactly three factors). Numbers with exactly three factors are squares of prime numbers.

3. (d) 35

For co-prime numbers, LCM = product of the numbers. LCM(5,7) = 5 × 7 = 35

4. (b) Last two digits are divisible by 4

A number is divisible by 4 if the number formed by its last two digits is divisible by 4.

5. (d) 6

Between 90 and 96: 90, 91, 92, 93, 94, 95, 96. All are composite (91 = 7×13, 93 = 3×31, others obvious).

6. (c) $2^3 \times 5^3$

1000 = 10 × 10 × 10 = $(2 \times 5)^3 = 2^3 \times 5^3$

7. (a) 24

Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24 (8 factors) - most among the options.

8. (b) 6

If divisible by both 2 and 3, it must be divisible by their LCM, which is 6.

9. (b) 36

LCM(12, 18) = 36. This is the smallest number divisible by both.

10. (c) 21 and 35

21 = 3 × 7 and 35 = 5 × 7. Common factor is 7, so they are NOT co-prime.

SECTION B - Answers to Short Answer Questions

11.

Multiples of 9 between 50 and 80:

54, 63, 72

12.

Check the last three digits: 256

256 ÷ 8 = 32 (exact division)

Yes, 256 is divisible by 8.

13.

Prime factorization of 150:

$150 = 2 \times 75$
$= 2 \times 3 \times 25$
$= 2 \times 3 \times 5 \times 5$
$= 2 \times 3 \times 5^2$

14.

Three prime numbers between 60 and 80:

61, 67, 71, 73, 79 (any three of these)

SECTION C - Answers to Short Answer Questions

15.

(a) Multiples of 3 from 1 to 100: 3, 6, 9, ..., 99

Number of multiples = 100 ÷ 3 = 33 (taking integer part)

'Idli' will be said 33 times.

(b) Common multiples of 3 and 7 are multiples of 21

Multiples of 21 from 1 to 100: 21, 42, 63, 84

'Idli-vada' will be said 4 times.

16.

(a) 121 = 11 × 11 and 1331 = 11 × 11 × 11

Common factor is 11, so NOT co-prime.

(b) 343 = 7 × 7 × 7 and 216 = 2 × 2 × 2 × 3 × 3 × 3

No common factors, so they ARE co-prime.

17.

Numbers with prime factors 2, 3, and 7:

2 × 3 × 7 = 42 (two-digit)
2 × 2 × 3 × 7 = 84 (two-digit)
2 × 3 × 3 × 7 = 126 ✓
2 × 3 × 7 × 7 = 294 ✓
2 × 2 × 3 × 3 × 7 = 252 ✓

Three such numbers: 126, 252, 294

SECTION D - Answer to Long Answer Question

18.

(a) Find HCF of 48, 72, and 96:

48 = 2 × 2 × 2 × 2 × 3
72 = 2 × 2 × 2 × 3 × 3
96 = 2 × 2 × 2 × 2 × 2 × 3
HCF = 2 × 2 × 2 × 3 = 24

Each box should have 24 marbles.

(b) Number of boxes needed:

Red: 48 ÷ 24 = 2 boxes
Blue: 72 ÷ 24 = 3 boxes
Green: 96 ÷ 24 = 4 boxes

(c) Total boxes = 2 + 3 + 4 = 9 boxes

SECTION E - Answers to Case Study Based Questions

19. Case Study 1: The Traffic Light System

(a) Find LCM of 48, 72, and 108:

48 = $2^4 \times 3$
72 = $2^3 \times 3^2$
108 = $2^2 \times 3^3$
LCM = $2^4 \times 3^3 = 16 \times 27 = 432$ seconds

(b) From 6:00 PM to 7:00 PM = 3600 seconds

3600 ÷ 432 = 8.33

All three lights will change together 8 times (not counting the initial change at 6:00 PM).

20. Case Study 2: The Classroom Arrangement

(a) Factors of 42: 1, 2, 3, 6, 7, 14, 21, 42

Valid arrangements (between 2 and 10 students per row):

21 rows × 2 students
14 rows × 3 students
7 rows × 6 students
6 rows × 7 students

(b) Most rows: 21 rows × 2 students

Least rows: 6 rows × 7 students
