

SEMESTER-ONE**MATHEMATICS**

Class XI

Student Name:

Date:

Unit 1**MODULAR ARITHMETIC****Multiple Choice Questions**

Select and write one most appropriate option out of the four options given for each of the questions 1 – 5.

- What is the time 15 hours before 11 p.m.?
(a) 6 p.m. (b) 7 p.m.
(c) 8 p.m. (d) 9 p.m.
- If the time now in a 12-hour clock is 9 o'clock, what was the time 71 hours back?
(a) 2 o'clock (b) 6 o'clock
(c) 8 o'clock (d) 10 o'clock
- The value of $-11 \pmod{5}$ is
(a) 4 (b) 3
(c) 2 (d) 1
- If $5 \oplus_{11} n = 0$, the least positive value of n is
(a) 7 (b) 6
(c) 5 (d) 4
- The value of $(3 \otimes_5 4) \otimes_6 (4 \otimes_7 5)$ is
(a) 0 (b) 1
(c) 2 (d) 3

Fill in the Blanks

Fill in the blanks with a correct answer for each of the questions 1 – 5.

1. The value of $1011 \pmod{15}$ is _____ .
2. The value of $32 - 18 \pmod{4}$ is _____ .
3. If $26 = 2 \pmod{x}$ where $7 \leq x \leq 11$, the value of x is _____ .
4. The least positive integer that satisfies the equation $5x = 2 \pmod{3}$ is _____ .
5. If $24 = 3 \pmod{x}$, the value of x is _____ .

True or False

State whether the following statements are true or false for each of the questions 1 – 5.

1. The value of expression $101 - 27 \pmod{5}$ is 3.
2. The value of $848 \pmod{16}$ is 0.
3. Simplified value of $23 \times 8 \pmod{6}$ is 3.
4. The least positive integer that satisfies the equation $7x = 3 \pmod{6}$ is 3.
5. The value of $11 \oplus_7 5$ is 2.

Very Short Answer Type Questions

Answer each of the questions 1 – 5.

1. Find the least positive value of x such that $89 = (x + 3) \pmod{4}$.

2. Solve: $3x - 2 = 0 \pmod{11}$

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3. Today is a Monday. What day of the week will it be in 1000 day?

4. Albert was assigned a work on Friday. He agreed to complete the work after 25 days. But he took two more days to complete the work. On what day did he complete the work?

5. If $2x^2 + 3 = 4 \pmod{7}$, then find the value(s) of x between 1 and 6 that satisfies the given equation.

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Short Answer Type Questions

Answer each of the questions 1 – 5.

1. Construct the table for ‘addition modulo 4’ and evaluate the following using the table:

(i) $(1 \oplus_4 3) \oplus_4 2$

(ii) $2 \oplus_4 (2 \oplus_4 3)$

2. Let $S = \{1, 2, 3, 4\}$. Construct the table for ‘multiplication modulo 5’ in S. Using the table, find

(i) $(3 \otimes_5 2) + (1 \otimes_5 4)$

(ii) $2 \otimes_5 n = 3$

3. Construct the table for ‘multiplication modulo 5’ and evaluate the following using the table:

(i) $(2 \otimes_5 3) \otimes_5 4$

(ii) $(3 \oplus_5 4) \otimes_5 (4 \otimes_5 4)$

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4. Construct the table for 'addition modulo 6'. Using the tables, evaluate the following:

(i) $2 \oplus_6 3$

(ii) $(1 \oplus_6 3) \oplus_6 5$

5. Construct the table for 'multiplication modulo 12' on the set $S = \{1, 4, 9, 11\}$. Using the table, find the truth set of:

(i) $9 \otimes_{12} n = 0$

(ii) $n \otimes_{12} n = 1$

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