Modulo Arithmetic

CBSE Sample Question Paper (2021-22)

Term-1

(1) The value of $50 \odot_8 11$, where $\odot$ is multiplication modulo is —

(a) -1 (b) 0 (c) 7 (d) 9

(2) If $x \equiv -4 \pmod 3$, then a solution for x is —

(a) -2 (b) 12 (c) 19 (d) 35

(3) If the present time is 8:40 p.m, then the time after $876\frac{1}{2}$ hours will be —

(a) 8:40 a.m. (b) 9:10 a.m (c) 6:10 p.m. (d) 10:40 p.m.

(4) Let $m \in \mathbb{Z}^+$, consider the ~~mod~~ relation R_m defined as $a R_m b$ iff $a \equiv b \pmod m$, then R_m is —

(a) reflexive but not symmetric
(b) Symmetric but not transitive
(c) reflexive, symmetric but not transitive
(d) an equivalence relation

CBSE Sample Question Paper (2022-23)

(1) What is the least value of x that satisfies $x \equiv 27 \pmod 4$, when $27 < x \leq 36$?

(a) 27 (b) 30 (c) 31 (d) 35

CBSE Sample Question Paper (2023-24)

(Q.1) The value of $-70 \bmod 13$ is —

(a) 5 (b) -5 (c) 8 (d) -8

(Q.2) The least non-negative remainder when 3^{50} is divided by 7 is —

(a) 4 (b) 3 (c) 2 (d) 1

CBSE Sample Question Paper (2024-25)

(Q.1) If it is currently 6:00 p.m. in 12 hours, clock then what will be the time after 375 hours?

(a) 6 a.m. (b) 6 p.m. (c) 9 a.m. (d) 9 p.m.

(Q.2) Find the remainder when 5^{61} is divided by 7.

CBSE Question Paper 2023

(1) The unit (last) digit of 22^{12} is —.

(a) 2 (b) 4 (c) 6 (d) 8

(2) The least non-negative remainder, when 3^{15} is divided by 7 is —

(a) 1 (b) 5 (c) 6 (d) 7

CBSE Question Paper 2024

(1) Evaluate $(137 + 995) \pmod{12}$

(2) Find the unit's digit of 12^{12}.

CBSE Question Paper 2025

(1) $-41 \bmod 9$ is —

(a) 5 (b) 4 (c) 3 (d) 0

(2) Find the units digit in 7^{295}.

- Find the congruence class of 4 mod 7. [M L Aggarwal]

- Assertion (A): $-62 \bmod 12 = -2$
- Reason (R): $a \bmod b = r$, where r is the remainder when a is divided by b, $0 < r < |b|$

(a) A✓R✓E✓ (b) A✓R✓EX (c) A✓RX (d) AXR✓

Assertion (A): Last two digits of product 482×307 is 74.

Reason (R): If $a \equiv b \pmod{n}$ and $c \equiv d \pmod{n}$, then $ac \equiv bd \pmod{n}$

(a) A ✓ R ✓ E ✓ (b) A ✓ R ✓ E ✗ (c) A ✓ R ✗ (d) A ✗ R ✓

Assertion (A): If $60 \equiv 4 \pmod{m}$, then possible values of m are 2, 4, 7, 8, 14, 28, 56

Reason (R): If $a \equiv b \pmod{n}$, then $(a-b)$ is an integral multiple of n, where $n \in \mathbb{Z}$, $n \geq 1$.

(a) A ✓ R ✓ E ✓ (b) A ✓ R ✓ E ✗

(c) A ✓ R ✗ (d) A ✗ R ✓

~~Assertion (A): $a +_m b = \begin{cases} (a+b) \bmod m, & \text{if } a+b \geq m \\ a+b, & \text{if } a+b < m \end{cases}$~~

Assertion (A): $18 -_3 7 = 2$

Reason (R): $a +_m b = \begin{cases} (a+b) \bmod m, & \text{if } (a+b) \geq m \\ (a+b), & \text{if } (a+b) < m \end{cases}$

(a) A ✓ R ✓ E ✓ (b) A ✓ R ✓ E ✗ (c) A ✓ R ✗ (d) A ✗ R ✓