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.

1. The value of (73 – 65) (mod 5) is

(a) 2 (mod 5) (b) 3 (mod 5)

(c) 4 (mod 5) (d) None of these

2. The value of 46 × 23 (mod 7) is

(a) 0 (b) 1

(c) 2 (d) 3

3. In 12-hour clock system, what is the time 100 hours after 7 a.m.?

(a) 11 a.m (b) 10 a.m

(c) 8 p.m (d) 9 p.m

4. The least positive value of x for 71 = x mod 8 is

(a) 3 (b) 5

(c) 6 (d) 7

5. A work was assigned to Felix on a Tuesday. He took 72 days to complete this work. On what day did he complete the work?

(a) Saturday (b) Wednesday

(c) Friday (d) Thursday

WORKSHEET — 1

Fill in the Blanks

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

1. The value of (81 + 38 – 54 + 16) (mod 11) is _____ .

2. If 2022 = n mod 7, the least value of n is _____ .

3. The truth set for the equation $3 \otimes_6 n = 1$ on the set S = {0, 1, 2, 3, 4, 5} is _____ .

4. If 27 = 2 mod x, the value of x is _____ .

5. The value of expression $(10 \oplus_8 11) \otimes_7 (12 \oplus_{11} 13)$ 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 5 × 8 (mod 3) is 1.

2. The value of $12 \otimes_7 15$ is 4.

3. The value of x in 54 = x mod 4 is 3.

4. The value of $8 \oplus_6 9$ is 0.

5. The truth set of $3 \oplus_8 n = 0$ is {0}.

Very Short Answer Type Questions

Answer each of the questions 1 – 5.

1. Solve: $5x = 4 \bmod 6$

2. Today is Tuesday. My uncle will come after 46 days. In which day my uncle will be coming?

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3. Construct the composition table for 'multiplication modulo 5' on the set S = {2, 3, 4}.

4. Michael took a work in the month of September and agreed to complete the work after 19 months. In which month, did he complete the work?

5. Find the least positive integer x such that $5x + 1 = 3 \bmod 4$.

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

(ii) $(1 \oplus_4 2) + (2 \oplus_4 3)$

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2. Construct the table for 'addition modulo 5' and evaluate the following using the table:

(i) $2 \oplus_5 3$

(ii) $3 \oplus_5 4$

3. Construct the table for 'multiplication modulo 12' on the set S = {1, 4, 9, 11}. Using the table, answer the following:

(i) $4 \otimes_{12} 9$

(ii) $11 \otimes_{12} 4$

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4. Constructing the composition table for 'multiplication modulo 13' on the set S = {1, 5, 8, 12}, find the truth set of the following:

(i) $5 \otimes_{13} n = 1$

(ii) $12 \otimes_{13} n = 5$

5. Find the values of x and y if $x = 13 \bmod 17$ and $7x - 3 = y \bmod 17$.

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