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## JULY MONTHLY TEST - 2024

Standard - X

Reg.No. 10A027

Time: 1.30 hrs.

MATHEMATICS

Marks:50

## PART - A

## I. Choose the correct answer :

5×1=5

- $A = \{a, b, p\}$ ,  $B = \{2, 3\}$ ,  $C = \{p, q, r, s\}$  then  $n[(A \cup B) \times C]$  is  
A) 8                      B) 20                      C) 12                      D) 16
- If  $\{(a, 8), (6, b)\}$  represents an identify functions, then the value of a and b are respectively  
A) (8,8)                      B) (6,6)                      C) (8,6)                      D) (6,8)
- If  $g = \{(1,1), (2,3), (3,5), (4,7)\}$  is a function, given by  $g(x) = \alpha x + \beta$  then the value of  $\alpha$  and  $\beta$  are  
A) (-1,2)                      B) (2,-1)                      C) (-1,-2)                      D) (1,2)
- $7^{4K} \equiv \underline{\hspace{2cm}} \pmod{100}$   
A) 1                      B) 2                      C) 3                      D) 4
- If  $A = 2^{65}$  and  $B = 2^{64} + 2^{63} + 2^{62} + \dots + 2^0$  which of the following is true?  
a) B is  $2^{64}$  more than A                      b) A and B are equal  
c) B is larger than A by 1                      d) A is larger than B by 1.

## PART - B

## II. Answer any 6 questions:

6×2=12

- If  $B \times A = \{(-2,3), (-2,4), (0,3), (0,4), (3,3), (3,4)\}$  find A and B.
- Let  $A = \{3, 4, 7, 8\}$  and  $B = \{1, 7, 10\}$ . which of the following sets are relations from A and B?  
(i)  $R_1 = \{(3,7), (4,7), (7,10), (8,1)\}$  (ii)  $R_2 = \{(3,1), (4,12)\}$
- A relation f is defined by  $f(x) = x^2 - 2$  where  $X \in \{-2, -1, 0, 3\}$   
(i) List the elements of f (ii) Is f a function?
- Let f be a function from  $\mathbb{R}$  to  $\mathbb{R}$  defined by  $f(x) = 3x - 5$ . find the values of a and b given that (a,4) and (1,b) belong to f.
- If  $13824 = 2^a \times 3^b$  then find a and b.
- Which term of an A.P 16, 11, 6, 1, .... is -54?
- In a G.P 729, 243, 81, .... find  $t_7$ .
- Find the sum :  $5 + 10 + 15 + \dots + 200$ .

## PART - C

5×5=25

## III. Answer any 5 questions:

- Let  $A = \{x \in \mathbb{N} / 1 < x < 4\}$ ,  $B = \{x \in \mathbb{W} / 0 \leq x < 2\}$  and

$C = \{x \in \mathbb{N} | x < 3\}$ . Then verify that  $A \times (B \cup C) = (A \times B) \cup (A \times C)$

15. A function  $f : [-5, 9) \rightarrow \mathbb{R}$  is defined as follows:

$$f(x) = \begin{cases} 6x + 1 & ; -5 \leq x < 2 \\ 5x^2 - 1 & ; 2 \leq x < 6 \\ 3x - 4 & ; 6 \leq x < 9 \end{cases}$$

find (i)  $f(-3) + f(2)$

ii)  $f(7) - f(1)$

iii)  $\frac{2f(-2) - f(6)}{f(4) + f(-2)}$

16. Let  $f : A \rightarrow B$  be a function defined by  $f(x) = \frac{x-3}{3}$ , where

$A = \{6, 9, 15, 18, 21\}$  and  $B = \{1, 2, 3, 4, 5, 6\}$ . Represent  $f$  by

i) set of ordered pairs

ii) a table

iii) an arrow diagram

iv) a graph

17. If  $f(x) = 2x + 3$ ,  $g(x) = 1 - 2x$  and  $h(x) = 3x$ .

Prove that  $f \circ (g \circ h) = (f \circ g) \circ h$

18. A Mother divides Rs.207 into three parts such that the amount are in A.P and gives it to her three children. The product of the two least amounts that the children had Rs.4623. Find the amount received by each child.

19. Find the sum to  $n$  terms of the series  $3 + 33 + 333 + \dots$

20. Find the sum of the series  $10^3 + 11^3 + 12^3 + \dots + 20^3$

### PART - D

IV. Answer any one:

$1 \times 8 = 8$

21. Construct a triangle similar to a given triangle PQR with its sides equal

to  $\frac{3}{5}$  of the corresponding sides of the triangle PQR. (scale factor  $\frac{3}{5} < 1$ )

22. Construct a triangle similar to a given triangle ABC with its sides equal to

$\frac{6}{5}$  of the corresponding sides of the triangle ABC. (scale factor  $\frac{6}{5} > 1$ )

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