

MODEL QUESTION PAPER FOR FORMATIVE ASSESSMENT - 1

MATHEMATICS

TIME: 1 HOUR

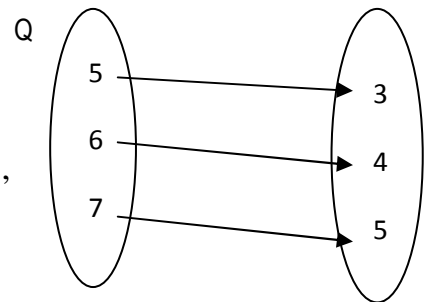
MAX. MARKS:25

I Answer any TWO questions. $2 \times 1 = 2$

1. If A has 4 elements then find the number of elements of the power set of A.
2. Draw appropriate Venn diagram for $A' \cap B'$.
3. If $n(A) = 5$ and $(A \times B) = 15$, find $n(B)$.
4. If $f = \{1,2,3,4,5\}$, $B = \{2,4,6\}$ & $C = \{1,3\}$, then find $(A - B) \times C$.

II Answer any THREE questions. $3 \times 2 = 6$

5. If $U = \{x: x \leq 10, x \in N\}$, $A = \{x: x \in N \text{ \& } x \text{ is prime}\}$, $B = \{x: x \in N \text{ \& } x \text{ is even}\}$ write $A \cap B'$ in roster form.
6. The following figure shows a relation between sets P and Q. P



Write this relation in (i) set-builder form (ii) roster form.

7. $f : z \rightarrow z$ is a linear function defined by $f = \{(1,1), (0,-1), (2,3)\}$, find $f(x)$.

8. If $X = \{1,3,5,7\}$ and $Y = \{1,2,3,4\}$, find i) $X \cup Y$ ii) $X - Y$

III Answer any FOUR questions. $4 \times 3 = 12$

10. A market research group conducted a survey of 1000 consumers and reported that 720 consumers like product A and 450 consumers like product B, what is the least number of consumers that must have liked both products?
11. Let $R : Z \rightarrow Z$ be a relation defined by $R = \{(a, b): a, b \in Z, a - b \in Z\}$. Show that
(i) $\forall a \in Z, (a, a) \in R$, (ii) $(a, b) \in R \Rightarrow (b, a) \in R$, (iii) $(a, b) \in R, (b, c) \in R \Rightarrow (a, c) \in R$.

12. Find the domain and the range of the real function f defined by $f(x) = \sqrt{x-1}$.

13. f and g are two real functions and $f(x) = \begin{cases} x & , x \geq 0 \\ -x & , x < 0 \end{cases}$ and $g(x) = \begin{cases} -1 & , x < 0 \\ 0 & , x = 0 \\ 1 & , x > 0 \end{cases}$.

Find range of $(f + g)(x)$, $(fg)(x)$.

14. Let $A = \{1,2,3,4\}$, $B = \{1,5,9,11,15,16\}$ & $f = \{(1,5), (2,9), (3,1), (4,5), (2,11)\}$. Are the following true?
(i) f is a relation from A to B (ii) f is a function from A to B. Justify your answer in each case.

IV Answer any ONE questions. $1 \times 5 = 5$

13. Using mathematical induction, prove for all $n \geq 1$, that $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \dots + \frac{1}{n(n+1)} = \frac{n}{n+1}$.
14. Prove by mathematical induction that $1^3 + 2^3 + 3^3 + \dots + n^3 = \frac{n^2(n+1)^2}{4}$.

*** END ***