**Blue Print (As per PU Board)**

| Topic | 1 mark questions | 2 marks questions | 3 marks questions | 5 marks questions | Total Marks |
|---|---|---|---|---|---|
| Relations & Functions | 1 | 1 | 1 | 1 | 11 |

### One mark questions

1. **If $n(A)=p$ and $n(B)=q$, then find $n(A\times B)$.**
   Answer: Given $n(A)=p$ and $n(B)=q$
   $\therefore n(A\times B)=pq$
2. **If $R=\{(2,4),(3,6)\}$. Write the image of the relation $R$.**
   Answer: Image of $R=\{4,6\}$
3. **Find the domain of $f(x)=x+2$.**
   Answer: Domain is set of all reals.
4. **If $n(A)=3$ and $n(B)=4$ then find the total number of relationsfrom $A$ to $B$.**
   Answer: $n(A\times B)=12$

### Two marks questions

5. **Write the domain and range of the relation $T=\{(2x,\ 3x-1):x\in(1,2,3)\}$**
   Answer: $R=\{(2,2),(4,5),(6,8)\}$
   Domain $=\{2,4,6\}$
   Range $=\{2,5,8\}$
6. **Let $A=\{4,5,6,7,8,9\}$. Let $R$ be a relation on $A$ defined by $R=\{(x,\ x+2):x\in A\}$. Find the domain of $R$.**
   Answer: $R=\{(4,6),(5,7),(6,8),(7,9)\}$
   Domain $=\{4,5,6,7\}$
7. **Find the domain of the function $f(x)=\sqrt{3-x}$**
   Answer: $3-x\geq 0\Rightarrow 3\geq x$ or $x\leq 3$
   $\therefore$ domain $=\{x:x\in R,\ x\leq 3\}$
8. **Write the domain and range of the relation $R=\left\{\left(\dfrac{2x-1,\ 3-x}{x\leq 3, x\in N}\right)\right\}$**
   Answer: $R=\{(1,2),(3,1)\}$
   Domain $=\{1,3\}$
   Range $=\{2,1\}$

### Three marks questions

9. **If $A=\{a,b,c\}$, $B=\{b,c,d\}$ and $C=\{a,c,e\}$, verify that $a\times(B\cap C)=(A\times B)\cap(A\times C)$ $B\cap C=\{c\}$**
   Answer: $A\times(B\cap C)=\{a,b,c\}\times\{c\}$
   $=\{(a,c),(b,c),(c,c)\}$ …(1)

$A\times B=\{(a, b), (a,c), (a,d), (b, c), (b,d), (c, b), (b, b), (c,c), (c,d)\}$

$A\times C=\{(a,a), (a,c), (a,e), (b,a), (b,c), (b,e), (c,a),(c,c), (c,e)\}$

$\therefore (A\times B)\cap(A\times C)=\{(a,c), (b,c), (c,c)\}$ …(2)

From equations (1) and (2) $A\times(B\cap C)=(A\times B)\cap(A\times C)$

10. **If** $P=\{2, 3\}$, $Q=\{3, 4\}$ **and** $R=\{2, 4\}$**, verify that** $P\times(Q\cup R)=(P\times Q)\cup(P\times R)$

Answer: $Q\cup R=\{2, 3, 4\}$ $P=\{2, 3\}$

$P\times(Q\cup R)=\{(2,2), (2,3), (2,4), (3,2), (3,3), (3,4)\}$ …(1)

$P\times Q=\{(2,3), (2,4), (3,3), (3,4)\}$

$R\times R=\{(2,2). (2,4), (3,2), (3, 4)\}$

$\therefore (P\times Q)\cup(P\times R)=\{(2,3), (2,4), (3,3), (3,4), (2,2), (3,2)\}$ …(2)

From (1) and (2) $P\times(Q\cup R)=(P\times Q)\cup(P\times R)$

11. **Let** $A=[1,2, 3, 4, 5]$ **and** $B=\{1, 2, 3, 4,.....,36\}$**. If** $R$ **is a relation from** $B$ **to** $A$ **defined by** $R=\{(x, y): x=y^2\}$ **write** $R$**, domain of** $R$ **and range of** $R$.

Answer: $R=\{(1, 1), (2,4)\}$

Domain of $R=\{1, 2\}$

Range of $R=\{1, 4\}$

12. **If** $R$ **is a relation defined on** $A=\{1, 2, 3, 4\}$ **by** $xRy$ **iff** $x\le y$ **find the domain and range of** $R$**.**

Answer: $R=\{(1,1), (2,2), (3,3), (4,4), (1,2), (1,3), (1,4), (2,3), (2,4), (3,4)\}$

Domain of $R=\{1, 2, 3\}$

Range of $R=\{1, 2, 3, 4\}$