

Subject/Subject Code	Semester/Branch
TOC / 2160704	6 <sup>th</sup> - CE

## Chap-1 Question Bank

1. Define onto and one-to-one functions.
2. Define reflexivity, symmetry, and transitivity properties of relations.
3. Consider the relation  $R = \{(1,2), (1,1), (2,1), (2,2), (3,2), (3,3)\}$  defined over  $\{1, 2, 3\}$ . Is it reflexive? Symmetric? Transitive? Justify each of your answers.
4. Draw truth table for following logic formula:  $P \rightarrow (\neg P \vee \neg Q)$ . Is it a tautology? A contradiction? Or neither? Justify your answer.
5. Use the principle of mathematical induction to prove that  $1 + 3 + 5 + \dots + r = n^2$  for all  $n > 0$  where  $r$  is an odd integer &  $n$  is the number of terms in the sum. ( Note :  $r = 2n - 1$ )
6. Let  $A = \{1, 2, 3, 4, 5, 6\}$  and  $R$  be a relation on  $A$  such that  $aRb$  iff  $a$  is a multiple of  $b$ . Write  $R$ . Check if the relation is i) Reflexive ii) Symmetric iii) Asymmetric iv) Transitive
7. Define relation. Define reflexive and transitive relation. A binary relation  $R$  on  $N \times N$  is defined as  $(a,b)R(c,d)$  if  $a \leq c$  or  $b \leq d$ . Prove that  $R$  is reflexive but not transitive
8. Define mathematical induction. Prove that if  $0 < a < 1$  then  $(1-a)^n \geq 1 - na$ .
9. Prove  $n/(n+1) = \sum_{i=1}^n 1/i(i+1)$