1. **[Marks 20]**
Consider the propositions,
p: You drive over 120 km per hour.
q: You get caught by Saher camera.

Express the following propositions using *p* and *q* and logical connectives, i.e. $\wedge$ (and), $\vee$ (or), and $\neg$ (not).

A	You drive over 120 km per hour, but you do not get caught by Saher camera.	
B	You will get caught by Saher camera if you drive over 120 km per hour.	
C	If you do not drive over 120 km per hour, then you will not get caught by Saher camera.	
D	Driving over 120 km per hour is sufficient for getting caught by Saher camera.	
E	You did get caught by Saher camera, but you did not drive over 120 km per hour.	

2. **[Marks 10]**
Show that $(p \wedge q) \rightarrow (p \vee q)$ is a tautology.

3. **[Marks 10]**
Consider the set $S = \{\varnothing, a, 2, (b, 3)\}$. Write the subset of the power set of *S* where each element has a cardinality of 3.

4. **[Marks 10]**
Let $f(x) = 1 / x^2$ and $g(x) = x / \sqrt{x+1}$. Compute:
a. $(f \circ g)(x) =$
b. $(f \circ f)(x) =$

5. **[Marks 10]**
Find the prime factorization of the number 197351.

6. **[Marks 10]**
You are given the sequence $a_{35} = 45, a_{36} = 53, a_{37} = 61$ and $a_{38} = 69$. Find the sum $\sum_{k=10}^{20} a_k$. Show all the details.

7. **[Marks 10]**
Determine if the numbers: 22, 35, and 63 are pairwise relatively prime.

8. **[Marks 10]**
Calculate the summation, $\sum_{i=1}^{n} \prod_{j=1}^{i} c$. Show all the details.