

Following short questions are selected from previous 5 years papers of different boards. Solve these at your own to perform well in annual exams.

1. Define complement of a set.
2. Define the difference of two sets.
3. Prove that for any two sets A and B , $A - B = A \cap B^c$.
4. What is the difference between $\{a, b\}$ and $\{\{a, b\}\}$?
5. If $A = \{1, 2, 3, 4\}$, $B = \{3, 4, 5, 7, 8\}$, $C = \{1, 2, 3, 7, 8, 9\}$, verify the associative laws of union and intersection.
6. Define power set of a set.
7. Write down the power set of $\{a, \{b, c\}\}$.
8. Write down the power sets of $\{\}$ and $\{0\}$.
9. Write any two proper subsets of a set $\{a, b, c\}$.
10. Show $A - B$ by Venn diagram when A and B are overlapping sets.
11. Under what conditions on A and B , the statement $n(A) = n(A \cap B)$?
12. What is meant by tautology?
13. Show that $\sim(p \rightarrow q) \rightarrow p$ is a tautology.
14. Show that $p \rightarrow (p \vee q)$ is a tautology.
15. Write the converse and inverse of $\sim p \Rightarrow q$.
16. Write converse and contrapositive of $p \Rightarrow q$.
17. Construct the truth table for $(p \wedge \sim q) \Rightarrow q$.
18. For $A = \{1, 2, 3, 4\}$, find the relation $\{(x, y) : x = y\}$ in A .
19. For $A = \{1, 2, 3\}$, find the relation $\{(x, y) : x + y < 5\}$ in A .
20. Find the inverse of the relation $\{(1, 2), (2, 5), (3, 4), (2, 1), (5, 4)\}$.
21. Find the inverse of the relation $\{(x, y) : y^2 = 4ax, x \geq 0\}$.
22. Define a semigroup.
23. Define a group.

24. If a and b are elements of a group G , then show that $(ab)^{-1} = b^{-1}a^{-1}$.
25. Show that the set of natural numbers, \mathbb{N} is not a group w.r.t. addition.
26. Show that $\{1, \omega, \omega^2\}$, where $\omega^3 = 1$, is an abelian group w.r.t. multiplication.
27. If a, b are elements of a group G , then solve the equation $ax = b$.
28. If e is the identity in a group G , show that e is unique.

Best of Luck