

SUBJECT CODE NO: - BNP-2729
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. (NEP) (P-2024) S.Y Sem III
Examination November / December 2025
Mathematics (Logic and Sets)

[Time: 1:00 Hour]

[Max. Marks:30]

N. B

Please check whether you have got the right question paper.

1) Question No. 1 is multiple-choice objective type and it is compulsory. It carries 10 marks.

2) Attempt any four questions from Question No. 2 to 7. Each of these questions carries 5 marks.

3) Figures to the right indicate full marks.

Part - A**Q1 Choose the correct alternative.****10**

1. The disjunction of two propositions p and q is denoted by _____.
 (a) $p \wedge q$ (b) $p \vee q$ (c) $p \Rightarrow q$ (d) $q \Rightarrow p$
2. The converse of $p \Rightarrow q$ is _____.
 (a) $q \Rightarrow p$ (b) $\sim p \Rightarrow \sim q$
 (c) $\sim q \Rightarrow \sim p$ (d) None of the above
3. Which of the following is an empty set?
 (a) Set of all integers whose square is 2
 (b) Set of all even integers ending at 6
 (c) Set of all roots of the equation $x^2 - 4 = 0$
 (d) Set of all points in a plane
4. If $A = \{a, b, c\}$, then number of elements in $P(A)$ is:
 (a) 4 (b) 8 (c) 6 (d) 3
5. If A and B are any two non-empty sets, then $A \cup (A \cap B)$ is equal to:
 (a) A (b) B
 (c) ϕ (d) None of the above

**Part - B**

- Q2** Show that $\{(p \wedge \sim p \vee q)\} \vee \{(q \wedge \sim(p \wedge q))\} = q$. **05**
- Q3** Prove that $\sim(p \vee q) = \sim p \wedge \sim q$. **05**
- Q4** Prove that $A \cup (B \cup C) = (A \cup B) \cup C$. **05**
- Q5** If A and B are any two non-empty sets, then prove that $A - B = A \cap B'$. **05**

Q6 Show that $A - (B \cup C) = (A - B) \cup (A - C)$.

05

Q7 If $A \subseteq B$, then show that:

05

1. $A \cap C \subseteq B \cap C$
2. $A \cup C \subseteq B \cup C$

