MATHEMATICAL REASONING

1. Which of the following is not a statement -
(A) 3 is an even number
(B) New Delhi is in India
(C) Every square is a rectangle
(D) Today is Monday

2. Which of the following is not a statement -
(A) Give me a glass of water
(B) Asia is a continent
(C) The earth revolved round the sun
(D) The number 6 has two prime factors 2,3

3. Which of the following is not a statement -
(A) $\sqrt{3}$ is a rational number
(B) $8 > 7$
(C) Please open the door
(D) All prime numbers are odd.

4. Which of the following is not a proposition -
(A) $\sqrt{3}$ is a prime
(B) $\sqrt{2}$ is irrational
(C) Mathematics is interesting
(D) 5 is an even integer

5. Negation of "2 + 3 = 5 and 8 < 10" is -
(A) $2 + 3 \neq 5$ and < 10
(B) 2 + 3 = 5 and 810
(C) $2 + 3 \neq 5$ or 810
(D) None of these

6. Negation of '' 3 is an odd number and 7 is a rational number is -
(A) 3 is not an odd number and 7 is not a rational number
(B) 3 is an odd number or 7 is a rational number
(C) 3 is an odd number or 7 is not a rational number
(D) 3 is not an odd number or 7 is not a rational number.

7. Negation of "Ram is in Class X or Rashmi is in Class XII" is -
(A) Ram is not in Class X but Ram is in class XII
(B) Ram is not in Class X and Rashmi is not in Class XII
(C) Either Ram is not in Class X or Ram is not in Class XII
(D) None of these

8. The negation of the compound statement $p \vee (\sim p \vee q)$ is -
(A) $(p \wedge \sim q) \wedge \sim p$ (B) $(p \wedge \sim q) \vee \sim p$
(C) $(p \vee \sim q) \vee \sim p$ (D) None of these

9. The negation of statement
$(\sim p \vee q) \wedge (\sim p \wedge \sim q)$ is -
(A) $(p \vee \sim q) \wedge (p \vee q)$
(B) $(p \wedge \sim q) \vee (p \vee q)$
(C) $(\sim p \vee q) \vee (\sim p \wedge \sim q)$
(D) $(p \wedge \sim q) \wedge (p \vee q)$

10. The negation of $q \vee \sim (p \wedge r)$ is -
(A) $\sim q \wedge \sim (p \wedge r)$ (B) $\sim q \wedge (p \wedge r)$
(C) $\sim q \vee (p \wedge r)$ (D) $q \vee \sim (p \wedge r)$

11. $\sim (p \wedge q)$ is equal to -
(A) $\sim p \vee \sim q$ (B) $\sim p \wedge \sim q$
(C) $\sim p \wedge q$ (D) $p \wedge \sim q$

12. The negation of statement
$(p \wedge q) \vee (q \vee \sim r)$
(A) $(p \wedge q) \vee (\sim q \vee \sim r)$
(B) $(\sim p \wedge \sim q) \wedge (\sim q \wedge r)$
(C) $(\sim p \vee \sim q) \wedge (\sim q \wedge r)$
(D) None of these

13. $\sim [(\sim p) \wedge q]$ is equal to -
(A) $p \vee (\sim q)$ (B) $p \vee q$
(C) $p \wedge (\sim q)$ (D) $\sim p \wedge \sim q$

14. $\sim (p \vee q)$ is equal to -
(A) $\sim p \vee \sim q$ (B) $\sim p \wedge \sim q$
(C) $\sim p \vee q$ (D) $p \vee \sim q$

15. The statement $(p \wedge \sim q) \vee p$ is logically equivalent to -
(A) p (B) ~p
(C) q (D) ~q

16. $\sim [p \vee ((\sim q))]$ is equal to -
(A) $\sim p \vee q$ (B) $(\sim p) \wedge q$
(C) $\sim p \vee \sim p$ (D) $\sim p \wedge \sim q$

17. If p, q, r are simple statement, then $(p \wedge q) \wedge (q \wedge r)$ is true then -
(A) p, q, r are all false
(B) p, q, r are all true
(C) p, q are true and r is false
(D) p is true and q and r are false

18. If $(p \wedge \sim q) \vee (q \wedge r)$ is true and. q and r both true then p is -
(A) True
(B) False
(C) may be true or false
(D) none

19. If p and q are simple statement, then $p \Rightarrow q$ is false when -
(A) p is true and q is true
(B) p is false and q is true
(C) p is true and q is false
(D) both p and q are false

20. If p, q, r are simple statement with truth values T, F, T, then the truth value of $(\sim p \vee q) \wedge \sim r \Rightarrow p$ is -
(A) true (B) false
(C) true if r is false (D) true if q is true

21. Negation of the statement
If a number is prime then it is odd' is.
(A) A number is not prime but odd.
(B) A number is prime and it is not odd.
(C) A number is neither primes nor odd.
(D) None of these

22. If $(p \wedge \sim r) \Rightarrow (q \vee r)$ is false and q and r are both false, then p is -
(A) true
(B) false
(C) may be true or false
(D) data insufficient

23. The statement $(p \rightarrow \sim q) \Leftrightarrow (p \wedge q)$ is a -
(A) Tautology
(B) contradiction
(C) Neither tautology nor contradiction
(D) None

24. Negation of the statement : If we control population growth, we prosper -
(A) If we do not control population growth, we prosper
(B) If we control population, we do not prosper
(C) We control population and we do not prosper
(D) We do not control population, but we prosper

25. If p, q, r are substatements with truth values. T, T, F then the
Statement $r \rightarrow (p \wedge \sim q) \vee (\sim q \wedge \sim r)$
will be
(A) True
(B) False
(C) may be true or false
(D) None of these

26. Negation of the conditional : "If it rains then I shall go to school" is -
(A) It rains and I shall go to school
(B) It rains and I shall not go to school
(C) If does not rain and I shall go to school
(D) None of these

27. Which of the following is always false ?
(A) $(p \Rightarrow q) \equiv \sim q \Rightarrow \sim p$
(B) $\sim (p \vee q) \equiv \sim p \vee \sim q$
(C) $\sim (p \Rightarrow q) \equiv p \wedge \sim q$
(D) $\sim (p \vee q) \equiv \sim p \wedge \sim q$

28. The Negation of the statement
$(p \wedge q) \rightarrow r$ is -
(A) $(\sim p \vee \sim q) \rightarrow r$ (B) $(\sim p \wedge \sim q) \wedge \sim r$
(C) $(p \wedge q) \wedge \sim r$ (D) $(\sim p \vee \sim q) \wedge r$

29. If $p \Rightarrow (q \vee r)$ is false, then the truth values of p, q, r are respectively -
(A) T, F, F (B) F, F, F
(C) F, T, T (D) T, T, F

30. If $p \Rightarrow (\sim p \vee q)$ is false, the truth values of p and q are respectively -
(A) F, T (B) F, F
(C) T, T (D) T, F

31. The contrapositive of $p \Rightarrow (\sim p \wedge q)$ is -
(A) $\sim p \Rightarrow (pv \sim q)$ (B) $(p \wedge \sim q) \Rightarrow \sim p$
(C) $(pv \sim q) \Rightarrow p$ (D) $(p \vee \sim q) \Rightarrow \sim p$

32. Which of the following is logically equivalent to $\sim (\sim p \Rightarrow q)$?
(A) $p \wedge q$ (B) $p \wedge \sim q$
(C) $\sim p \wedge q$ (D) $\sim p \wedge \sim q$

33. $p \Rightarrow q$ can also be written as -
(A) $p \Rightarrow \sim q$ (B) $\sim p \vee q$
(C) $\sim p \Rightarrow \sim q$ (D) None of these

34. $(\sim p \vee q)$ is logically equal to -
(A) $p \rightarrow q$ (B) $q \rightarrow p$
(C) $\sim (p \rightarrow q)$ (D) $\sim (q \rightarrow p)$

35. Nagation of the statement $p \circledR (\sim q \wedge r)$ is
(A) $p \wedge (q \vee \sim r)$ (B) $\sim p \wedge (q \vee \sim r)$
(C) $p \vee (q \vee \sim r)$ (D) None of these

36. The contrapositive of $(p \vee q) \Rightarrow r$ is -
(A) $r \Rightarrow (p \vee q)$ (B) $\sim r \Rightarrow (p \vee q)$
(C) $\sim r \Rightarrow \sim p \wedge \sim q$ (D) $p \Rightarrow (q \vee r)$

37. The statement $p \Leftrightarrow q$ is equal to -
(A) $(\sim p \vee q) \vee (p \vee q)$
(B) $(p \wedge q) \vee (\sim p \wedge \sim q)$
(C) $(\sim p \vee q) \wedge (pv \sim q)$
(D) $(p \wedge q) \vee (p \vee q)$

38. $\sim (p \Leftrightarrow q)$ is -
(A) $\sim p \wedge \sim q$
(B) $\sim p \vee \sim q$
(C) $(p \wedge \sim q) \vee (\sim p \wedge q)$
(D) None of these

39. If p and q are simple statement, then $p \Leftrightarrow \sim q$ is true when -
(A) p is true and q is true
(B) both p and q are false
(C) p is false and q is true
(D) None of these

40. The statement $(p \wedge q) \Leftrightarrow \sim p$ is a
(A) Tautology
(B) contradiction
(C) Neither tautology nor contradiction
(D) None of these