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India's Number 1 Education App

# MATHS

# BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

# MATHEMATICAL LOGIC

## Practice Exercise Exercies 1 Topical Problems

**1.** The conditional statement of "You will get a sweet dish after the dinner" is

A. If you take the dinner, then you will get a sweet dish

B. If you take the dinner, you will get a sweet dish

C. You get a sweet dish if and only if you take the dinner

D. None of the above

**Answer: A**

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**2.** 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

**Answer: C**

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**3.** If p,q and r are simple propositions with truth values T,F and T , respectively, 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

**Answer: A**

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**4.** In the truth table for the statement $(\sim p \Rightarrow \sim q) \wedge (\sim q \Rightarrow \sim p)$, the last column has the truth value in the following order

A. TTTF

B. FTTF

C. TFFT

D. TTTT

**Answer: C**

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**5.** The false statement among the following is

A. $p \wedge (\sim p)$ is contradiction

B. $(p \Rightarrow q) \Leftrightarrow (\sim q \Rightarrow \sim p)$ is a contradiction

C. $\sim(\sim p) \Leftrightarrow p$ is a tautology

D. $p \vee (\sim p) \Leftrightarrow p$ is a tautology

**Answer: B**

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**6.** For the following three statements

p : 2 is an even number

q : 2 is a prime number

r : Sum of two prime numbers is always even.

Then, the symbolic statement $(p \wedge q) \Rightarrow \sim r$ means

A. 2 is an even and prime number and the sum of two prime numbers is always even

B. 2 is an even and prime number and the sum of two prime numbers is not always

even

C. If 2 is an even and prime number, then the sum of two prime numbers is not always even

D. If 2 is an even and prime number, then the sum of two prime numbers is always even

**Answer: C**

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**7.** Let p be the proposition that Mathematics is interesting and q be the proposition that Mathematics is difficult, then the symbol $p \wedge q$ means

A. Mathematics is interesting implies that Mathematics is difficult

B. Mathematics is interesting implies and is implied by Mathematics is difficult

C. Mathematics is interesting and Mathematics is difficult

D. Mathematic is interesting or Mathematics is difficult

**Answer: C**

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**8.** For two statement p and q

p : A quadrilateral is a parallelogram

q : The opposite sides are parallel

Then, the compound proposition, "A quadrillateral is a parallelogram if and only if

the opposite sides are parallel" is represented by

A. $p \vee q$

B. $p \rightarrow q$

C. $p \wedge q$

D. $p \leftrightarrow q$

**Answer: D**

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**9.** Consider the following statements :

p: He is intelligent

q: He is strong

Then symbolic form of statements 'it is wrong that he is intelligent or strong's

A. $\sim P \vee \sim p$

B. $\sim(p \wedge q)$

C. $\sim(p \vee q)$

D. $p \vee \sim q$

**Answer: C**

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**10.** The converse of the contrapositive of the conditional $p \rightarrow \sim q$ is

A. $p \rightarrow q$

B. $\sim p \rightarrow \sim q$

C. $\sim q \rightarrow p$

D. $\sim p \rightarrow q$

**Answer: D**

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**11.** If p,q and r simple propositions with truth values T, F, T, then the truth value of $(\sim p \vee q) \wedge \sim q \rightarrow p$ is

A. true

B. , false

C. true, if r is false

D. None of the above

**Answer: A**

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**12.** The contrapositive of $(p \vee q) \rightarrow r$ is

A. $\sim r \rightarrow (p \vee q)$

B. $r \rightarrow (p \vee q)$

C. $\sim r \rightarrow (\sim p \wedge \sim q)$

D. $p \rightarrow (q \vee r)$

**Answer: C**

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**13.** If $(p \wedge \sim r) \rightarrow (\sim p \vee q)$ is false, then truth values of p,q and r are respectively.

A. T, F and F

B. F, F and T

C. F, T and T

D. T, F and T

**Answer: A**

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**14.** The contrapositive of "If two triangles are identical, then these are similar" is

A. if two triangles are not similar, then these are not idential

B. If two triangles are not identical, then these are similar

C. If two triangles are not similar, then these are

D. If two triangles are not similar, then these are identical

**Answer: A**

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**15.** Which of the following is the proposition ?

"If a number is a prime, then it is odd".

A. If a number is not a prime, then it is odd

B. If a number is not a prime, then it is not odd

C. If a number is not odd, then it is not a prime

D. If a number is odd, then it is prime

**Answer: B**

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**16.** The statement $(\sim p \wedge q) \vee \sim q$ is equivalent

A. $p \vee q$

B. $p \wedge q$

C. $\sim(p \vee q)$

D. $\sim(p \wedge q)$

**Answer: D**

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**17.** $(\sim(\sim p)) \wedge q$ is equal to

A. $\sim p \wedge q$

B. $p \wedge q$

C. $p \wedge \sim q$

D. $\sim p \wedge \sim q$

**Answer: B**

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**18.** The statement $p \to (q \to p)$ is equivalent to

A. $p \Rightarrow (p \Rightarrow q)$

B. $p \Rightarrow (p \vee q)$

C. $p \Rightarrow (p \wedge q)$

D. $p \Rightarrow (p \Leftrightarrow q)$

**Answer: B**

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**19.** $\sim(p \vee q) \vee (\sim p \wedge q)$ is logically equivalent to

A. $\sim p$

B. p

C. q

D. $\sim q$

**Answer: A**

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**20.** Which of the following is True?

A. $p \Rightarrow q \equiv \sim p \Rightarrow \sim q$

B. $\sim(p \Rightarrow \sim q) \equiv \sim p \wedge q$

C. $\sim(\sim p \Rightarrow \sim q) \equiv \sim p \wedge q$

D. $\sim(\sim p \Leftrightarrow q) \equiv (\sim(p \Rightarrow q) \wedge \sim(q \Rightarrow p))$

**Answer: C**

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**21.** The logically equivalent proposition of $p \Leftrightarrow q$ is

A. $(p \wedge q) \vee (p \wedge q)$

B. $(p \Rightarrow q) \wedge (q \Rightarrow p)$

C. $(p \wedge q) \vee (q \Rightarrow p)$

D. $(p \wedge q) \Rightarrow (p \vee q)$

**Answer: B**

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**22.** logically equivalent to $\sim(\sim p \Rightarrow q)$ is

A. $p \wedge q$

B. $p \wedge \sim q$

C. $\sim p \wedge q$

D. $\sim p \wedge \sim q$

**Answer: D**

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**23.** Let p and q be two statements, then $(p \vee q) \vee \sim p$ is

A. tautology

B. contradiction

C. Both (a) and (b)

D. None of these

**Answer: A**

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**24.** The statement $(p \Rightarrow q) \Leftrightarrow (\sim p \wedge q)$ is a

A. tautology

B. contradiction

C. Neither (a) nor (b)

D. None of these

**Answer: C**

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**25.** Let p and q be two statements. Then, $(\sim p \vee q) \wedge (\sim p \wedge \sim q)$ is a

A. tautology

B. contradiction

C. Neither tautology nor contradiction

D. Both tautology and contradiction

**Answer: C**

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**26.** If p and q are two statements, then $(p \Rightarrow q) \Leftrightarrow (\sim q \Rightarrow \sim p)$ is

A. contradiction

B. tautology

C. Neither (a) nor (b)

D. None of these

**Answer: B**

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**27.** If p and q are two stastements, then stastement $p \Rightarrow p \wedge \sim q$ is a

A. tautology

B. contradiction

C. Neither tautology nor contradiction

D. None of the above

**Answer: C**

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**28.** The statement $\sim(p \to q) < - > (\sim p \vee \sim q)$ is-:

A. tautology

B. contradiction

C. Either (a) or (b)

D. Neither (a) nor (b)

**Answer: A**

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**29.** The proposition $S: (p \Rightarrow q) \Leftrightarrow (\sim p \vee q)$ is a

A. tautology

B. contradiction

C. Either (a) or (b)

D. Neither (a) nor (b)

**Answer: A**

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**30.** $\sim(p \vee q) \vee (\sim p \wedge q)$ is equivalent to

A. p

B. $\sim p$

C. q

D. $\sim q$

**Answer: B**

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**31.** Let p and q be two statements, then $(p \vee q) \vee \sim p$ is

A. tautology

B. contradiction

C. Both (a) and (b)

D. None of these

**Answer: A**

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**32.** The statement $p \to (q \to p)$ is equivalent to

A. $p \to (p \leftrightarrow q)$

B. $p \to (p \to q)$

C. $p \to (p \vee q)$

D. $p \to (p \wedge q)$

**Answer: C**

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**33.** Which of the following statements is a tautology ?

A. $(\sim q \wedge p) \wedge q$

B. $(\sim q \wedge p) \wedge (p \wedge \sim p)$

C. $(\sim p \wedge p) \vee (p \vee \sim p)$

D. $(p \wedge q) \wedge (p \wedge q))$

**Answer: C**

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**34.** Which of the following is an example of quantifiers ?

A. p : There exists a rectangle whose all sides are equal

B. q : For every prime number $P$, $\sqrt{P}$ is an irrational number

C. Both (a) and (b)

D. None of the above

**Answer: C**

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**35.** The dual of the statement $(p \vee q) \wedge \sim(r \vee s)$ is

A. $(p \vee q) \vee \sim(r \vee s)$

B. $(p \wedge q) \vee \sim(r \vee s)$

C. $(p \wedge q) \vee (\sim r \vee \sim s)$

D. $(p \wedge q) \vee (\sim r \wedge \sim s)$

**Answer: C**

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**36.** The dual of the statement $((p \wedge q) \wedge \sim q) \vee (\sim q)$ is

A. $((p \vee q) \wedge \sim q) \vee (\sim q)$

B. $((p \wedge q) \wedge \sim q) \vee (\sim q)$

C. $((p \wedge q) \wedge \sim p) \vee (\sim q)$

D. $(p \wedge q) \vee \sim q) \wedge (\sim q)$

**Answer: D**

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**37.** Write the negation of the following statement: $r$ : There exists a number $x$ such that `0

A. there does not exist a number x such that $0 < x < 2$

B. there does not exist a number x such that $0 < x < 1$

C. Both (a) and (b)

D. None of the above

**Answer: B**

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**38.** The negation of the statement

p : "For every positive real number x, the number x - 1 is also positive" is

A. there exists atleast one positive real number x for which (x -1) is not positive

B. for every positive real number x, the number (x +1) is also positive

C. Both (a) and (b)

D. Neither (a) nor (b)

**Answer: A**

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**39.** Given, 'Sachin score runs but India does not win the match is statement.

Statement I The symbolic form is $p \wedge \sim q$.

Statement II Negation is 'Sachin not score runs or India win the match.

Where P : Sachin score runs

q : India win the match.

A. Statement I is true, statement II is false

B. Statement I is false, statement II is true

C. Statement I is false, statement II is false

D. Statement I is true, statement II is true

**Answer: D**

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**40.** Let S be a non-empty subset of R. Consider the statement P : There is a rational number $x \in S$ such that $x > 0$.

Which of the following statements is the negation of the statement P ?

A. There is a rational number $x \in S$ such that $x \leq 0$

B. There is no rational number $x \in S$ such that $x \leq 0$

C. Every rational number $x \in S$ satisfies

$x \leq 0$

D. $x \in S$ and $x \leq 0 \Rightarrow x$ is not rational

**Answer: C**

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**41.** Let p : 7 is not greater than 4 and q : Paris is in France be two statements. Then, ~$(p \vee q)$ is the statement

A. 7 is greater than 4 or Paris is not France

B. 7 is not greater than 4 and Paris is not in France

C. 7 is greater than 4 and Paris is in France

D. 7 is greater than 4 and Paris is not in France

**Answer: D**

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**42.** The negation of the proposition "If 2 prime, then 3 is odd" is

A. 2 is prime and 3 is not odd

B. 2 is prime and 3 is odd

C. 2 is not prime and 3 is odd

D. if 2 is not prime, then 3 is odd

**Answer: A**

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**43.** $(\sim(\sim p)) \wedge q$ is equal to

A. $p \vee (\sim q)$

B. $p \vee q$

C. $p \wedge (\sim q)$

D. $\sim p \wedge \sim q$

**Answer: A**

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**44.** The negation of the compound proposition is $p \vee (\sim p \vee q)$

A. $(p \wedge \sim q) \wedge \sim p$

B. $(p \vee \sim q) \vee \sim p$

C. $(p \wedge \sim q) \vee \sim p$

D. None of these

**Answer: A**

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**45.** The negation of $p \wedge (q \rightarrow \sim r)$ is

A. $\sim p \wedge (q \wedge r)$

B. $p \vee (q \vee r)$

C. $p \vee (q \wedge r)$

D. $\sim p \vee (q \wedge r)$

**Answer: D**

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**46.** Negation of "London is in England and Berut is in Lebnan" is

A. London is in Lebnan and Berut is in England

B. London is not England or Berut is not Lebnan

C. Berut is in England or London is in Lebnan

D. None of the above

**Answer: B**

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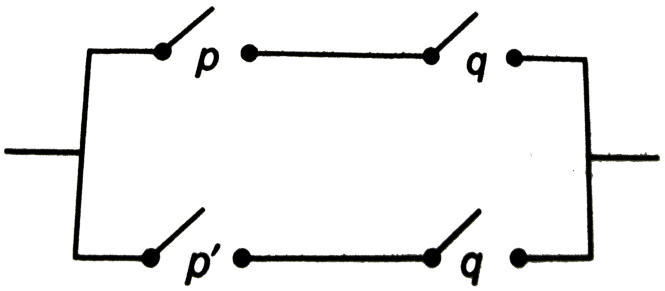
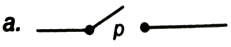
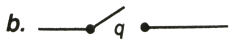
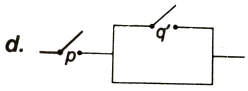
**47.** The simplified circuit for the following circuit is




A. 


B. 

C. 


D. 


**Answer: B**

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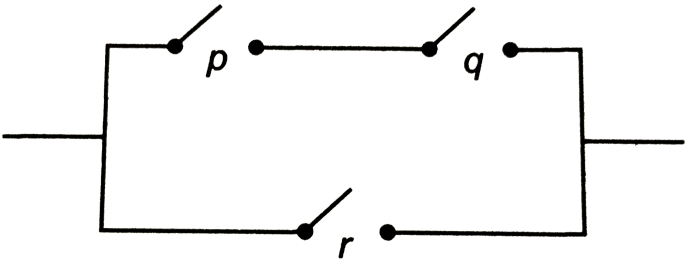
**48.** Consider the circuit




Then, the current flow in the circuit is

A. $(p \wedge q) \vee r$

B. $p \wedge q$

C. $p \vee q$

D. None of the above

**Answer: A**

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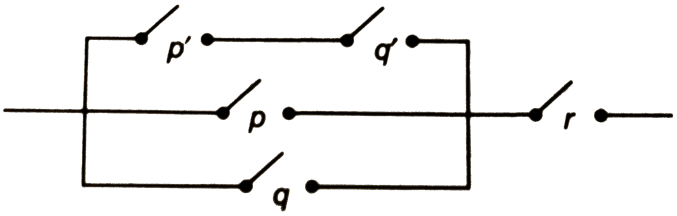
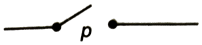
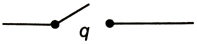
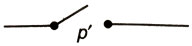
**49.** The simplified circuit for the following circuit is




A. a. 


B. b. 


C. c. 


D. d. 


**Answer: D**

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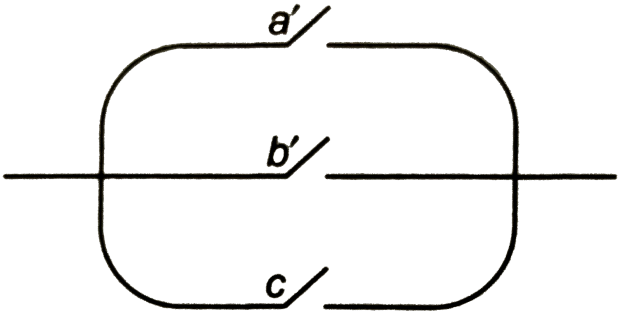
**50.** Consider the switching circuit given below

:




Then, the current flow in the circuit is

A. $a' \wedge b' \wedge c$

B. $a \vee b \vee c'$

C. $a \wedge b \wedge c'$

D. $a' \vee b' \vee c$

**Answer: D**

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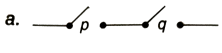
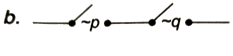
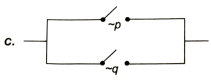
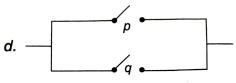
**51.** Quivalent circuit for the logical expression

$(\sim p \wedge q) \vee (\sim p \wedge \sim q) \vee (p \wedge \sim q)$ is

A. 


B. 


C. 


D. 

**Answer: C**

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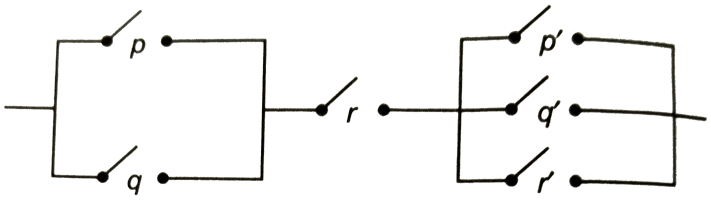
**52.** Consider the switching circuit given below




Then, the current flow in the circuit is

A. $(p \wedge q) \vee r \vee (p' \wedge q' \wedge r')$

B. $(p \wedge q) \vee r \vee (p' \wedge q' \wedge r)$

C. $(p \vee q) \wedge r \wedge (p' \vee q' \vee r')$

D. None of the above

**Answer: A**

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## Practice Exercise Exercies 2 Miscellaneous Problems

**1.** The negation of the statement "Plants take in $CO_2$ and given out $O_2$ and give out $O_2$" is

A. Plants do not take in $CO_2$ and do not give out $O_2$

B. Plants do not take in $CO_2$ or do not give out $O_2$

C. Plants take in $CO_2$ and do not give out $O_2$

D. Plants take in $CO_2$ or do not give out $O_2$

**Answer: B**

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**2.** The negation of $(\sim p \wedge q) \vee (p \wedge \sim q)$ is

A. $(p \vee \sim q) \vee (\sim p \vee q)$

B. $(p \vee \sim q) \wedge (\sim p \vee q)$

C. $(p \wedge \sim q) \wedge (\sim p \vee q)$

D. $(p \wedge \sim q) \wedge (\sim q)$

**Answer: B**

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**3.** If p : Samir is tall, q : Samir is intelligent, then $\sim p \vee q$ means

A. Samir is not tall or he is intelligent

B. Samir is tall or he is intelligent

C. Samir is not tall and he is intelligent

D. Samir is not tall, so he is intelligent

**Answer: A**

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**4.** Which among the following is equivalent to $r \leftrightarrow s$ ?

A. $(r \wedge s) \vee (r \vee s)$

B. $(r \vee s) \vee (r \vee \sim s)$

C. $(\sim r \vee s) \vee (r \vee s)$

D. $(\sim r \vee s) \wedge (\sim s \vee r)$

**Answer: D**

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**5.** Which of the following statements is a tautology?

A. $(p \to q) \wedge (p \to q)$

B. $(p \to q) \vee (p \to q)$

C. $(p \to q) \vee (q \to p)$

D. None of these

**Answer: C**

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**6.** Which of the following is True?

A. $\sim(p \leftrightarrow q) \equiv \sim(p \rightarrow q) \wedge \sim(q \rightarrow p)$

B. $\sim(p \rightarrow \sim q) \equiv \sim p \wedge q$

C. $\sim(\sim p \rightarrow \sim q) \equiv \sim p \wedge q$

D. $(p \rightarrow q) \equiv (\sim p \Rightarrow \sim q)$

**Answer: C**

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**7.** If p, q and r are any three logical statements, then which one of the following is correct ?

A. $\sim[p \wedge (\sim q)] \equiv (\sim p) \wedge q$

B. $\sim(p \vee q) \wedge (\sim r) \equiv (\sim p) \vee (\sim q) \vee (\sim r)$

C. $\sim[p \vee (\sim q)] \equiv (\sim p) \wedge q$

D. $\sim[p \wedge (\sim q)] \equiv (\sim p) \wedge \sim q$

**Answer: C**

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**8.** Among the following statements, which is a tautology ?

A. $p \wedge (p \vee q)$

B. $p \vee (p \wedge q)$

C. $(p \wedge (p \rightarrow q)) \rightarrow q$

D. $q \rightarrow (p \wedge (p \rightarrow q))$

**Answer: C**

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**9.** Which of the following is not always true ?

A. $(p \Rightarrow q) \equiv \sim q \Rightarrow \sim p$

B. $(p \vee q) \equiv \sim p \wedge \sim q$

C. $p \Rightarrow q \equiv p \wedge q$

D. $\sim(p \wedge q) \equiv \sim p \vee \sim q$

**Answer: C**

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**10.** Converse of the statement "If a number x is even, then $x^2$ is even" is

A. if a number $x^2$ is even, then x is even

B. if x is not even, then $x^2$ is not even

C. Neither x nor $x^2$ is even

D. None of the above

**Answer: A**

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**11.** If $p \rightarrow (\sim p \vee q)$ is false, the truth values of p and q are , respectively

A. F,F

B. T,T

C. T,F

D. F,T

**Answer: C**

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**12.** The truth values of p,q and r for which $(p \wedge q) \vee (\sim r)$ has truth value F are respectively

A. F,T,F

B. F,F,F

C. T,T,T

D. F,F,T

**Answer: D**

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**13.** $p \vee \sim(p \wedge q)$ is a

A. contradiction

B. contingency

C. tautology

D. None of these

**Answer: C**

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**14.** The false statement among the following is

A. $p \wedge (\sim p)$ is a tautology

B. $(p \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim p)$ is a conbtradiction

C. $\sim(\sim p) \leftrightarrow p$ is a tautology

D. $p \vee (\sim p)$ is tautology

**Answer: B**

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**15.** Which of the following is true for any two statements p and q ?

A. $\sim(p \vee \sim q) \equiv \sim p \wedge q$

B. $\sim p \wedge q$ is fallacy

C. $p \vee \sim q$ is a tautology

D. $p \vee \sim p$ is contradiction

**Answer: A**

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**16.** The proposition $(p \rightarrow \sim p) \wedge (\sim p \rightarrow p)$ is a

A. tautology

B. contradiction

C. tautology and contradiction

D. Neither tautology nor contradiction

**Answer: B**

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**17.** For integers m and n, both greater than 1, consider the following three statements

P : m divides n, Q : m divides $n^2$ and R : m is prime, then

A. $Q \wedge R \rightarrow P$

B. $P \wedge Q \rightarrow R$

C. $Q \rightarrow R$

D. $Q \rightarrow P$

**Answer: A**

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**18.** The statement $\sim(p \leftrightarrow \sim q)$ is

A. equivalent to $p \leftrightarrow q$

B. equivalent to $\sim p \leftrightarrow q$

C. tautology

D. fallacy

**Answer: A**

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**19.** $\sim[(\sim p) \wedge q]$ is logocally equivalent to

A. $\sim[p \wedge (\sim q)]$

B. $p \vee (\sim q)$

C. $\sim(p \vee q)$

D. $p \wedge (\sim q)$

**Answer: B**

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**20.** The statement $p \to (q \to p)$ is equivalent to

A. $p \to q$

B. $p \to (p \vee q)$

C. $p \to (p \to q)$

D. $p \to (p \wedge q)$

**Answer: B**

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**21.** If $S(p, q, r) = (\sim p) \vee (\sim(q \wedge r))$ is a compound statement, then $S(\sim p, \sim q, \sim r)$ is

A. $\sim S(p, q, r)$

B. $S(p, q, r)$

C. $p \vee (q \wedge r)$

D. $p \vee (q \vee r)$

**Answer: D**

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**22.** $\sim(p \vee q) \vee (\sim p \wedge q)$ is logically equivalent to

A. $\sim p$

B. p

C. q

D. $\sim q$

**Answer: A**

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**23.** Dual of $(x \vee y) \wedge (x \vee 1) = x \vee x \wedge y \vee y$ is

A. $(x \wedge y) \vee (x \wedge 0) = x \wedge (x \vee y) \wedge y$

B. $(x \vee y) \vee (x \wedge 1) = x \wedge (x \vee y) \wedge y$

C. $(x \wedge y) \wedge (x \wedge 0) = x \wedge (x \vee y) \wedge y$

D. None of the above

**Answer: A**

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**24.** $\sim[(\sim p) \wedge q]$ is logocally equivalent to

A. $\sim(p \vee q)$

B. $\sim[p \wedge (\sim q)]$

C. $p \wedge (-q)$

D. $p \vee (\sim q)$

**Answer: D**

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**25.** The negation of $\sim s \vee (\sim r \wedge s)$ is equivalent to : (1) $s \wedge \sim r$ (2) $s \wedge (r \wedge \sim s)$ (3) $s \vee (r \vee \sim s)$ (4) $s \wedge r$

A. $s \wedge \sim r$

B. $s \wedge (r \wedge \sim s)$

C. $s \vee (r \vee \sim s)$

D. $s \wedge r$

**Answer: D**

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**26.** Given statement is 'if x = y, then $x^2 = y^2$,

and the statement are

(i) If x = y, then $x^2 \neq y^2$

(ii) If $x \neq y$, then $x^2 = y^2$

(iii) $x \neq y$ or $x^2 = y^2$

(iv) If $x^2 \neq y^2$, then $x \neq y$

Which of the statement are equivalent to the given statement ?

A. (i) and (iii)

B. (ii) and (iv)

C. (i) and (iv)

D. (ii) and (iv)

**Answer: D**

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## Mht Cet Corner

**1.** If p : Every square is a rectangle.

q : Every rhombus is a kite, then truth values of $p \rightarrow q$ and $p \leftrightarrow q$ are _____ and _____ respectively.

A. F,F

B. T,F

C. F,T

D. T,T

**Answer: A**

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**2.** Which of the following quantified statement is true?A) The square of every real number is positive

A. The square of every real number is positive.

B. There exists a real number, whose square is negative.

C. There exists a real number, whose square is negative.

D. Every real number is rational.

**Answer: A**

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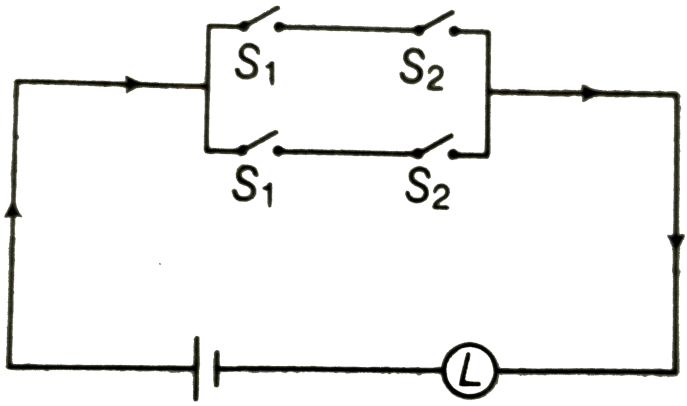
3. 


Symbolic form of the given switching circuit is

equivalent to

A. $p \vee \sim q$

B. $p \wedge \sim q$

C. $p \wedge q$

D. $(p \leftrightarrow q)$

**Answer: C**

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**4.** The statement $(p \rightarrow \sim p) \wedge (\sim p \rightarrow p)$ is

A. tautology

B. contradiction

C. tautology and contradiction

D. Neither tautology nor contradiction

**Answer: B**

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**5.** The inverse of the statement $(p \wedge \sim q) \rightarrow r$ is

A. $\sim r \Rightarrow \sim p \vee q$

B. $\sim p \vee q \Rightarrow \sim r$

C. $r \Rightarrow p \wedge \sim q$

D. None of these

**Answer: B**

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**6.** If x and y have different truth values, then $x \wedge (x \vee y)$ is equivalent to

A. y

B. x

C. 1

D. 0

**Answer: B**

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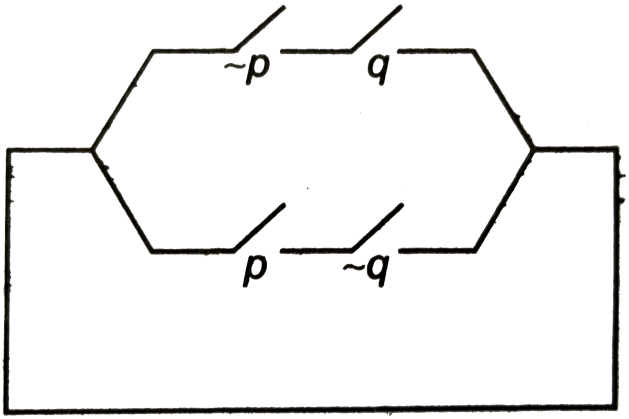
**7.** For the circuit shown below, the Boolean polynomial is




A. $(\sim p \vee q) \vee (p \vee \sim q)$

B. $(\sim p \wedge q) \wedge (p \wedge q)$

C. $(\sim p \wedge \sim q) \wedge (q \wedge p)$

D. $(\sim p \wedge q) \vee (p \wedge \sim q)$

**Answer: D**

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**8.** Dual of $(x \vee y) \wedge (x' \vee 1)$ is

A. $(x \wedge y) \vee (x' \wedge 0)$

B. $(x \wedge y)(x' \wedge 1)$

C. $(x \wedge y) \vee (x \wedge 1)$

D. None of these

**Answer: A**

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**9.** If p,q,r are single proposition with truth values T, F, F, then the truth value of $(p \wedge \sim q) \rightarrow (\sim p \vee r)$ is

A. T

B. F

C. Cannot find

D. None of these

**Answer: B**

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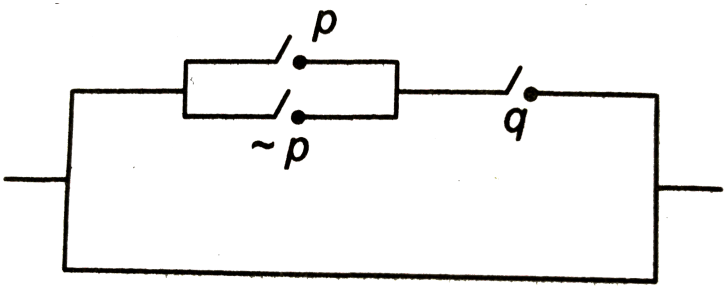
**10.** The output of the following circuit is




A. p

B. q

C. $\sim p$

D. $p + q$

**Answer: B**

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**11.** The proposition $(\sim p) \vee (p \tilde{} q)$ is equivalent to

A. $\sim p \wedge q$

B. $\sim p \vee q$

C. $p \wedge q$

D. $p \vee q$

**Answer: B**

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**12.** $\sim(\sim p \rightarrow q)$ is equivalent to

A. $p \wedge \sim q$

B. $\sim p \wedge q$

C. $\sim p \wedge \sim q$

D. $\sim p \vee \sim q$

**Answer: C**

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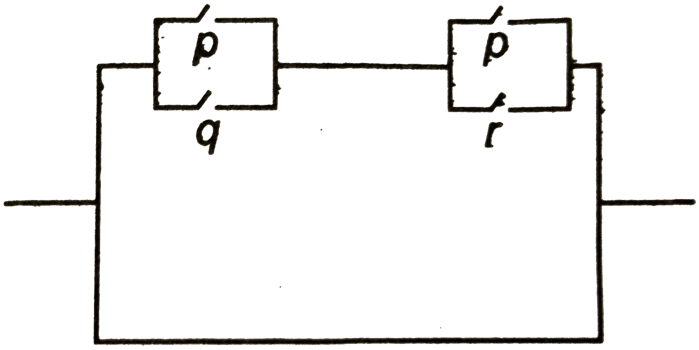
**13.** Simplify the following circuit and it is equivalent to.




A. $p \vee (q \wedge r)$

B. $p \wedge (q \vee r)$

C. $p \vee (q \vee r)$

D. $p \wedge (q \wedge r)$

**Answer: A**

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**14.** Simplify $(p \vee q) \wedge (p \vee \sim q)$.

A. p

B. T

C. F

D. q

**Answer: A**

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**15.** Negation of the conditional "If it rains, 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. it does not rain and I shall go to school

D. None of the above

**Answer: B**

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**16.** The dual of the statement $[p \vee (\sim q)] \wedge (\sim p)$ is

A. $p \vee (\sim q) \vee \sim p$

B. $(p \wedge \sim q) \vee \sim p$

C. $p \wedge \sim(q \vee \sim p)$

D. None of these

**Answer: B**

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**17.** Which of the following statement has the truth value F ?

A. A quadratic equation has always a real root

B. The number of ways of seating 2 persons in two chairs out of n persons is P(n,2)

C. The cube roots of unity are in GP

D. None of the above

**Answer: A**

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**18.** The negation of the statement "He is rich and happy" is given by

A. he is not eich and not happy

B. he is not rich or not happy

C. he is rich and happy

D. he is not rich and happy

**Answer: B**

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**19.** $\sim(p \leftrightarrow q)$ is a

A. tautology

B. contradiction

C. Neither (a) nor (b)

D. Either (a) or (b)

**Answer: C**

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**20.** $\sim[(p \wedge q) \rightarrow (\sim p \vee q)]$ is a

A. tautology

B. contradiction

C. Neither (a) nor (b)

D. Either (a) or (b)

**Answer: B**

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**21.** $(p \wedge \sim q) \wedge (\sim p \wedge q)$ is a

A. tautology

B. contradiction

C. tautology and contradiction

D. Neither tautology nor contradiction

**Answer: B**

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**22.** If p : A man is happy and

q : A man is rich

Then, the statement "If a man is not happy, then he is not rich" is written as

A. $\sim p \rightarrow \sim q$

B. $\sim q \rightarrow p$

C. $\sim q \rightarrow \sim p$

D. $q \rightarrow \sim p$

**Answer: A**

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