MATHS

BOOKS - MARVEL MATHS (HINGLISH)

MATHEMATICAL LOGIC

Multiple Choice Question

1. If p : Square of any real number is positive, q:5+4=11 and r: Square of any odd number is even, which of the following has truth-value T?

A. P

B. q

C. r

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

Answer: D

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2. If p: Mumbai is the capital of India,

$q: x^2 - 5x - 6 = 0$ when x=2, r : 829 is

divisible by 9, which fo them has truth-valueT?

A. p

B. ~q

C. r

D. p or r

Answer: B

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3. If P : Every natural number is whole number,

q : Equation $x^2 - 3x + 2 = 0$ has two real

roots, r :36 is a prime number, which of them has truth-value F?

A. p

B. q

C. r

D. p or r

Answer: C

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4. If p: $\sin 2\theta = 2\sin\theta\cos\theta$ where θ is mango, q: $\sin 2\theta = 2\sin\theta\cos\theta$ for all θ, r: $\sin 2\theta = 2\sin\theta\cos\theta$ for all real values of θ, which of them is not a statement?

A. p

B. q

C. r

D. p or r

Answer: B

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5. If p: Rohit is tall q:Rohit is handsome, indicate the symbolic form of the following statement [in

Rohit is tall and handsome.

A. $p \vee q$

B. $p \wedge q$

C. $p \rightarrow q$

D. $p \leftrightarrow q$

Answer: B

6. If p: Rohit is tall q:Rohit is handsome, indicate the symbolic form of the following statement [in Rohit is tall or not handsome.

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

    B. $\sim p \vee q$

    C. $p \vee \sim q$

    D. $(p \vee q)$

Answer: C

7. If p: Rohit is tall q:Rohit is handsome, indicate the symbolic form of the following statement [in

Rohit is neither tall nor handsome.

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

B. $\sim p \land \sim q$

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

D. $\sim p \rightarrow \sim q$

Answer: B

8. If p: Rohit is tall q:Rohit is handsome, indicate the symbolic form of the following statement [in

Rohit is tall, or he is short and handsome.

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

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

C. $p \lor (p \land \sim q)$

D. $p \lor \sim(p \land q)$

Answer: A

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9. If p: Rohit is tall q:Rohit is handsome, indicate the symbolic form of the following statement [in

It is false that Rohit is short or handsome.

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

B. $p \vee \sim q$

C. $p \wedge \sim q$

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

Answer: C

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10. If p: Rohit is tall q:Rohit is handsome,
indicate the symbolic form of the following

statement [in It is not true that Rohit is short or not handsome.

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

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

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

D. $p \wedge q$

Answer: D

11. If p: Sam is fat,q : Sam is happy,indicate the symbolic form of the following verbal statements

Sam is thin but happy.

    A. $\sim p \lor q$

    B. $p \lor \sim q$

    C. $p \land \sim q$

    D. $\sim p \land q$

Answer: D

12. If p: Sam is fat,q : Sam is happy,indicate the symbolic form of the following verbal statements

Sam is fat or unhappy.

A. $\sim p \vee q$

B. $p \vee \sim q$

C. $p \wedge \sim q$

D. $\sim p \wedge q$

Answer: B

13. If p: Sam is fat,q : Sam is happy,indicate the symbolic form of the following verbal statements

If sam is fat, then he is happy.

 A. $p \leftrightarrow q$

 B. $p \leftrightarrow \sim q$

 C. $p \rightarrow q$

D. $\sim p \rightarrow q$

Answer: C

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14. If p : It is cold, q : It is raining indiacate the verbal form of the following symbolic statements

$\sim P$

A. Isn't is cold?

B. It is hot or what?!

C. It is not cold.

D. Isn't it hot?

Answer: C

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15. If p : It is cold, q : It is raining. Indiacate the verbal form of the following symbolic statements $q \lor \sim p$

A. It is raining and it is not cold.

B. It is rainingj or it is not cold.

C. It is raining but cold.

D. None of these

Answer: B

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16. If p : It is cold, q : It is raining indiacate the verbal form of the following symbolic

statements

$\sim p \lor \sim q$

A. It is neither cold nor raining.

B. when it is not raining, it is also not cold.

C. It is not cold or it is not raining.

D. It is raining but cold.

Answer: C

17. If p : It is cold, q : It is raining indiacate the verbal form of the following symbolic statements

$\sim p \wedge \sim q$

A. It is neither cold nor raining.

B. It is not either cold or hot.

C. It has stopped raining yet it is cold.

D. It is not cold or raining.

Answer: A

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18. If p : price increase,q : demand falls, indicate the symbolic form of the following verbal statements [If] Prcie increases, then demand falls.

A. $q \rightarrow q$

B. $p \rightarrow q$

C. $\sim q \vee q$

D. $q \wedge q$

Answer: B

19. If p : price increase,q : demand falls, indicate the symbolic form of the following verbal statements Price increase if, and only if, demand falls.

A. $p \leftrightarrow q$

B. $q \rightarrow q$

C. $q \rightarrow q$

D. $q \wedge q$

Answer: A

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20. If p : price increase,q : demand falls, indicate the symbolic form of the following verbal statements If demand does not fall, then price does not increses

A. $\sim q \wedge \sim q$

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

C. $q \rightarrow p$

D. $p \rightarrow q$

Answer: B

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21. If p : price increase,q : demand falls, indicate the symbolic form of the following verbal statements If price does not increses, then demand does not fall.

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

B. $q \rightarrow p$

C. $p \lor \sim q$

D. $\sim p \rightarrow \sim q$

Answer: D

22. If truth-values of statements p andq are F

and T respectively. Then the truth-value of

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

B. $p \rightarrow (q \wedge p)$ is F

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

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

Answer: C

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23. If $(p \vee q)$ and $(p \wedge q)$ are both true, then the truth-values of p and q are respectively

A. T,F

B. F,T

C. F,F

D. T,T

Answer: D

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24. If $[(p \lor q) \to q]$ is false, then the truth-values of p and q are respectively

A. T,F

B. F,T

C. F,F

D. T,T

Answer: A

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25. If statements $(p \wedge q)$" and $[(p \wedge q) \leftrightarrow q]$

are both false, then truth-values of p and q are

respectively

A. T,F

B. F,T

C. F,F

D. T,T

Answer: B

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26. If statements p.q. are both true and r,s, are

both false, then indicate the truth -value of

the compound statement

$$[(P \to q)] \to (q \to r) \to (r, s)$$

A. -1

B. θ

C. F

D. T

Answer: D

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27. If statements p.q. are both true and r,s, are both false, then indicate the truth -value of the compound statement

$$[p \wedge (q \wedge r)] \vee \sim[(p \vee q) \wedge (\sim r \vee s)]$$

A. T

B. F

C. both T and F

D. 10

Answer: B

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28. If statements p.q. are both true and r,s, are both false, then indicate the truth -value of the compound statement

$$(\sim r \leftrightarrow p) \rightarrow \sim q$$

A. T

B. F

C. both T and F

D. 1

Answer: B

29. If statements p.q. are both true and r,s, are both false, then indicate the truth -value of the compound statement

$$[p \vee (q \wedge r)] \vee [(p \wedge q) \vee (r \vee s)]$$

A. T

B. F

C. both T and F

D. 0

30. If statements p.q. are both true and r,s, are both false, then indicate the truth -value of the compound statement

$\sim[(p \wedge r)] \vee (\sim q \vee s)$

A. T

B. F

C. both T and F

D. 1

Answer: A::D

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31. If statements p.q. are both true and r,s, are

both false, then indicate the truth -value of

the compound statement

$$[(\sim p \wedge q) \wedge \sim r] \vee [(q \to r) \to (\sim s \vee r)]$$

A. T

B. F

C. both T and F

D. O

Answer: A

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32. If statements p.q. are both true and r,s, are both false, then indicate the truth -value of the compound statement $\sim q \vee (\sim p \to r)$

A. T

B. F

C. both T and F

D. 0

Answer: A

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33. If statements p.q. are both true and r,s, are both false, then indicate the truth -value of the compound statement $\sim q \wedge (r \rightarrow q)$

A. T

B. F

C. both T and F

D. 1

Answer: B

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34. If p is any statement, then $(p \wedge \sim)$ is a

A. contingency

B. contradiction

C. tautology

D. paradox

Answer: C

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35. If p is any statement, then ($\wedge$ ~p) is a

A. contingency

B. contradiction

C. tautology

D. theorem

Answer: B

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36. Ifp : 'If a man is rich, then he is happy',q: 'If a man is not rich, then he is not happy', r :'If a man is unhappy, then he is nor rich' and s: 'If a man is happy, then he is rich', then pairs of

statements having the same meaning

(equivalent) are :

A. p,q and r,s

B. p,s and q,r

C. p,r and q,s

D. $\sim p$, s and $\sim q$, r

Answer: C

37. The negation of the statement $(\sim p \lor \sim q)$ is

A. $p \to q$

B. $p \lor q$

C. $\sim p \land \sim q$

D. $p \land q$

Answer: D

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38. The negation of the statement $(\sim p \lor \sim q) \lor (p \land \sim q)$ is

A. $p \to q$

B. $p \leftrightarrow q$

C. $(p \land \sim q) \land (p \lor \sim q)$

D. q

Answer: B

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39. The dual of the statement $(p \wedge q) \vee {\sim}q = p \vee {\sim}q$ is

A. $(p \vee){\sim}q = p \vee {\sim}q$

B. $(p \wedge q) \wedge {\sim}q = p \vee {\sim}q$

C. $(p \vee q) \wedge {\sim}q = p \wedge {\sim}q$

D. $(q \wedge p) \vee {\sim}p = q \vee {\sim}p$

Answer: C

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40. The dual of the statement $p \vee (q \vee r) \equiv (p \vee q) \vee r$ is

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

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

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

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

Answer: B

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41. Negation of the statement "This is false or That is true" is

    A. That is true or This false.

    B. That is true and This is false.

    C. This is true and That is false.

    D. This is false and That is true.

Answer: C

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42. Negation of the statement 'This is true and That is false' is

A. That is true or This is false.

B. That is true and This is false.

C. This is false and That is true.

D. This is false or That is true.

Answer: D

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43. If statements t and f represent a tautology and a contradiction (fallacy) respectively, then $p \lor f \equiv$

A. t

B. f

C. p

D. 2

Answer: C

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44. If statements t and f represent a tautology and a contradiction (fallacy) respectively, then

$p \lor t \equiv$

A. t

B. f

C. p

D. 0

Answer: A

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45. If statements t and f represent a tautology and a contradiction (fallacy) respectively, then

$p \wedge t \equiv$

A. t

B. f

C. p

D. 3

Answer: C

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46. If statements t and f represent a tautology and a contradiction (fallacy) respectively, then

$p \wedge f \equiv$

A. t

B. f

C. p

D. 1

Answer: B

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47. If statements t and f represent a tautology and a contradiction (fallacy) respectively, then

$p \wedge {\sim}p \equiv$

    A. t

    B. f

    C. p

    D. 0

Answer: B

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48. If statements t and f represent a tautology and a contradiction (fallacy) respectively, then

$p \wedge\ \sim\ \equiv$

A. t

B. f

C. p

D. 1

Answer: B

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49. If p is the sentence 'This statement is false', then

A. truth-value of p is T

B. truth-value of p is F

C. p is both true and false

D. p is neither true nor false

Answer: D

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50. If p : If the dozen is thirteen, then this sentence will contain thirteen words, then

   A. truth-value of p is T

   B. truth-value of p is F

   C. p is both true and false

   D. p is neither true nor false

Answer: A

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51. Which of the following is the conditional $p \rightarrow q$?

A. $p \rightarrow \sim q$

B. $\sim p \lor q$

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

D. $p \lor \sim q$

Answer: B

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

A. F,F,T

B. T,F,F

C. F,T,T

D. T,F,T

Answer: B

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53.

Current flows through the above circuit when

A. p,q are closed and r is open

B. p,q,r are closed

C. p,q, r are open

D. p,q', r are open

Answer: B

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54. The simplified form of the circuit :

is

A.

B.

C.

D.
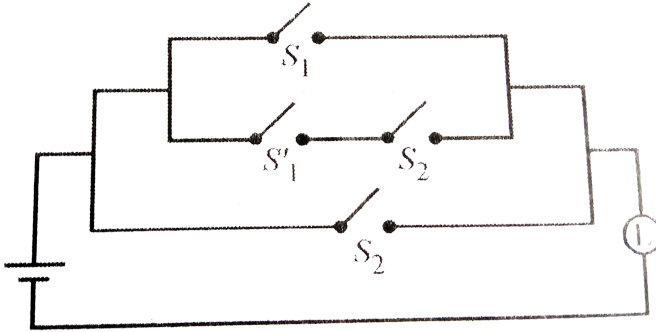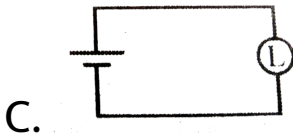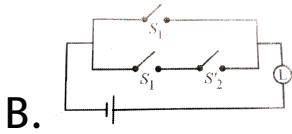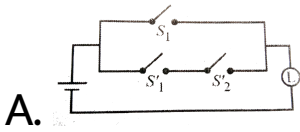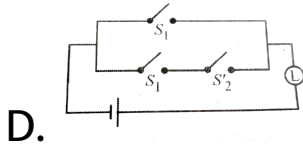
Answer: C

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55. The statement $p \rightarrow (q \rightarrow p)$ is equivalent to

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

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

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

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

Answer: C

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56. Let S be non-empty subset of R. consider the following statement:

P: There is a rational number $x \neq S$ 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 jis 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 $x \leq -$ $\Rightarrow$ x is not rational

Answer: C

57. The only statement among the following i.e. a tautology is

A. $B \rightarrow [A \wedge (A \rightarrow B)]$

B. $A \wedge (A \vee B)$

C. $A \vee (A \wedge B)$

D. $[A \wedge (A \rightarrow B)] \rightarrow B$

Answer: D

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58. Consider the following statements

P: Suman is brilliant

Q: Suman is rich

R: Suman is honest

The negation of the statement "Suman is brilliant and dishonest if any only if Suman is rich" can be expressed as

A. $\sim[Q \leftrightarrow (P \wedge R]$

B. $\sim Q \leftrightarrow P \wedge R$

C. $\sim(P \wedge R) \rightarrow Q$

D. $\sim P \wedge (Q \rightarrow \sim R)$

Answer: A

59. The negation of the statement

"If I becomes a teacher, then I will open a

school", is

A. I will become a teacher and I will not

open a school

B. Either I will not become a teacher or I

will not open a school

C. Neither I will become a teacher a nor I

will open a school

D. I will not become a teacher a teacher nor

I will open a school

Answer: A

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

A. equivalent to $p \to q$

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

C. a tautoloy

D. a faallacy

Answer: A

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61. The equivalent of $(P \to \sim p) \lor (\sim p \to p)$ is

:

A. F

B. $(P \rightarrow \sim p) \wedge (\sim p \rightarrow p)$

C. $p \vee T$

D. $p \wedge \sim p$

Answer: C

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62. t : Ram is talented, r : Ram is rich, s: Ram jis successful. Ram is neither talented nor rich and hence he is not successful is represented as :

A. $(\sim t \wedge \sim r) \rightarrow \sim s$

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

C. $\sim(t \wedge \sim r) \rightarrow \sim s$

D. $(\sim t \vee \sim r) \rightarrow s$

Answer: A

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63. The dual of
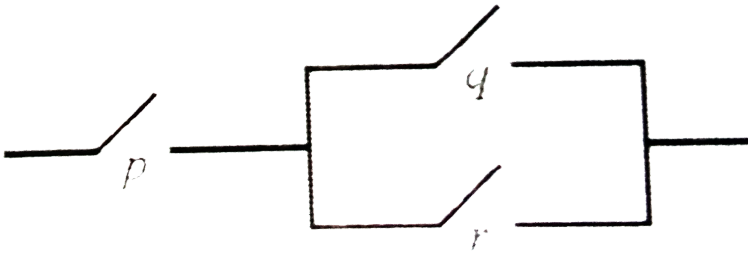
is:

A. $p \lor (q \land r)$

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

C. $p \lor (q \land \sim r)$

D. $(\sim p \lor \sim q) \land (\sim p \land \sim r)$

Answer: B

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64. The negation of $p \lor q$ is

A. $\sim p \lor \sim q$

B. $\sim p \land \sim q$

C. $p \land \sim q$

D. $\sim p \lor q$

Answer: B

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65. The simplified form of $(p \wedge q) \vee (p \wedge \sim q)$ is

A. p

B. q

C. $p \wedge q$

D. $p \vee q$

Answer: A

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66. 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. Both T and F

Answer: B

67. $(p \wedge q) \vee {\sim}p$ is equivalent to

    A. ${\sim}p \wedge q$

    B. ${\sim}p \vee q$

    C. $p \wedge q$

    D. $p \vee q$

Answer: C

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68. Which of the following statements is contingency?

A. $[p \rightarrow q] \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$

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

C. $[p \rightarrow (q \rightarrow r)] \leftrightarrow [(p \wedge q) \rightarrow r]$

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

Answer: D

69. If $p \rightarrow q$ is true, and p is false, then q is

A. true

B. false

C. either true or false

D. neither true nor false

Answer:

70. If $p \leftrightarrow q$ is false, and q true, then p is

A. 1

B. false

C. true

D. neither true nor false

Answer:

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71. If $p \to (\sim p \lor q)$ is false, then the truth

values of p and q are respectively

A. F,T

B. F,F

C. T,T

D. T,F,

Answer:

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72. If $p \to (p \to q)$ is false, then the truth values of p and q are respectively

A. F,T

B. F,F

C. T,T

D. T,F

Answer:

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73. If $p \to (q \lor r)$ is false, then the truth values of p,q and r are respectively

A. T,F,F

B. F,F,F

C. F,T,T

D. T,T,F

Answer:

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74. If $(p \lor q) \top$ is false, then the truth value

of p and q are respectively

A. F,F,

B. T,T

C. T,F

D. F,T

Answer:

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75. Contrapositive of the conditional statement

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

A. $(\sim p \lor \sim q) \rightarrow \sim p$

B. $(p \lor q) \rightarrow p$

C. $(\sim p \lor q) \rightarrow p$

D. $(\sim p \lor \sim q) \rightarrow p$

Answer:

76. Symbolic form of the following circuit is :
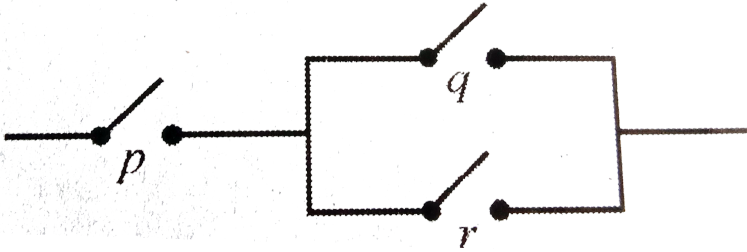
A. $p \vee (p \wedge r)$

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

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

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

Answer:

77. Switching circuit for the statement pattern

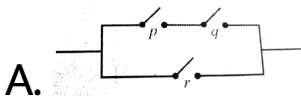$(p \wedge q) \vee (r \wedge \sim p)$ is

A.

B.

C.

D.
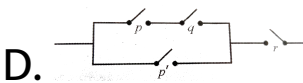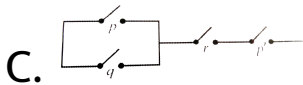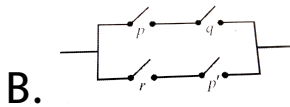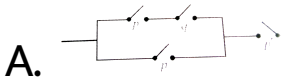
Answer:
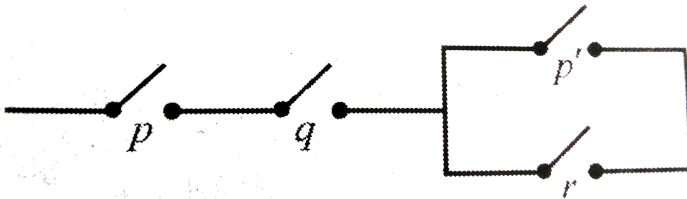
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78. Simplest circuit equivalent to the following circuit is :

A.

B.

C.

D.

Answer: