MATHS

JEE (MAIN AND ADVANCED)

MATHEMATICS

MATHEMATICAL REASONING

Exercise I

1. Which of the following is a proposition

A. Logic is an interesting subject

B. He is very talented

C. I am a lion

D. A triangle is a circle and 10 is a prime number

Answer: D

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2. Which of the following is not a proposition

A. 3 is a prime

B. Mathematics is interesting

C. 5 is an even integer

D. $\sqrt{2}$ is irrational

Answer: B

3. Let p be the proposition : Mathematics is interesting and let 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 it implied by Mathematics is difficult

C. Mathematic is interesting and Mathematics is difficult

D. Mathematic is interesting or Mathematics is difficult

Answer: C

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4. Let p and q be two propositions given by p : The sky is blue, q : milk is white. Then $p \wedge q$ is

A. The sky is blue or milk is white

B. The sky is blue and milk is white

C. The sky is white and milk is blue

D. If the sky is blue, then milk is white

Answer: B

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5. Let p and q be two propositions given by p : It is hot , q : He wants water. Then, the verbal meaning of $p \rightarrow q$ is

A. It is hot or he wants water

B. It is hot and he wants water

C. if it is hot, than he wants water

D. If and only if it is hot, he wants water

Answer: C

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6. Consider the following propositions p : I take medicine , q : I can sleep. Then, the compound statement $\sim p \rightarrow \sim q$ means

A. If I do not take medicine, then I cannot sleep

B. If I do not take medicine, then I can sleep

C. I take medicine iff I can sleep

D. I take medicine if I can sleep

Answer: A

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7. The contrapositive of the statement "if $2^2 = 5$, then I get first class' is

A. If I do not get a first class, then $2^2 = 5$

B. If I do not get a first class, then $2^2 \neq 5$

C. If I get a first class, then $2^2 = 5$

D. If I get a first class, then $2^3 = 5$

Answer: B

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8. The negative of the proporition : "If a number is divisible by 15, then it is divisible by 5 or 3".

A. If a number is divisibley by 15, then it is not divisible by 5 and 3

B. A number is divisible by 15 and it is not divisible by 5 and 3

C. A number is divisible by 15 and it is not divisible by 5 or 3

D. A number is not divisible by 15 or it is not divisible by 5 and 3

Answer: B

9. Consider the proposition : "If the pressure increases, then the volume decreases". The negation of this propositions is

A. If the pressure does not increases the volume does not decrease

B. If the volume increases, the pressure decrease

C. Pressure increases and volume does not decreases

D. If the volume decrease, then the pressure increases

Answer: C

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10. The negation of the proposition " If 2 is prime then 3 is odd" is

A. If 2 is not prime then 3 is not odd

B. 2 is prime and 3 is not odd

C. 2 is not prime and 3 is odd

D. If 2 not prime then 3 is odd

Answer: B

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11. Let there be two propositions

p : I take only bread and butter in breakfast.

q : I do not take any thing in breakfast.

Then the compound proposition " T take only

bread and butter in breakfast or I do not take any thing " is represented by

A. $p \wedge q$

B. $p \vee q$

C. $p \rightarrow q$

D. $p \leftrightarrow q$

Answer: B

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12. Consider the following propositions

p : To become an airforce officer one should be graduate.

q: To become an airforce officer one should have good health.

The compound proposition "To become an airforce officer one should be a graduate and should have good health" is represented by

A. $p \vee q$

B. $p \rightarrow q$

C. $p \wedge q$

D. $p \leftrightarrow q$

Answer: C

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13. Consider the following propositions

p : it rains , q : The street gets flooded.

The proposition " If it does not rain, then the street does not get flooded" is represented by

A. $p \rightarrow \sim q$

B. $\sim p \rightarrow q$

C. $p \leftrightarrow q$

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

Answer: D

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14. Given that water freezes below zero degree celsius.

Consider the following statements.

p : water froze this morning, q : This morning temperature was below $0^{\circ} C$.

Which of the following is correct ?

A. p and q are logically equivalent

B. p is the inverse of q

C. p is the converse of p

D. p is the contrapositive of q

Answer: A

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15. The contrapositive of $2x + 3y = 9 \Rightarrow x \neq 4$ is

A. $x = 4 \Rightarrow 2x + 3y \neq 9$

B. $x = 4 \Rightarrow 2x + 3y = 9$

C. $x \neq 4 \Rightarrow 2x + 3y \neq 9$

D. $x \neq 4 \Rightarrow 2x + 3y = 9$

Answer: A

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16. If p and q are two simple propositions, then $p \to q$ 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

Answer: C

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17. For any three propositions p, q and r, the proposition $(p \wedge q) \wedge (q \wedge r)$ is true when

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

Answer: B

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18. Which of the following is true for the propositions p and q ?

A. $p \wedge q$ is true when at least one of p and q is true

B. $p \rightarrow q$ is true when p is true and q is false

C. $p \leftrightarrow q$ is true only when both p and q are true

D. $\sim(p \vee q)$ is true only when both p and q are false

Answer: D

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19. If $p \to (q \vee r)$ 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

Answer: A

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20. The compound statement $p \to (\sim p \vee q)$ is false. Then the truth values of p and q are respectively

A. T, T

B. T, F

C. F, T

D. F, F

Answer: B

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

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

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

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

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

Answer: A

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22. Let p and be two propositions. Then the contrapositive of the implication $p \to q$ is

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

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

C. $q \rightarrow p$

D. $p \leftrightarrow q$

Answer: A

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23. $p \wedge (q \wedge r)$ is logically equivalent to

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

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

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

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

Answer: B

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24. Which of the following is logically equivalent to $p \wedge q$?

A. $p \rightarrow \sim q$

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

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

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

Answer: C

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

A. $\sim p$

B. p

C. q

D. $\sim q$

Answer: A

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26. $\sim p \vee \sim q$ is logically equivalent to

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

B. $p \wedge q$

C. $p \rightarrow \sim q$

D. $p \leftrightarrow q$

Answer: C

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27. The negation of the compound propositions $p \leftrightarrow \sim q$ is logically equivalent to

A. $\sim p \leftrightarrow q$

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

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

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

Answer: A

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28. Negation of the statement $p \rightarrow (q \wedge r)$ is

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

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

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

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

Answer: D

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29. Negation of the statement $(p \wedge r) \rightarrow (r \vee q)$ is

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

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

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

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

Answer: A

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

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

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

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

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

Answer: C

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31. The contrapositive of $(\sim p \wedge q) \rightarrow (q \wedge \sim r)$ is

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

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

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

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

Answer: C

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32. If p and q are two propositions, then $\sim(p \leftrightarrow q)$ is

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

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

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

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

Answer: C

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33. The negation of the proposition $q \vee \sim(p \wedge r)$ is

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

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

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

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

Answer: B

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34. 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. $\sim p \wedge \sim q$

Answer: A

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35. Which of the following is logically equivalent to $\sim(\sim q \rightarrow p)$?

A. $q \wedge p$

B. $q \wedge \sim p$

C. $\sim q \wedge p$

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

Answer: A

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36. Which of the following is logically equivalent to $\sim(p \leftrightarrow q)$?

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

B. $p \vee q$

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

D. $p \wedge q$

Answer: C

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37. The negation of the compound propositions $p \vee (\sim p \vee q)$ is

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

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

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

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

Answer: A

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38. The inverse of the proposition $(p \wedge \sim q) \rightarrow r$ 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. $\sim p \rightarrow (q \wedge r)$

Answer: B

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

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

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

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

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

Answer: A

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40. The statement $\sim p \vee q$ is equivalent is

A. $p \to q$

B. $\sim p \to q$

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

D. $p \rightarrow \sim q$

Answer: A

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41. Let P, Q, R and S be statement and suppose that $P \rightarrow Q \rightarrow R \rightarrow P$. If $\sim S \rightarrow R$, then

A. $S \rightarrow \sim Q$

B. $\sim Q \rightarrow S$

C. $\sim S \rightarrow \sim Q$

D. $Q \rightarrow \sim S$

Answer: B

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42. The false statement in the following is

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

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

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

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

Answer: B

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43. The proposition $(p \rightarrow \sim p) \wedge (\sim p \rightarrow p)$ is

A. a tautology

B. a contradiction

C. neither a tautology nor a contradiction

D. a tautology and a contradiction

Answer: B

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44. Which one of the following is not a contradiction

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

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

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

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

Answer: D

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45. Which of the following statement is a tautology

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

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

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

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

Answer: D

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46. Which one of the following is wrong ?

A. $p \rightarrow q$ is logically equivalent to $\sim p \vee q$

B. If the truth values of p, q, r are T, F, T respectively, then the truth value of $(p \vee q) \wedge (q \vee r)$ is T

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

D. The truth value of $p \wedge \sim(p \vee q)$ is always T

Answer: D

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47. Which of the following propositions is a contradiction ?

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

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

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

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

Answer: D

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48. Which of the following is false ?

A. $p \vee \sim p$ is a tautology

B. $\sim(\sim p) \leftrightarrow p$ is tautology

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

D. $p \wedge \sim p$ is a contradiction

Answer: C

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49. The inverse of the proposition $(p \wedge \sim q) \rightarrow r$ 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. $\sim q \vee r \rightarrow p$

Answer: B

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50. If p : 4 is an even prime number

q : 6 is a divisor of 12 and

r : the HCF of 4 and 6 is 12, then which one of the following is true ?

A. $p \wedge q$

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

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

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

Answer: D

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51. If the inverse of implication $p \rightarrow q$ is defined as $\sim p \rightarrow \sim q$, then the inverse of the proposition $(p \wedge \sim q) \rightarrow r$ is not equivalent to :

I : $\sim r \rightarrow$ p vv qII : ~p vv ~q rarr ~rIII : r rarr p ^^

~q`

The true statements in the above are :

A. I, II only

B. II, III only

C. I, III only

D. All the above

Answer: 4

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52.

List - I		List - II	
(1)	$\sim(\sim p) \leftrightarrow$ p is	(a)	$(\sim p \vee \sim q)$
(2)	$(p \wedge q) \wedge (\sim(p \vee q))$ is	(b)	a tautology
(3)	$\sim(p \wedge q) \equiv$	(c)	$(\sim p \wedge \sim q)$
		(d)	a contradiction

The correct match is :

A. 1-b, 2-a, 3-d

B. 1-b, 2-d, 3-a

C. 1-d, 2-b, 3-a

D. 1-c, 2-a, 3-d

Answer: B

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53. Let p be the statement "x is an irrational number", q be the statement "y is a transcendental number " and r be the statement "x is a rational number iff y is a transcendental number".

Statement - 1 : r is equivalent to either q or p.

Statement -2 : r is equivalent to $\sim(p \leftrightarrow \sim q)$

A. S -1 is true , S - 2 is true, S -2 is a correct explanation of S-1

B. S-1 is true, S - 2 is true, S - 2 is not a correct explanation of S-1

C. S-1 is true, S - 2 is false

D. S-1 is false, S - 2 is true

Answer: C

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54. Statement -1 : $\sim(P \leftrightarrow \sim q)$ is equivalent to $p \leftrightarrow q$

Statement - 2 : $\sim(P \leftrightarrow \sim q)$ is a tautology.

A. S -1 is true , S - 2 is true, S -2 is a correct explanation of S-1

B. S-1 is true, S-2 is false

C. S-1 is false, S-2 is true

D. S-1 is true, S-2 is true S-2 is a correct explanation for S - 1

Answer: B

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55. 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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56. The compound statement $p \to (\sim p \vee q)$ is false. Then 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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57. Statement 1 : The statement $A \to (A \to B)$. Is equivalent to $A \to (A \vee B)$

statement 2 : The statement $\sim[(A \wedge B) \to (\sim A \vee B)]$ is a tautology

A. Statement 1 and statement 2 are both false

B. Statemet 1 and statement 2 are both true

C. statement 1 is true and statement 2 is false

D. statement 1 is false and statement 2 is true

Answer: C

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

P : m divides n, Q : m divides n^2 , 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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59. The contrapositive of the statement "if I am not feeling well, then I will go to the doctor" is

A. if I am feeling well, then I will not go to the doctor

B. if I will go to the doctor, then I am feeling well

C. if I will not go to the doctor, then I am feeling well

D. if I will go to the doctor, then I am not feeling well

Answer: C

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60. The proposition $\sim(p \vee \sim q) \vee \sim(p \vee q)$ is logically equivalent to

A. p

B. q

C. $\sim p$

D. $\sim q$

Answer: C

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61. Let p, q, r denote three arbitrary statements. The logically equivalent of the statement $p \to (q \vee r)$ is

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

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

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

D. $p \vee q \to \rho$

Answer: B

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62. The contrapositive of the statement "I go to school if it does not rain" is

A. If it rains, I do not go to school

B. If I do not go to school, it rains

C. If it rains, I go to school

D. If I go to school, it rains

Answer: B

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63. The statement $\sim(p \wedge q) \vee q$

A. is a tautology

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

C. is equivalent to $p \vee q$

D. is a contradiction

Answer: A

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64. The contrapositive of the statement, 'If x is a prime number and x divides ab then x divides a or x divides b", can be symnolically represented using

logical connectives, on appropriately defined statements p, q, r, s as

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

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

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

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

Answer: C

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65. Statement 1 : $(A \Leftrightarrow \sim B))$ a tautology to $A \Leftrightarrow B$

Statement 2: $A \vee (\sim A \wedge \sim B))$ a tautology

A. Statement 1 and statement 2 are both false

B. Statement 1 and staement 2 are both true

C. statement 1 is true and statement 2 is false

D. statement 1 is false and statement 2 is true

Answer: B

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66. Statement 1 : Consider the statements

p : Delhi is in India

q : Mumbai is not in Italy

Then the negation of the statement $p \vee q$, is 'delhi is not in India and Mumbai is in Italy'

Statement 2: For any two statement p and q~$(p \vee q) = $ ~$p \vee$ ~q

A. Statement 1 and statement 2 are both false

B. Statement 1 and staement 2 are both true

C. statement 1 is true and statement 2 is false

D. statement 1 is false and statement 2 is true

Answer: C

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67. If p is any logical statement, then

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

B. $p \vee (\sim p)$ is a contradiction

C. $p \wedge p = p$

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

Answer: C

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68. Let p and q be any two propositons

Statement 1 : $(p \to q) \leftrightarrow q \vee \sim p$ is a tautology

Statement 2 : $\sim(\sim p \wedge q) \wedge (p \vee q) \leftrightarrow p$ is fallacy

A. Both statement 1 and statement 2 are true

B. Both statement 1 and statement 2 are false

C. statement 1 is true and statement 2 is false

D. statement 1 is false and statement 2 is true

Answer: C

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Practice Exercise

1. Which of the following is a proposition

A. I am an advocate

B. A half open door is half closed

C. Delhi is on the Jupiter

D. $x^2 + y^2 = 100$

Answer:

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2. Let p and q be two proposition given by

p : I play cricket during the holidays

q : I just sleep throughout the day, then the compound statement $p \vee q$ is

A. If I play cricket during the holidays, I just sleep throughout the day

B. I play cricket during the holidays and jusy sleep throughout the day

C. I just sleep throughout the day if and only if I play cricket during the holidays

D. I play cricket during the holidays or I just sleep throughout the days

Answer:

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3. If x = 5 and y = -2, then x - 2y = 9. The contrapositive of this proposition is

A. If $x - 2y \neq 9$, then $x \neq 5$ or $y \neq -2$

B. If $x - 2y = 9$, $x \neq 5$ and $y \neq -2$

C. $x - 2y = 9$ is and only if x = 5 and y = -2

D. $x - 2y = 9$ if and only if $x = 0$ and $y = 9$

Answer:

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4. Consider the proposition : "If we control population growth, then we prosper". Negative of this proposition is

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

Answer:

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5. Consider the following propositions

p : I have the raincoat.

q : I can walk in the rain.

The propositions "If I have the raincoat, then I can work in the rain" is represented by

A. $p \rightarrow q$

B. $p \vee q$

C. $p \wedge q$

D. $p \leftrightarrow q$

Answer:

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6. $p \rightarrow q$ is logically equivalent to

A. $p \wedge \sim q$

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

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

D. $\sim p \rightarrow q$

Answer:

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7. The contrapositive of $p \rightarrow (\sim q \rightarrow \sim r)$ is

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

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

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

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

Answer:

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8. The negation of $p \wedge \sim(q \wedge r)$ is

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

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

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

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

Answer:

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9. The contra positive of $(\sim p \wedge q) \rightarrow \sim r$ is

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

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

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

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

Answer: C

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10. Which of the following is logically equivalent to $(p \wedge q)$?

A. $p \rightarrow q$

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

C. $p \wedge \sim q$

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

Answer:

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

A. a tautology

B. a contradiction

C. both a tauology and a contradiction

D. neither a tautology nor a contradiction

Answer:

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12. Which of the following is always true ?

A. $(p \to q) \cong (\sim q \to \sim p)$

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

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

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

Answer:

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13. Which of the following propositions is a tautology ?

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

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

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

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

Answer: A

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14. Which of the following proposition is a tautology ?

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

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

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

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

Answer:

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15. Observe the following statements

I : The dual of $[\sim p \wedge q)] \vee [p \wedge \{\sim(q \vee \sim s)\}]$ is $[\sim(p \vee q)] \wedge [p \vee \{\sim(q \wedge \sim s)\}]$

II : The dual of $\sim p \wedge [(\sim q) \wedge (p \vee q) \wedge \sim r]$ is $\sim p \vee [\sim q) \vee (p \wedge q) \vee \sim r]$

The true statements in the above is/are :

A. only I

B. ony

C. both I, II

D. neither I nor II

Answer:

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16. Match the duals of t he statements in List - I :

	List - I		List - II
(1)	$(p \vee q) \vee r$	(a)	$(p \vee q) \vee r$
(2)	$(p \wedge q) \wedge r$	(b)	$(p \wedge q) \vee (r \wedge s)$
(3)	$(p \vee q) \wedge (r \vee s)$	(c)	$(p \wedge q) \wedge r$

The correct match is :

A. 1-c, 2-b, 3-a

B. 1-b, 2-a, 3-c

C. 1-b, 2-c, 3-a

D. 1-c, 2-a, 3-b

Answer:

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17. Match the duals of the statements in list - I :

	List - I		List - II
(1)	$(p \wedge q) \vee t$	(I)	$(p \wedge q) \wedge t$
(2)	$(p \vee t) \wedge r$	(II)	$(p \vee q) \wedge t$
(c)	$(p \vee q) \vee t$	(III)	$(p \wedge t) \vee r$

The correct match is :

A. a-I, b-II, 3-III

B. 1-I, b-III, c - II

C. a-II, b-I, c-III

D. a-II, b-III, c-I

Answer:

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18. Observe the following statements :

Statements - I : $(p \vee q) \wedge (\sim p \wedge \sim q)$ is a contradiction.

Statement - II : A statement pattern is called a contradiction, it it is a always false, whatever may the truth values of its consitutes statements.

A. Statement - I is true, Stateent - II is true, Statement - II is a correct explanation of Statement - I

B. Statement - I is true, Statement - II is true, Statement - II is not a correct explanation of

Statement - I

C. statement 1 is true and statement 2 is false

D. statement 1 is false and statement 2 is true

Answer:

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19. Observe the following statements

Statement - I : $p \vee \sim(p \wedge q)$ is a tautology

Statement - II : A statement pattern is called a tautology, if it is always true, whatever may be the true value of constitute statements.

A. Statement - I is true, Stateent - II is true, Statement - II is a correct explanation of Statement - I

B. Statement - I is true, Statement - II is true, Statement - II is not a correct explanation of Statement - I

C. statement 1 is true and statement 2 is false

D. statement 1 is false and statement 2 is true

Answer:

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20. Consider the following two statements

P :if 7 is an odd number, then 7 is divisible by 2

Q : If 7 is a prime number, then 7 is an odd number.

If V_1 is the truth valaue of the contra positive of P and V_2 is the truth value of contra positive of Q, then the ordered pair (V_1, V_2) equals

A. (F,F)

B. (F,T)

C. (T,F)

D. (T,T)

Answer:

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21. The contrapositive of the following statement, "If the side of a square doubles, then its area increases four times" is

A. If the area of a square increases four times, then its side is not doubled

B. If the area of a square increases four times, then its side is doubled

C. If the area of a square does not increases fur times, then its side is not doubled

D. If the side of a square is not doubled, then its area does not increases four times.

Answer:

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