Which one of the following is a proposition? d

a) How are you?
b) What time is it?
c) $4 + x = 5$
d) India is in Europe.

What is the negation of the statement "Salman sent more than 100 text messages every day"? c

a) Salman sent more than 200 text messages every day.
b) Salman sent less than 100 text messages but not every day.
c) Salman did not send more than 100 text messages every day.
d) Salman did not send any text message every day.

b

Select the appropriate option after evaluating following four biconditionals are true or false. c

1) 2 + 2 = 4 if and only if 1 + 1 = 2.
2) 1 + 1 = 2 if and only if 2 + 3 = 4.
3) 1 + 1 = 3 if and only if fishes can fly.
4) 0 > 1 if and only if 2 > 1.

a) Only 1 and 3 are True
b) Only option 3 and 4 are True
c) Option 1 is True
d) All options are false

What will be Truth values of the statement $\mathbf{p} \leftrightarrow \neg\mathbf{p}$ for the Truth values T, F of p? d

a) T, F
b) F, T
c) T, T
d) F,F

What will be Truth values of the statement $(p \wedge q) \rightarrow (p \vee q)$ for the Truth values T,T,F,F of p and T,F,T,F of q? C

a) T, F,T,F
b) F, T,F,T
c) T, T,T,T
d) F,F,F,F

If $\boldsymbol{p}$: "You can use the wireless network in the airport," $\boldsymbol{q}$: "You pay the daily fee," and $\boldsymbol{r}$: "You are a subscriber to the service". Which is the right expression for the statement "To use the wireless network in the airport you must pay the daily fee unless you are a subscriber to the service". B

a) $q \wedge r \rightarrow p$
b) $q \vee r \rightarrow p$
c) $p \wedge (q \vee r)$

d) $p \wedge (q \wedge r)$

What is the negation of the statement "Sam is rich and happy"? C

a) Sam is poor and unhappy.
b) Either Sam is poor or happy
c) Either Sam is poor or unhappy
d) Sam is not rich and happy.

Let Q(x, y) denote the statement "y is the capital of x." What are these truth values? C
i) Q(Punjab, Chandigarh), ii) Q(India, New Delhi) iii) Q(Rajasthan, Shimla), iv) Q(Nepal, Kathmandu)

a) T,F,T,F
b) T,T,F,F
c) T,T,F,T
d) T,T,T,T

$(\neg q \wedge (p \rightarrow q)) \rightarrow \neg p$ is a b

a) Contingency
b) Tautology
c) Contradiction
d) None of these

$(p \rightarrow q) \wedge (p \rightarrow r)$ is logically equivalent to B

a) $p \rightarrow (q \vee r)$
b) $p \rightarrow (q \wedge r)$
c) $p \wedge (q \rightarrow r)$
d) $p \wedge \neg(q \rightarrow r)$

$\neg p \leftrightarrow q$ is logically equivalent to A

a) $p \leftrightarrow \neg q$
b) $p \leftrightarrow q$
c) $p \wedge \neg q$
d) $p \vee \neg q$

$\neg p \leftrightarrow q$ is logically equivalent to B

a) $p \leftrightarrow \neg q$
b) $p \leftrightarrow q$
c) $p \wedge \neg q$
d) $p \vee \neg q$

$(p \rightarrow q) \wedge (q \rightarrow r) \rightarrow (p \rightarrow r)$ is a

a) Contingency
b) Contradiction
c) Tautology
d) All the above are true

If x and y are integers of opposite parity (one odd another even) the 5x+5y is A

a) Always Odd
b) Always Even
c) Odd for some values and even for other values
d) Can not be decided

$\neg(\forall x \in A)p(x)$ is logically equivalent to A

a) $(\exists x \in A)\neg p(x)$
b) $(\exists x \in \neg A)p(x)$
c) $(\forall x \in \neg A)p(x)$
d) $(\forall x \in A)\neg p(x)$

Contrapositive of the statement "If you are honest, then you are respected." B

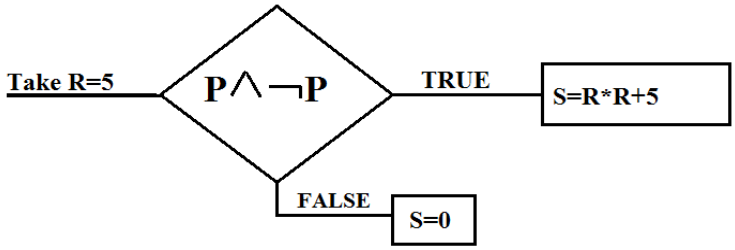
a) If You are honest then he is not respected.
b) If You are not respected than you are not honest.
c) If you are not honest then you are not respected.
d) If you are respected then you are honest.

Contrapositive of the statement "If Sahir is a poet, then he is poor" A

e) If Sahir is rich then he is not poet
f) If Sahir is not a poet then he is not poor
g) If Sahir is not poor then he is a poet
h) If Sahir is not a poet then he is not poor

Let P: Dogs can fly c

And consider the following flow chart of a computer program



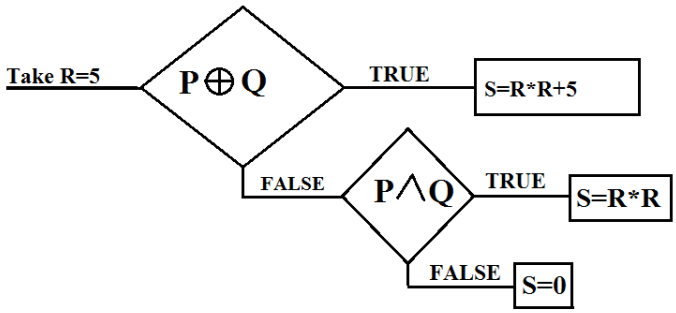
Then the value of S is

a) 30
b) 20
c) 0
d) 10

a

Let P: 5+10=15, Q: 5*10=50

And consider the following flow chart of a computer program



Then the value of S is

a) 30
b) 25
c) 0
d) 10

What is the correct translation of the following statement into mathematical logic? C
"Some COVID 19 vaccines have complete the last trial are ready for production"
where: x: COVID-19 vaccine, $t(x)$: x has completed the last trial, $p(x)$: x is ready for production.

a) $\exists x\ (t(x) \vee p(x))$
b) $\exists x\ (t(x) \rightarrow p(x))$
c) $\exists x\ (t(x) \wedge p(x))$
d) $\exists x\ (p(x) \rightarrow t(x))$

Consider the following statements over the set of integers c

P: k is even Q: 3k+1 is odd

Then which of the following is/are true

a) Only converse for the proposition $P \rightarrow Q$ is true
b) Only inverse for the proposition $P \rightarrow Q$ is true
c) Both converse and inverse for the proposition $P \rightarrow Q$ is true
d) Neither converse nor inverse for the proposition $P \rightarrow Q$ is true

Which of the following statements is the contrapositive of the statement, "You win the game if you know the rules but are not over confident?" a

a) If you lose the game then you don't know the rules or you are overconfident.
b) A sufficient condition that you win the game is that you know the rules or you are not overconfident.
c) If you don't know the rules or are overconfident you lose the game.
d) If you know the rules and are overconfident then you win the game.

In proving π as irrational, we begin with assumption $\sqrt{7}$ is rational in which type of proof? B

a) Direct proof
b) Proof by Contradiction
c) Vacuous proof
d) Mathematical Induction

Which of the following can only be used in disproving the statements? C

a) Direct proof
b) Contrapositive proofs
c) Counter Example
d) Mathematical Induction

Let P: We should be honest., Q: We should be dedicated., R: We should be overconfident. Then 'We should be honest or dedicated but not overconfident.' is best represented by? D

a) $\neg P \vee \neg Q \vee R$
b) $P \wedge \neg Q \wedge R$
c) $P \vee Q \wedge R$
d) $P \vee Q \wedge \neg R$

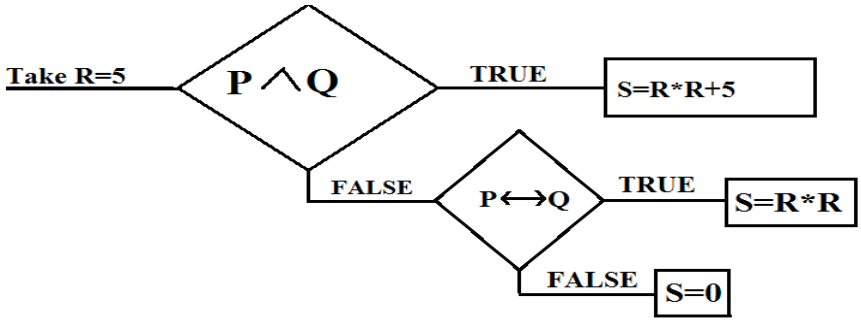
What is the contrapositive of the conditional statement "I come to class whenever there is going to be a test"? B

a) "If I come to class, then there will be a test."
b) "If I do not come to class, then there will not be a test."
c) "If there is not going to be a test, then I don't come to class."
d) "If there is going to be a test, then I don't come to class."

Let a and b are the legs of a right triangle with hypotenuse c B
A sufficient condition that a triangle T be a right angled triangle is that $a^2 + b^2 = c^2$. An equivalent statement is

(a) If T is a right angled triangle then $a^2 + b^2 = c^2$.
(b) If $a^2 + b^2 = c^2$ then T is a right triangle.
(c) $a^2 + b^2 \neq c^2$ Then T is not a right triangle.
(d) T is a right triangle only if $a^2 + b^2 = c^2$

Let P: $R^2 - 5 = 10$. C
Q:$R^2 - 5 = 20$
And consider the following flow chart of a computer program



Then the value of S is

(A) 30
(B) 25
(C) 0
(D) 10

Which one of the following is the most appropriate logical formula to represent the statement? "Students who know Mathematical , coding skills are placed". D

The following notations are used:
M(x): x is knowing the Mathematical skills
C(x): x is knowing the Coding skills
P(x): x is placed

(A) $\forall x(P(x) \rightarrow (M(x) \wedge C(x)))$

(B) $\forall x((M(x) \wedge C(x)) \rightarrow P(x))$

(C) $\exists x((M(x) \wedge C(x)) \rightarrow P(x)$

(D) $\forall x((M(x) \vee C(x)) \rightarrow P(x))$

P and Q are two propositions. Which of the following logical expressions are equivalent? B

I. $P \vee \sim Q$
II. $\sim (\sim P \wedge Q)$
III. $(P \wedge Q) \vee (P \wedge \sim Q) \vee (\sim P \wedge \sim Q)$
IV. $(P \wedge Q) \vee (P \wedge \sim Q) \vee (\sim P \wedge Q)$

(A) Only I and II

(B) Only I, II and III

(C) Only I, II and IV

(D) All of I, II, III and IV