QUIZ 1A and 1B SOLUTIONS

Which of the following propositions is tautology?

A. (p v q)→q

B. p v (q→p)

C. p v (p→q)

D. Both (b) & (c)

Which of the following are tautologies?

A. ((P v Q) ^ Q) ↔ Q

B. ((P v Q) ^ ¬P) → Q

C. ((P v Q) ^ P) → P

D. Both (a) & (b)

Do these premises P ^ (P → Q) results in the conclusion Q?

A. True

B. False

Do these premises P v Q, Q → R, P → M, ¬M results in the conclusion Q ^ (P v R)?

A. True

B. False

(P v Q) ^ (P → R)^ (Q →S) is equivalent to

A. S ^ R

B. S → R

C. S v R

D. All of above

(P v Q) ^ (P→R) ^ (Q → R) is equivalent to

A. P

B. Q

C. R

D. True = T

Which of the following statement is a proposition?
a) Get me a glass of milkshake
b) God bless you!
c) What is the time now?
d) The only odd prime number is 2

Which of the following statement is a proposition?
a) Get me a glass of milkshake
b) Today is Monday.
c) What is the time now?
d) I love you!

Which of the following option is true?
a) If the Sun is a planet, elephants will fly
b) 3 +2 = 8 if 5-2 = 7
c) 1 > 3 and 3 is a positive integer
d) -2 > 3 or 3 is a negative integer

Let P: I am in Karachi. , Q: I love cricket. ; then q -> p(q implies p) is:
a) If I love cricket then I am in Karachi
b) If I am in Karachi then I love cricket
c) I am not in Karachi
d) I love cricket

Let Q(x) be the statement "x < 5." What is the truth value of the quantification ∀xQ(x), having domains as real numbers?
a) True
b) False

Determine the truth value of ∀n(n + 1 > n) if the domain consists of all real numbers.
a) True
b) False

The statement," Every comedian is funny" where C(x) is "x is a comedian" and F (x) is "x is funny" and the domain consists of all people.
a) ∃x(C(x) ∧ F (x))
b) ∀x(C(x) ∧ F (x))
c) ∃x(C(x) → F (x))
d) ∀x(C(x) → F (x))

The statement, "At least one of your friends is perfect". Let P (x) be "x is perfect" and let F (x) be "x is your friend" and let the domain be all people.
a) ∀x (F (x) → P (x))
b) ∀x (F (x) ∧ P (x))
c) ∃x (F (x) ∧ P (x))
d) ∃x (F (x) → P (x))

Determine the truth value of statement ∃n (4n = 3n) if the domain consists of all integers.
a) True
b) False

Let Q(x, y) denote "M + A = 0." What is the truth value of the quantifications ∃A∀M Q(M, A), if U is all real numbers
a) True
b) False

Express, "The difference of a real number and itself is zero" using required operators.

a) $\forall x(x - x! = 0)$

b) $\forall x(x - x = 0)$

c) $\forall x \forall y(x - y = 0)$

d) $\exists x(x - x = 0)$

Find a counterexample of $\forall x \forall y(xy > y)$, where the domain for all variables consists of all integers.

a) x = -1, y = 17

b) x = -2 y = 8

c) Both a and b

d) Does not have any counter example

Which rule of inference is used in each of these arguments, "If it rains today, the local office will be closed. The local office is not closed today. Thus, it did not rain today."

a) Modus tollens

b) Conjunction

c) Hypothetical syllogism

d) Simplification

What rule of inference is used here?

"It is cloudy and drizzling now. Therefore, it is cloudy now."?

a) Addition

b) Simplification

c) Resolution

d) Conjunction

What rule of inference is used in this argument?

"If I go for a balanced diet, then I will be fit. If I will be fit, then I will remain healthy. Therefore, if I go for a balanced diet, then I will remain healthy."

a) Modus tollens

b) Modus ponens

c) Disjunctive syllogism
d) Hypothetical syllogism

What rules of inference are used in this argument?
"All students in this science class has taken a course in physics" and "Marry is a student in this class" imply the conclusion "Marry has taken a course in physics."
a) Universal instantiation
b) Universal generalization
c) Existential instantiation
d) Existential generalization

Which of the following statements is the contrapositive of the statement, "You win the game if you know the rules but are not overconfident."

(a) If you lose the game then you don't know the rules or you are over confident.

(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.

(e) A necessary condition that you know the rules or you are not overconfident is that you win the game.

A sufficient condition that a triangle T be a right triangle is that a2+b2=c2. An equivalent statement is

(a) If T is a right triangle then a2+b2=c2.

(b) If a2+b2=c2 then T is a right triangle.

(c) If a2+b2=c2 then T is not a right triangle.

(d) T is a right triangle only if a2+b2=c2.

(e) T is a right triangle unless a2+b2=c2

Consider the statement form p ⇒ q where p ="If Tom is Jane's father then Jane is Bill's niece" and q = "Bill is Tom's brother." Which of the following statements is equivalent to this statement?

(a) If Bill is Tom's Brother, then Tom is Jane's father and Jane is not Bill's niece.

(b) If Bill is not Tom's Brother, then Tom is Jane's father and Jane is not Bill's niece.

(c) If Bill is not Tom's Brother, then Tom is Jane's father or Jane is Bill's niece.

(d) If Bill is Tom's Brother, then Tom is Jane's father and Jane is Bill's niece.

Consider the statement, "If n is divisible by 30 then n is divisible by 2 and by 3 and by 5." Which of the following statements is equivalent to this statement?

(a) If n is not divisible by 30 then n is divisible by 2 or divisible by 3 or divisible by 5.

(b) If n is not divisible by 30 then n is not divisible by 2 or not divisible by 3 or not divisible by 5.

(c) If n is divisible by 2 and divisible by 3 and divisible by 5 then n is divisible by 30.

(d) If n is not divisible by 2 or not divisible by 3 or not divisible by 5 then n is not divisible by 30.