

# Mathematical Reasoning

Question 1.

Which of the following statement is a conjunction

- (a) Ram and Shyam are friends
- (b) Both Ram and Shyam are friends
- (c) Both Ram and Shyam are enemies
- (d) None of these

Answer: (d) None of these

All the statements are conjunction. So, option 4 is the correct answer.

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Question 2.

Which of the following is true

- (a) A prime number is either even or odd
- (b)  $\sqrt{3}$  is irrational number.
- (c) 24 is a multiple of 2, 4 and 8
- (d) Everyone in India speaks Hindi.

Answer: (d) Everyone in India speaks Hindi.

The statement Everyone in India speaks Hindi is not true.

This is because, there are some states like Tamilnadu, Kerala, etc. where the person does not speak Hindi.

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Question 3.

The contrapositive of the statement If a number is not divisible by 3, it is not divisible by 9 is

- (a) If a number is divisible by 3, it is not divisible by 9
- (b) If a number is not divisible by 3, it is divisible by 9
- (c) If a number is divisible by 3, it is divisible by 9
- (d) If a number is not divisible by 3, it is not divisible by 9

Answer: (c) If a number is divisible by 3, it is divisible by 9

Given, statement is: If a number is not divisible by 3, it is not divisible by 9

Now, contrapositive is:

If a number is divisible by 3, it is divisible by 9

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Question 4.

The negation of the statement The product of 3 and 4 is 9 is

- (a) It is false that the product of 3 and 4 is 9
- (b) The product of 3 and 4 is 12
- (c) The product of 3 and 4 is not 12
- (d) It is false that the product of 3 and 4 is not 9

Answer: (a) It is false that the product of 3 and 4 is 9

Given, statement is The product of 3 and 4 is 9

The negation of the statement is:

It is false that the product of 3 and 4 is 9

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Question 5.

The connective in the statement Earth revolves round the Sun and Moon is a satellite of earth is

- (a) or
- (b) Earth
- (c) Sun
- (d) and

Answer: (d) and

Given, statement is Earth revolves round the Sun and Moon is a satellite of earth.

Here, and is the connective.

It connects two statements Earth revolves round the Sun, Moon is a satellite of earth.

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Question 6.

If p is a statement then the negation of p is

- (a) p
- (b) -p
- (c)  $\sim p$
- (d)  $p\sim$

Answer: (c)  $\sim p$

If p is a statement then the negation of p is  $\sim p$

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Question 7.

If (p or q) is false when

- (a) p is true and q is false

- (b) p is true and q is true
- (c) p is false and q is false
- (d) p is false and q is true

Answer: (a) p is true and q is false  
(p or q) is false when both p and q are false otherwise it is true.

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Question 8.

If (p and q) is true then

- (a) p is true and q is false
- (b) p is false and q is false
- (c) p is false and q is true
- (d) p is true and q is true

Answer: (d) p is true and q is true  
(p and q) is true when both p and q are true otherwise it is false.

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Question 9.

If (p and q) is false then

- (a) p is true and q is false
- (b) p is false and q is false
- (c) p is false and q is true
- (d) all of the above

Answer: (d) all of the above  
(p and q) is true when both p and q are true otherwise it is false.

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Question 10.

The compound statement with AND is true if all its component statements are

- (a) true
- (b) false
- (c) either true or false
- (d) None of these

Answer: (a) true

The compound statement with AND is true if all its component statements are true.

Ex: Sheela is an honest and nice girl

If this statement is true when the statements

Sheela is an honest girl, Sheela is a nice girl are true separately.

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Question 11.

Which of the following is not a negation of the statement A natural number is greater than zero

- (a) A natural number is not greater than zero
- (b) It is false that a natural number is greater than zero
- (c) It is false that a natural number is not greater than zero
- (d) None of these

Answer: (c) It is false that a natural number is not greater than zero

Given statement is:

A natural number is greater than zero

Negation of the statement:

A natural number is not greater than zero

It is false that a natural number is greater than zero

So, option 3 is not true.

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Question 12.

If a recipe calls for  $\frac{2}{3}$  cups of sugar but I only want to make  $\frac{1}{4}$  of the recipe, how much sugar do I need?

- (a)  $\frac{2}{3}$
- (b)  $\frac{1}{4}$
- (c)  $\frac{1}{6}$
- (d)  $\frac{1}{3}$

Answer: (c)  $\frac{1}{6}$

The sugar I need =  $(\frac{1}{4}) * (\frac{2}{3}) = \frac{2}{12} = \frac{1}{6}$

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Question 13.

Which of the following is the conditional  $p \rightarrow q$

- (a) q is sufficient for p
- (b) p is necessary for q
- (c) p only if q
- (d) if q then p

Answer: (c) p only if q

Given,  $p \rightarrow q$

Now, conditional of the statement is

p only if q

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Question 14.

Which of the following is true

- (a) A prime number is either even or odd

- (b)  $\sqrt{3}$  is irrational number.
- (c) 24 is a multiple of 2, 4 and 8
- (d) Everyone in India speaks Hindi.

Answer: (d) Everyone in India speaks Hindi.

The statement Everyone in India speaks Hindi is not true.

This is because, there are some states like Tamilnadu, Kerala, etc. where the person does not speak Hindi.

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Question 15.

Which of the following statement is a conjunction

- (a) Ram and Shyam are friends
- (b) Both Ram and Shyam are friends
- (c) Both Ram and Shyam are enemies
- (d) None of these

Answer: (d) None of these

All the statements are conjunction. So, option 4 is the correct answer.

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Question 16.

The converse of the statement If a number  $n$  is even, then  $n^2$  is even is

- (a) If a number  $n$  is even, then  $n^2$  is even
- (b) If a number  $n$  is even, then  $n^2$  is not even
- (c) If a number  $n^2$  is even, then  $n$  is even
- (d) If a number  $n^2$  is not even, then  $n$  is even

Answer: (c) If a number  $n^2$  is even, then  $n$  is even

Given, statement is: If a number  $n$  is even, then  $n^2$  is even

Now, the converse of the number is:

If a number  $n^2$  is even, then  $n$  is even

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Question 17.

Which of the following is a statement

- (a) 8 is less than 5
- (b) Every set is finite set
- (c) Mathematics is fun.
- (d) 2 is the only even prime number

Answer: (d) 2 is the only even prime number

The statement 2 is the only even prime number is true.

So, it is a statement.

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Question 18.

Which of the following is a statement

- (a) I will go tomorrow
- (b) She will come today
- (c) 3 is a prime number
- (d) Tomorrow is Friday

Answer: (c) 3 is a prime number

The statement 3 is a prime number is true.

So, it is a statement.

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Question 19.

if p then q is written as

- (a)  $p \Rightarrow q$
- (b)  $q \Rightarrow p$
- (c)  $p \Leftrightarrow q$
- (d)  $q \Leftrightarrow p$

Answer: (a)  $p \Rightarrow q$

if p then q is written as

$p \Rightarrow q$

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Question 20.

Which of the following is not a statement

- (a) The product of (-1) and 8 is 8
- (b) All complex number are real number
- (c) Today is windy day
- (d) All of the above

Answer: (d) All of the above

A sentence is a statement if it is true.

None of the above sentence is true.

So, option 4 is the correct answer.

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