

QB365

Important Questions - Mathematical Reasoning

11th Standard CBSE

Mathematics

Reg.No. :

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Time : 01:00:00 Hrs

Total Marks : 50

Section-A

- 1) Given below are two statements 2
p :100 is a multiple of 5.
q :100 is a multiple of 4.
Write the compound statement connecting these two statements with 'and' and check its validity.
- 2) Using contrapositive method, prove that if n^2 is an even integer, then n is also an even integer. 2
- 3) Write the negation of the following statement 2
Every natural number is an integer
- 4) Identify the quantifier(s) in the following statement and write the negation of the statement 2
'There exists a capital for every state in India'.
- 5) Write down the contrapositive of the following statements. 2
If $x = y$ and $y = 3$, then $x = 3$.
- 6) Write the negation of the following statements. 2
(ii) If $2 + 3 = 5$, then 5 is an odd number.

Section-B

- 7) Write down the truth bvalue of each of the following statements. 3
(i) Delhi is in India
(ii) Chennai is in Pakistan
(iii) $5 + 6 = 11$
- 8) For each of the following statement,determine whether an inclusive 'OR' or exclusive 'OR' is used.Give reason 3
for your answer
Sun rises or Moon sets
- 9) Rewrite the following statement with 'if-then' in five different ways conveying the same meaning 'If a natural is 3
odd, then its square is also odd'.
- 10) Rewrite the following statements in the form of conditional statements 3
When you sing, my ears hurt.
- 11) Which of the statements are compound statement? 3
(iv) Ravi opened the door and run away.
- 12) Write the truth value of the following compound statements. 3
If the number $R = 57423$ is divisible by 3, then the sum of digits forming R is divisible by 3.

Section-C

- 13) Write the component statements of the following compound statement and check whether the compound statement is true or false 4
 $2 + 4 = 6$ or $2 + 4 = 7$
- 14) Identify the quantifiers and write the negation of the following statements 4
 There exists a number which is a multiple of 6 and 9
- 15) By giving a counter example, shows that the following statement is not true. 4
 p: If all the angles of a triangle are equal, than the triangle is an obtuse angled triangle.
- 16) Write down the negation 4
 $2 + 4 > 5$ or $3 + 4 < 6$.
- 17) Write down the negation 4
 $\triangle ABC$ is isosceles, if and only if $\angle B = \angle C$

Section-A

- 1) The compound statement is '100 is multiple of 5 and 4'. 2
 The compound statement 'p and q' is a valid statement.
- 2) Let p: n^2 is an even integer 2
 and q: n is also an even integer.
 Let $\sim p$ is true, i.e. n is not an even integer.
 $\Rightarrow n^2$ is not an integer.
 $\Rightarrow \sim p$ is true.
- 3) Some natural numbers are not an integer 2
 Or
 Atleast one natural number is not integer
- 4) Here, quantifier are 'There exists' and 'For every'. Negation of given statement is 2
 'There exists a state in India, which does not have a capital'.
- 5) If $x \neq 3$, then $x \neq y$ or $y \neq 3$. 2
- 6) Let p : $2 + 3 = 5$ 2
 and q : 5 is an odd number.
 The given proposition is $P \Rightarrow q$.
 $\sim (p \Rightarrow q) \equiv p \wedge (\sim q)$
Ans. $2 + 3 = 5$ and 5 is an even number.

Section-B

- 7) (i) T, because statement 'Delhi is in India' is true 3
 (ii) F, because statement 'Chennai is in pakistan' is false
 (iii) T, because statement ' $5 + 6 = 11$ ' is true
- 8) Here 'OR' is exclusive, because Sun rises and Moon sets during day time 3

9)

3

The component statements of the given statement are

p : A natural number is odd

q : Square of a natural number is odd.

The given statement is 'if p then q '.

It can be expressed in five different ways as follows

(i) $p \Rightarrow q$ i.e. x is an odd natural number $\Rightarrow x^2$ is an odd natural number.

(ii) P is a sufficient condition for q i.e. knowing that a natural number is odd is sufficient to conclude that its square is odd.

(iii) p only if q i.e. a natural number is odd only if its square is odd.

(iv) q is necessary condition for p i.e. when a natural number is odd, its square is necessarily odd.

(v) $\sim q \Rightarrow \sim p$ i.e. if the square of a natural number is not odd, then the natural number is not odd.

10)

3

Here 'when' means the same as 'if' and so the equivalent formulation of the given statement is "If you sing, then my ears hurt"

11) (iv) Given statement can not be broken into two simple sentences. So, it is not compound statement.

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12) The connective 'If-then' is used in the given compound statement.

3

Let p : The number $R = 57423$ is divisible by 3.

and q : The sum of digits forming R is divisible by 3.

Here, both the statements p and q are true.

Therefore, the compound statement is true and its truth value is T.

Section-C

13) Compound statement is true and its component statement are

4

$$p : 2 + 4 = 6; q : 2 + 4 = 7$$

14)

4

The quantifier is 'there exists' and the negation is There does not exist a number which is multiple of both 6 and 9

15) p : All the angles of a triangle are equal.

4

q : the triangles is an obtuse angled triangled.

We have to show that if p then $\sim q$. Take each angle equal to 60° , it means they are acute angle.

Hence, we conclude that the given statement is false.

16) $2 + 4 \leq 5$ and $3 + 4 \geq 6$

4

17) Either $\triangle ABC$ is isosceles and $\angle B \neq \angle C$ or $\triangle ABC$ is not isosceles and $\angle B = \angle C$

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