Class - XI  Set - A

Core Maths

Marking Scheme / Hints to Solution

May Unit Test

Note :- Any relevant solution not mentioned here but correct would be suitably awarded

Q1 d) $\{\{5, 6\}\}$ — 1

Q2 b) $\{6, 8, 9, 10, 11, 12\}$ — 1

Q3 b) $-19$ — 1

Q4 B) none — 1

Q5 d) U — 1

Q6 c) $R - \{-1\}$ — 1

Q7 b) 64 — 1

Q8 a) $\{(2,3), (2,4), (3,4), (4,6)\}$ — 1

Q9 c) Identity function — 1

Q10 c) $2^6 - 1$ — 1

Q11 b) Domain $= (-\infty, \infty)$ and Range $= [0, \infty)$ — 1

Q12 c) A is true and R is false — 1

Q13 $(A \cap B)' = \{8, 9, 10\}' = \{5, 6, 7, 11, 12\}$ — 1

$A' \cup B' = \{5, 6, 7, 11, 12\}$ — 1 — 2

Q14 Let $x \in C - B$

$\Rightarrow x \in C$ and $x \notin B$ — $\frac{1}{2}$

$\Rightarrow x \in C$ and $x \notin A$ $(\because A \subset B)$ — $\frac{1}{2}$

$\Rightarrow x \in C - A$ — $\frac{1}{2}$

$\Rightarrow C - B \subset C - A$ — $\frac{1}{2}$ — 2

Q15 (i) $R = \{(1,6), (2,7), (3,8)\}$ — 1

(ii) Domain of $R = \{1, 2, 3\}$ — $\frac{1}{2}$

(iii) Range of $R = \{6, 7, 8\}$ — $\frac{1}{2}$ — 2

16 False, Let $X = \{1, 2\}$
Let $Y = \{1, 2, 3, 4\}$
and $Z = \{\{1, 2, 3, 4\}, 5, 6\}$
Here $X \subset Y$ and $Y \in Z$ but $X \notin Z$ — 2 — 2

$f(x) = 2 - 3x$, $x \in R$, $x > 0$

$\Rightarrow y = 2 - 3x$

$\Rightarrow 3x = 2 - y$ — $\frac{1}{2}$

$\Rightarrow x = \frac{2-y}{3}$

Here $x > 0$ so, $\frac{2-y}{3} > 0$ — $\frac{1}{2}$

$\Rightarrow 2 - y > 0$

$\Rightarrow 2 > y$

$\Rightarrow y < 2$ — $\frac{1}{2}$ — 2

$\Rightarrow y \in (-\infty, 2)$ — $\frac{1}{2}$

$\Rightarrow$ Range of $f(x) = (-\infty, 2)$

018 (i) $(f+g)x = f(x) + g(x)$
$= x + 1 + 2x - 3$
$= 3x - 2$

(ii) $(f-g)x = f(x) - g(x)$
$= x + 1 - 2x + 3$
$= -x + 4$ — $1\frac{1}{2}$

(iii) $\left(\frac{f}{g}\right)x = \frac{f(x)}{g(x)} = \frac{x+1}{2x-3}$ where $x \neq \frac{3}{2}$ — $\frac{1}{2}$ — 2

019 $f(x) = \sqrt{x^2 - 25}$

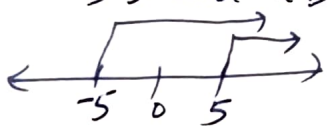
For $f(x)$ to exist on real line

$x^2 - 25 \geq 0$

$\Rightarrow (x-5)(x+5) \geq 0$ — $\frac{1}{2}$

$x - 5 \geq 0$ and $x + 5 \geq 0$

$x \geq 5$ and $x \geq -5$

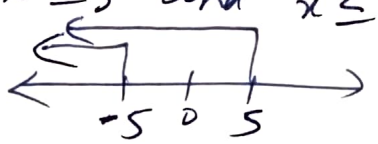



$\Rightarrow x \geq +5$

$\Rightarrow x \in [5, \infty)$

$x - 5 \leq 0$ and $x + 5 \leq 0$

$x \leq 5$ and $x \leq -5$




$\Rightarrow x \leq -5$

$\Rightarrow x \in (-\infty, -5]$ — 1+1

$\Rightarrow x \in (-\infty, -5] \cup [5, \infty)$ — $\frac{1}{2}$ — 3

$\Rightarrow D_f = (-\infty, -5] \cup [5, \infty)$

$\Rightarrow D_f = R - (-5, 5)$

given $A \cap X = B \cap X = \phi$
$A \cup X = B \cup X$

TP $A = B$

Proof As $A \cup X = B \cup X$

Take intersection with A on both sides

$A \cap (A \cup X) = A \cap (B \cup X)$

$(A \cap A) \cup (A \cap X) = (A \cap B) \cup (A \cap X)$

$A \cup (A \cap X) = (A \cap B) \cup (A \cap X)$ $1\frac{1}{2}$

$A \cup \phi = (A \cap B) \cup (A \cap X)$

$A = A \cap B$ — (1)

Again $A \cup X = B \cup X$

Take intersection with B on both sides

$B \cap (A \cup X) = B \cap (B \cup X)$

$(B \cap A) \cup (B \cap X) = (B \cap B) \cup (B \cap X)$

$(B \cap A) \cup \phi = B \cup \phi$

$(B \cap A) = B$ — (2)

$1\frac{1}{2}$ 3

from (1) & (2)

$A = A \cap B = B$

$\Rightarrow \boxed{A = B}$

Hence Proved.

Class - XI  Set - B

Core Maths

Marking Scheme / Hints to Solutions

May Unit Test

Note :- Any relevant solution not mentioned here but correct would be suitably awarded

Q1 c) $-21$ — 1

Q2 d) $2^8 * -1$ — 1

Q3 d) $\{x : x \in N, \ 8 < x < 9\}$ — 1

Q4 d) $\{\{1,2\}\}$ or c) $\{5,6\}$ — 1

Q5 a) 16 — 1

Q6 c) $A = \{(2,3), (2,4), (3,4), (4,6)\}$ — 1

Q7 b) $R - \{1\}$ — 1

Q8 c) Identity function — 1

Q9 a) $\{1,2,3,4,5,6,7,8,9,12\}$ — 1

Q10 b) $\phi$ — 1

Q11 b) Domain $= R$ and Range $= Z$ — 1

Q12 Both are false — 1

Q13 i) $(f+g)x = f(x) + g(x)$
$= 2x - 3 + x + 1$
$= 3x - 2$

(ii) $f-g(x) = f(x) - g(x)$
$= 2x - 3 - x - 1$
$= x - 4$ — $1\frac{1}{2}$

(iii) $\frac{f}{g}(x) = \frac{f(x)}{g(x)} = \frac{2x-3}{x+1}$, $x \neq -1$ — $\frac{1}{2}$ 2

Q14 Same as set A

Q15 $f(x) = 3 - 2x$, $x \in R$, $x > 0$

$y = 3 - 2x$

$\Rightarrow \quad 2x = 3-y$

$\Rightarrow \quad x = \frac{3-y}{2}$ $\frac{1}{2}$

Here $x \geq 0$

$\Rightarrow \frac{3-y}{2} \geq 0$ $\frac{1}{2}$

$\Rightarrow 3-y \geq 0$

$\Rightarrow 3 \geq y$

$\Rightarrow y \leq 3$ 1 2

$\Rightarrow y \in (-\infty, 3)$

$\Rightarrow R_f = (-\infty, 3)$

6 (i) $R = \{(1,9), (2,10), (3,11), (4,12)\}$ 1

(ii) Domain of $R = \{1,2,3,4\}$ $\frac{1}{2}$

(iii) Range of $R = \{9,10,11,12\}$ $\frac{1}{2}$ 2

17 Same as Q16 of set A

18 $(A \cup B)' = \{5,7,8,9,10,11,12\}' = \{6\}$ 1

$A' \cap B' = \{6\}$ 1 2

19 $f(x) = \sqrt{49-x^2}$

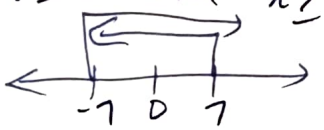
For $f(x)$ to exist on real line

$49-x^2 \geq 0$

$(7-x)(7+x) \geq 0$ $\frac{1}{2}$

$7-x \geq 0$ and $7+x \geq 0$

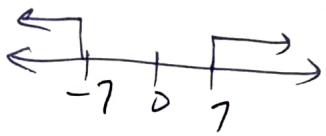
$7 \geq x$ and $x \geq -7$




$\Rightarrow x \in [-7,7]$

$7-x \leq 0$ and $7+x \leq 0$

$7 \leq x$ and $x \leq -7$ 1+1




No solution or $\phi$

$\Rightarrow \quad x \in [-7,7] \cup \phi$

$\Rightarrow \quad D_f = [-7,7]$ $\frac{1}{2}$ 3

Q2. Given $A \cap B = A \cap C$

$A \cup B = A \cup C$

To Prove $B = C$

Proof As $A \cup B = A \cup C$

Take intersection with $B$ on both sides

$B \cap (A \cup B) = B \cap (A \cup C)$

$\Rightarrow (B \cap A) \cup (B \cap B) = (B \cap A) \cup (B \cap C)$

$\Rightarrow (B \cap A) \cup B = (B \cap A) \cup (B \cap C)$

$\Rightarrow B = (B \cap A) \cup (B \cap C)$ — (1) 1½

Again $A \cup B = A \cup C$

Take intersection with $C$ on both sides

$\Rightarrow C \cap (A \cup B) = C \cap (A \cup C)$

$\Rightarrow (C \cap A) \cup (C \cap B) = (C \cap A) \cup (C \cap C)$

$\Rightarrow (C \cap A) \cup (C \cap B) = (C \cap A) \cup C$

$\Rightarrow (A \cap B) \cup (C \cap B) = C$ — (2) $(\because A \cap B = A \cap C)$

from (1) and (2) 1½

$\boxed{B = C}$ 3

Hence Proved

**May Test of Core Maths**

**Class – XI (2024-25)** **Set - B**

**Time : 1 hour** **M.M. 30**

**Instructions :**

1. **All questions are compulsory.**
2. **This question paper has 3 Sections. Section A has 12 questions of 1 mark each. Section B has 6 Questions of 2 marks each. Section C has 2 questions of 3 marks each.**

## Section - A

Q1 The value of [ -10.7] - [ 10.6] is ( where [ ] stands for greatest integer function)

a) -18 b) -19 c) -21 d) 0

Q2 If A is the set of the alphabets used in the word **MATHEMATICS** then the number of proper subsets of A are

a) $2^7$ b) $2^6$ c) $2^{11} - 1$ d) $2^8 - 1$

Q3 Which of the following is a null set

a) {0} c) {x: x + 3 = 3}

b) {x: x is neither positive nor negative, x ∈ R} d) { x: x ∈ N, 8 < x <9}

Q4 Which of the following set is subset of A = {{1,2}, 3, 4, 5, 6, 7}

a) {2} b) {1,2} c) {5,6} d) {{1, 2}}

Q5 If P = {2, 7} and Q = {4, 8} then number of relations from set P to set Q are

a) 16 b) 64 c) 63 d) 45

Q6 Among these Relations given below, choose that Relation which is not Function :

a) A = {(2, 1), (3, 1)} c) A = { (2, 3), (2, 4), (3, 4), (4,6)}

b) C = { (2, 4), (3, 5), (4, 8)} d) D = { (3, 1), (2, 3), (4, 6)}

Q7 The domain of the function f(x) = $\frac{x^2-8x+12}{x^2-2x+1}$ is

a) R – {2, 6} b) R – { 1} c) R – { -1} d) R – {0}

Q8 The domain and range are same for

a) Constant function c) Identity Function

b) Signum Function d) Greatest Integer Function

Q9 If U = { 1, 2, 3, ……. , 12} , A = { 8, 9, 10, 11} and B = { 1, 2, 3, 4, 5, 7, 8, 9}

then $(A - B)'$ is

a) { 1, 2, 3, 4, 5, 6, 7, 8, 9, 12} b) { 6, 8, 9, 10, 11, 12} c) { 1, 4 , 7, 8} d) ∅

Q10 A ∩ $A'$ = ____

a) A b) ∅ c) $A'$ d) U

Q11 The domain and range of f(x) = [x] is

a) Domain = R and Range = R
b) Domain = R and Range = Z
c) Domain = ( 0, ∞) and Range = (- ∞, ∞)
d) Domain = R and Range = {0, ∞}

**Choose according to these options in Q 12**

a) **Both A and R are true and R is the correct explanation of A.**
b) **Both A and R are true and R is not the correct explanation of A.**
c) **A is true and R is false.**
d) **A is false and R is true.**

Q12 **Assertion(A)** : Let A = { 1, 2, 3} and B = { 3, 4, 5} then number of relations from A to B are 16

**Reason ( R )**: If n(A) = p and n(B) = q then number of relations from A to B are p x q

**Section – B**

Q13 Let f, g: R→ R be defined, respectively by g(x) = x + 1, f(x) = 2x – 3. Find f +g, f – g , $\frac{f}{g}$

Q 14 Show that if A ⊂ B, then C – B ⊂ C – A

Q15 Find the range of the function: f(x) = 3 – 2x, x ∈ R, x > 0

Q16 Define a relation R on the set of natural numbers N by

R = { (x, y) : y = x +8, x is natural number less than 5 and x, y ∈ N}

i) Depict this relation in its roster form.
ii) Write the domain of R.
iii) Write the range of R.

Q 17 Determine whether the given statement is true or false. If it is true, prove it. If it is false, give an example. Statement: If X ⊂ Y and Y ∈ Z, then X ∈ Z

Q18 If U = { 5, 6, 7, 8, 9, 10, 11, 12}, A = { 7, 8, 9, 10} and B = {5,8, 9, 10,11, 12}.

Verify that $(A \cup B)' = A' \cap B'$

**Section - C**

Q19 Find the domain of the function : f(x) = $\sqrt{49 - x^2}$

Q20 Let A, B and C be sets such that A ∩ B = A ∩ C and A∪ B = A ∪ C then show that B = C .

**May Test of Core Maths**

**Class – XI (2024-25)** **Set - A**

**Time : 1 hour** **M.M. 30**

**Instructions :**

1. **All questions are compulsory.**
2. **This question paper has 3 Sections. Section A has 12 questions of 1 mark each. Section B has 6 Questions of 2 marks each. Section C has 2 questions of 3 marks each.**

## Section - A

Q1 Which of the following set is subset of A = {1, {2}, 3, 4, {5, 6}, 7}

a) {2} b) {1,5} c) {5,6} d) {{5, 6}}

Q2 If U = { 1, 2, 3, ……. , 12} , A = { 8, 9, 10, 11} and B = { 1, 2, 3, 4, 5, 7, 8, 9}

then $(B - A)'$ is

a) { 1, 2, 3, 4, 5, 7} b) { 6, 8, 9, 10, 11, 12} c) { 1, 4 , 7, 8} d) ∅

Q3 The value of [ -9.3] - [ 9.6] is ( where [ ] stands for greatest integer function)

a) -18 b) -19 c) -20 d) 0

Q4 Which of the following is an empty set

a) {0}
b) {x: x is both positive and negative, x ∈ R}
c) {x: x + 3 = 3}
d) { x: x = 3}

Q5 A ∪ $A'$ = ____

a) A b) ∅ c) $A'$ d) U

Q6 The domain of the function f(x) = $\frac{x^2-8x+12}{x^2+2x+1}$ is

a) R – {2, 6} b) R – { 1} c) R – { -1} d) R – {0}

Q7 If P = {50, -51, 78} and Q = {45, 7, -8} then number of relations from set P to set Q are

a) 6 b) 64 c) 63 d) 45

Q8 Among these Relations given below, choose that Relation which is not Function :

a) A = { (2, 3), (2, 4), (3, 4), (4,6)}
b) C = { (2, 4), (3, 5), (4, 8)}
c) B = {(2, 1), (3, 1)}
d) D = { (3, 1), (2, 3), (4, 6)}

Q9 The domain and range are same for

a) Constant function
b) Signum Function
c) Identity Function
d) Greatest Integer Function

Q10 If A is the set of the alphabets used in the word **ALGEBRA** then the number of proper subsets of A are

a) $2^7$ b) $2^6$ c) $2^6 - 1$ d) $2^7 - 1$

Q11 The domain and range of f(x) = |x| is

a) Domain = R and Range = R
b) Domain = (- ∞, ∞) and Range = [0, ∞)
c) Domain = ( 0, ∞) and Range = (- ∞, ∞)
d) Domain = R and Range = {0, ∞}

**Choose according to these options in Q 12**

a) **Both A and R are true and R is the correct explanation of A.**
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Q12 **Assertion(A)** : Let A = { 1,2} and B = { 3, 4} then number of relations from A to B are 16

**Reason ( R )**: If n(A) = p and n(B) = q then number of relations from A to B are p x q

**Section – B**

Q13 If U = { 5, 6, 7, 8, 9, 10, 11, 12}, A = { 7, 8, 9, 10} and B = {5,8, 9, 10,11, 12}.

Verify that $( A \cap B)' = A' \cup B'$

Q 14 Show that if A ⊂ B, then C – B ⊂ C – A

Q15 Define a relation R on the set of natural numbers N by

R = { (x, y) : y = x + 5, x is a natural number less than 4 and x, y ∈ N}

i) Depict this relation in its roster form.
ii) Write the domain of R.
iii) Write the range of R.

Q 16 Determine whether the given statement is true or false. If it is true, prove it. If it is false, give an example. Statement: If X ⊂ Y and Y ∈ Z, then X ∈ Z

Q17 Find the range of the function: f(x) = 2 – 3x, x ∈ R, x > 0

Q18 Let f, g: R→ R be defined, respectively by f(x) = x + 1, g(x) = 2x – 3. Find f +g, f – g , $\frac{f}{g}$

**Section - C**

Q19 Find the domain of the function : f(x) = $\sqrt{x^2 - 25}$

Q20 Let A and B be sets. If A ∩ X = B ∩ X = ∅ and A∪ X = B ∪ X for some set X, show that A = B.