



INDIAN SCHOOL AL WADI AL KABIR

Unit Test (2024 - 2025)

Answer Key

Class: XI

Sub: MATHEMATICS (041)

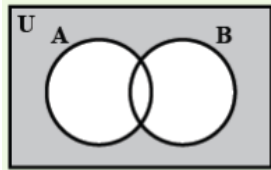
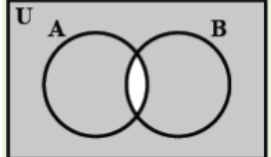
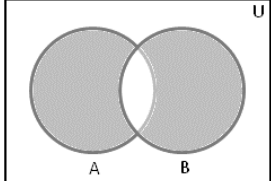
Max Marks: 30

Date: 28.05.2024

Time: 1 hr

General Instructions:

1. This question paper is divided into 4 sections- A, B, C and D.
2. Section A comprises of 7 questions of 1 mark each.
3. Section B comprises of 3 questions of 2 marks each.
4. Section C comprises of 3 questions of 3 marks each.
5. Section D comprises of 2 case study-based questions
6. Internal choice has been provided for certain questions

1	d) 12	2	c) 128	3	a) $x=1$ & $y=1$
4	d) $[0, 1)$	5	b) 2, -3	6	c) 12.56cm
7	(D) A is false and R is True				
8	<p>Given, A and B have m and n elements. Then, the no. of subsets of A is 2^m and that of B is 2^n.</p> <p>Given, $2^m = 2^n + 56$ $\Rightarrow 2^m - 2^n = 56 = 64 - 8 = 2^6 - 2^3$ \therefore The values of $m = 6$ and $n = 3$.</p>				
9	<p>$R = \{(0, 10), (3, 8), (6, 6), (9, 4), (12, 2), (15, 0)\}$ $D_R = \{0, 3, 6, 9, 12, 15\}$ & $R_R = \{10, 8, 6, 4, 2, 0\}$</p>				
10	<p>$\tan 5x = \tan(3x+2x)$ $\tan 5x = \frac{\tan 3x + \tan 2x}{1 - \tan 3x \cdot \tan 2x}$ Cross multiplication and correct proof -OR-</p> <p>$\cos x = 2\cos^2 \frac{x}{2} - 1$ $\cos^2 \frac{x}{2} = \frac{1}{10}$ $\cos \frac{x}{2} = \frac{1}{\sqrt{10}}$ ($\frac{x}{2}$ lies in first quadrant)</p>				
12	<p>(i) Given $A = \{2, 3, 4\}$, $B = \{3, 4, 5\}$ $\Rightarrow A \cup B = \{2, 3, 4, 5\}$ $\therefore (A \cup B)' = \{1, 6, 8\}$... (1) Also, $A' = \{1, 5, 6, 8\}$, $B' = \{1, 2, 6, 8\}$ $\Rightarrow A' \cap B' = \{1, 6, 8\}$... (2) From (1) and (2), we get $(A \cup B)' = A' \cap B'$ (ii) Given $A = \{2, 3, 4\}$, $B = \{3, 4, 5\}$ $\Rightarrow A \cap B = \{3, 4\}$ $\therefore (A \cap B)' = \{1, 2, 5, 6, 8\}$... (3) Also, $A' = \{1, 5, 6, 8\}$, $B' = \{1, 2, 6, 8\}$ $\Rightarrow A' \cup B' = \{1, 2, 5, 6, 8\}$... (4) From (iii) and (iv), we get $(A \cap B)' = A' \cup B'$.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>- OR -</p> <p>(i) $(A \cup B)'$</p>  <p>(ii) $A' \cap B'$</p>   </div> </div>				

11	<p>(i) $\tan 4x = \frac{2 \tan 2x}{1 - \tan^2 2x}$</p> $= \frac{2 \left(\frac{2 \tan x}{1 - \tan^2 x} \right)}{1 - \left(\frac{2 \tan x}{1 - \tan^2 x} \right)^2}$ $= \frac{4 \tan x (1 - \tan^2 x)}{(1 - \tan^2 x)^2 - (2 \tan x)^2}$ $= \frac{4 \tan x (1 - \tan^2 x)}{1 - 6 \tan^2 x + \tan^4 x}$ <p style="text-align: center;">- OR -</p>	<p>13 Given, L.H.S. = $\frac{(\cos 4x + \cos 2x) + \cos 3x}{(\sin 4x + \sin 2x) + \sin 3x}$</p> $= \frac{2 \cos \left(\frac{4x+2x}{2} \right) \cos \left(\frac{4x-2x}{2} \right) + \cos 3x}{2 \sin \left(\frac{4x+2x}{2} \right) \cos \left(\frac{4x-2x}{2} \right) + \sin 3x}$ $= \frac{2 \cos 3x \cos x + \cos 3x}{2 \sin 3x \cos x + \sin 3x}$ $= \frac{\cos 3x (\cos x + 1)}{\sin 3x (\cos x + 1)} = \cot 3x = \text{R.H.S.}$
14	<p>(i) $R = \{-4, 6\}$</p> <p>(ii) $D_f = [-3, 3]$ & $R_f = [0, 3]$</p>	
15	<p>(i) 84</p> <p>(ii) 16</p> <p>(iii) 12 OR 36</p>	