INDIAN SCHOOL AL WADI AL KABIR

Practice Paper Assessment- I (2022-2023)

Class: XI Sub: MATHEMATICS(041) Max Marks: 80

Date: 01.09.2022 Time: 03 hrs.

General Instructions:

1. This question paper contains two sections – A and B. Each part is compulsory.

2. Section - A has 24 Objective type questions and two case study-based questions.

3. Section - B has 08 questions of 02 marks, 04 questions of 03 marks and 04 questions of 05 marks.

4. Internal choice has been provided.

SECTION A (1mark)

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Q.1.	$Write\ -1 \leq x < 5\ using\ intervals.$
Q.2.	Given: For two finite sets A and B, n(A-B) = 10+x, n(B – A) = 3x and n(A∩ B)= x+1. If n(A) = n(B), then find n(A)). OR In a class of 70 students, 30 students play cricket and 20 students play tennis, and 10 students play both the games. Then, find the number of students who play neither of the games.
Q.3.	Write the roster form of the set $A = \{x: x = n^2 + 1, n \in N, n \leq 5\}$
Q.4.	$Write\ all\ subsets\ of\ \{a, b\}$ OR A= $\{a, b, c\}\ and\ B = \{b, c, d\} then\ write\ (A - B) U (B - A)$
Q.5.	How many relations can be defined from A= $\{a, b, c\}\ to\ B = \{x, y\}$
Q6	$Write\ the\ domain\ of\ \frac{2x+1}{x^2-5x+4}$
Q7	If $A \times B = \{(0,2)(1,2),(3,2)(0,1),(1,1),(3,1)\}\ then\ write\ the\ sets\ A\ and\ B.$
Q8	A= $\{0, 1, 2, 3, 4\}$, B =$\{-2, -1, 0, 1, \ldots, 10\} and$ R = $\{(0,-2),(1,0),(2,2),(3,4)(4,6)\}$. Write R in set builder form.
Q9	$Evaluate$: $\sin 480^0$ OR Covert 5.5 radians to degree measure. ($\pi = \frac{22}{7}$)
Q10	Evaluate: $cos\left(\frac{16\pi}{3}\right)$

Q11	$If\ \sin A = \frac{12}{13}\ A\ lies\ in\ second\ quadrant$ then evaluate $\cos A$. OR If $cosA = -\frac{1}{2}\ A\ lies\ in\ second\ quadrant, then\ \ evaluate: \frac{2tanA}{1+tan^2A}$.							
Q12	$Solve\ for\ x: \quad 2sin\frac{7\pi}{6} + x\ cos\frac{2\pi}{3} = 0.$ OR Convert $40^0\ 30'$ in to radian measure.							
Q13	$Solve: 3x + 1 \leq 13, x \in N$							
Q14	Represent the solution of the inequality $3x - 1 \geq 5$ on a number line.							
Q15	Ravi obtained 70 and 75 marks in the first two-unit tests. Find the minimum marks to be obtained in the third unit test to have an average of at least 60 marks.							
Q16	Solve for x: $0 \leq 2x - 5\ \leq 4$							
	SECTION B (MCQ)							
Q17	$The\ value\ of\ sin50^0 - \sin 70^0 + sin10^0$							
	A	1	**B**	0	**C**	2	**D**	-2
Q18	$If\ 3tanA - 4 = 0\ and\ A\ lies\ in\ the\ 3rd\ quadrant\ then\ the\ value\ of\ 2sinA - cosA$							
	A	$-\frac{1}{10}$	**B**	$\frac{3}{10}$	**C**	1	**D**	0
Q19	$The\ value\ of\ \frac{sin50^0}{sin130^0} + \frac{cos50^0}{cos130^0}$							
	A	1	**B**	0	**C**	2	**D**	-2
Q20	$If\ A + B = \frac{\pi}{4}\ then\ the\ value\ of\ (1 + tanA)(1 + tanB) =$							
	A	1	**B**	0	**C**	2	**D**	-2
Q21	$If\ \left(\frac{2a-3}{5}, a + 2b\right) = (1, 2\ ), then\ values\ of\ a\ and\ b.$							
	A	$a = 4, b = -1$	**B**	$a = -4, b = 1$	**C**	$a = -4, b = -1$	**D**	$a = 4, b = 1$

Q22 Which of the following relations are functions?

i) {(1, 2), (2, 2), (3, 2), (4, 2)}
ii) {(3, 5), (4, 7), (5, 8), (6, 10), (7,12)}
iii) {(2, 1), (2, 2), (3, 1), (4, 2), (5, 2)}
iv) {(5, 1), (5, 2), (5, 3), (5, 4)}

	A	*i and ii*	B	*ii and iv*	**C**	*i, ii, iii and iv*	**D**	*none of these*

Q23 Range of the function $f(x) = \frac{x^2}{x^2+1}$

	A	{0, 1}	B	[0, 1]	**C**	[0, 1)	**D**	(0, 1]

Q24 The domain and range of the function $f(x) = \sqrt{16 - x^2}$

	A	Domain: [0, 4] Range: [0, 4]	B	Domain: [-4, 4] Range: [0, 4]	**C**	Domain: {0, 4} Range: {0, 4}	**D**	Domain: {-4, 4} Range: {0, 4}

Section A-Case Study based questions

Q25. CASE STUDY QUESTIONS

In a class of 150 students, 58 play football, 75 play hockey and 75 play cricket, 30 play hockey and cricket, 16 play football and cricket, 42 play football and hockey and 8 play all the three games.

Use Venn diagram to find number of students**:** **(ANSWER ANY FOUR QUESTIONS)**

i) who do not play any of the three games.
A. 22 B.37 C. 70 D. 50

ii) who play only cricket
A. 30 B. 37 C. 75 D. 45

iii) Who play at least one game
A. 75 B. 142 C. 150 D. 128

iv) Who play only football
A. 37 B. 22 C. 8 D. 34

v) Who play exactly two games
A. 64 B. 75 C. 45 D. 72

Q26 Raji visited the Exhibition along with her family. The Exhibition had a huge swing, which attracted many children. Raji found that the swing traced the path of a Parabola as given by $f(x) = x^2$.

Answer the following questions based on the above informations:

a. Write domain and range of $f(x) = x^2$. Is it a function? Why?
b. Evaluate: $\frac{f(2.1)-f(2)}{2.1-2} + \frac{f(-1)}{f(1)}$.

	SECTION B (2marks)
Q27	Let U be the set of all boys and girls in a school. G be the set of all girls, B be the set of all boys and S be the set of all students who take swimming. Some but not all students in the school take swimming. Which of the following Venn diagram shows one of the possible relationships among the sets U, B, G and S.
Q28	Solve: $\|x+2\| \leq 5$
Q29.	$If\ f(x) = \begin{cases} 3x-1,\ 0 \leq x < 3 \\ 2x+1,\ 3 \leq x < 5 \\ x^2-10,\ 5 \leq x < 8 \end{cases}, x \in W, then\ f(0)+f(4)+f(5)$
Q30.	Solve: $\frac{x}{2}+\frac{x}{3}+x < 11$
Q31.	Shade the following using a Venn diagram: i) (AUBUC)' ii) A' ∩(C –B) OR Is $\left\{x: \frac{x+5}{x-7}-5 = \frac{4x-40}{13-x}\right\}$ $an\ empty\ set? Why?$
Q32	Write the relation R defined on set A in roster form where A= {1, 2, 3, 4, 5} and R={(x, y): x+y≤ $5, x, y \in A$}.
Q33	$If\ A+B+C = \pi, the\ prove\ tanA+tanB+tanC = tanA\ tanB\ tanC.$ OR Evaluate: $cosec(1470^0) + \tan(315^0)$
Q34.	Find all pairs of consecutive odd natural numbers, both of which are larger than 10, such that their sum is less than 30.
	SECTION B (3marks)
Q35.	There are 200 individuals with a skin disorder, 120 had been exposed to the chemical C1, 50 to chemical C2, and 30 to both the chemicals C1 and C2. Find the number of individuals exposed to (i) Chemical C1 but not chemical C2 (ii) Chemical C2 but not chemical C1 (iii) Chemical C1 or chemical C2.
Q36.	Prove: $\sqrt{2+\sqrt{2+2cos4A}} = 2cosA$ OR $Prove: tan3x\ tan2x\ tanx = tan3x - tan2x - tanx.$
Q37.	$If\ tanA = xtanB\ then\ prove\ that\ \dfrac{\sin(A+B)}{\sin(A-B)} = \dfrac{x+1}{x-1}$
Q38.	A manufacturer has 600 litres of a 12% solution of acid. How many litres of a 30% acid solution must be added to it so that acid content in the resulting mixture will be more than 15% but less than 18%?

	Section B (5 Marks)
Q39.	Solve the inequalities and represent the solution graphically on number line: $\frac{2x-1}{3} \geq \frac{3x-2}{4} - \frac{(2-x)}{5}$; $3(x-1) \leq 2(x+2)$
Q40.	$U = \{1,2,3,..10\}, \quad A = \{2,3,4,5\}, B = \{3,5,7,9\}, C = \{1,3,5,7,9\}.$ $Find\ (i)A^1 \cap B^1, (ii)A - (BUC), (iii)\ (A-B)U(B-C.$ $Verify:\ A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
Q41.	$f(x) = \begin{cases} 3x+1, & 0 \leq x < 3 \\ x+1, & 3 \leq x < 5 \\ x^2-1, & 5 \leq x < 8 \end{cases}$, $x \in W$. i. write the function in roster form. ii. Write Domain and Range of the function iii. Evaluate: f(f(2)).
Q42.	Prove: $\left(1+cos\frac{\pi}{8}\right)\left(1+cos\frac{3\pi}{8}\right)\left(1+cos\frac{5\pi}{8}\right)\left(1+cos\frac{7\pi}{8}\right) = \frac{1}{8}$. OR Prove: $cos^2A + cos^2\left(A+\frac{\pi}{3}\right) + cos^2\left(A-\frac{\pi}{3}\right) = \frac{3}{2}$.

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Answer Key

Q. No	Answer	Q No.		Q No.	Ans	Q. No	Ans
1	[1, 5)	11	-5/13 Or $-\frac{\sqrt{3}}{2}$	21	A	33	1
2	21 Or 30	12	-2 OR $\frac{9\pi}{40}$	22	A	34	(11,13) (13,15)
3	{2, 5,10, 17,26}	13	{1,2,3,4}	23	C	35	90,20, 140
4	{a} {b} {a, b} { } Or {a, d}	14	 2	24	B	38	120$< x < 300$
5	64	15	35	25	i) A ii) B iii) D iv) C v) A	39	[2, 7] on number line
6	R – {1, 4}	16	[5/2, 9/2]	26	Yes 5.1		
7	A= {0, 1, 3} B={1, 2}	17	B	28	[-7, 3]		
8	R= {(x y):y= 2x-2}	18	C	29	23		
9	$-\frac{\sqrt{3}}{2}$ OR 315^0	19	B	30	$(-\infty, 6)$		
10	-1/2	20	C	31	Not an empty set		

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