



Indian School Al Wadi Al Kabir

Assessment 1 (2022-2023)

Class: XI

Sub: MATHEMATICS(041)

Max Marks: 80

Date: 20.09.2022

Time: 03 hrs.

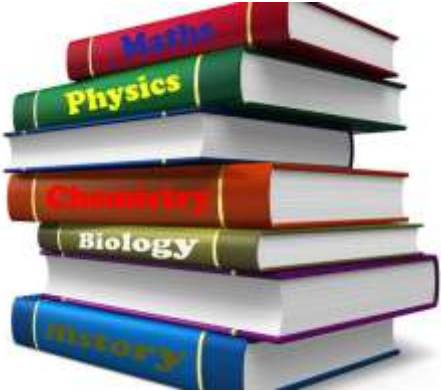
General Instructions:


1. This question paper contains two sections – A and B. Each part is compulsory.
2. Section - A has **24** Objective type questions of **1** mark each and two case study-based questions of **4** marks each.
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)

Q1.	List all the elements of the set $A = \{x: x^2 \leq 4, x \in Z\}$
Q2.	In a school there are 20 teachers who teach mathematics or physics. Of these, 12 teach mathematics and 4 teach both physics and mathematics. How many of them teach physics? OR A market research group conducted a survey of 1000 consumers and reported that 720 consumers like product A and 450 consumers like product B, what is the least number that must have liked both products?
Q3.	Write $P(A)$ if $A = \{1,2\}$.
Q4.	Write the set builder form of $A = \{2,4,6,8,10\}$ OR $A = \{1,2,3\}$ and $B = \{3,4,5\}$ then write $(A - B) \cup (B - A)$
Q5.	How many relations can be defined from A to B if $n(A) = 3$ and $n(B) = 2$.
Q6.	Write the domain of the real valued function $f(x) = \frac{2x + 1}{x^2 - 9}$.
Q7.	If $A = \{5,6\}$ and $B = \{6,8,10\}$ then write $B \times A$.
Q8.	If $R = \{(x, 2x - 1): x = 0, 1, 2, 3\}$, then write R in roster form.
Q9.	Evaluate: $\cos 480^\circ$ OR Convert 2.2 radians to degree measure. ($\pi = \frac{22}{7}$)
Q10.	Evaluate: $\cot\left(\frac{19\pi}{4}\right)$.

Q11.	<p>If $\cos A = -\frac{4}{5}$, A lies in second quadrant then evaluate $\sin A$.</p> <p style="text-align: center;">OR</p> <p>If $\sin A = -\frac{1}{\sqrt{2}}$, A lies in third quadrant, then evaluate: $\frac{2\tan A}{1+\tan^2 A}$.</p>							
Q12.	<p>Solve for x: $2\cos\frac{7\pi}{3} + x\sin\frac{5\pi}{6} = 0$.</p> <p style="text-align: center;">OR</p> <p>Convert $47^\circ 30'$ in to radian measure.</p>							
Q13.	Solve: $-3x + 2 > -13$, where, $x \in \mathbb{N}$							
Q14.	Represent the solution of the inequality $2x - 1 \leq 5$ on a number line.							
Q15.	The cost function and revenue function of a company that manufactures cassettes are given respectively as $C(x) = 24000 + 30x$ and $R(x) = 42x$, where x is the number of cassettes produced and sold in a week. How many cassettes must be sold by the company to realize some profit?							
Q16.	Solve for x: $1 \leq \frac{x}{2} - 1 \leq 3$.							
SECTION A (MCQ)								
Q17.	The value of $\cos 110^\circ + \cos 70^\circ$							
	A	1	B	0	C	2	D	-2
Q18.	If $5\sin A + 4 = 0$ and A lies in the 3rd quadrant then the value of $\cos A - \sin A$.							
	A	$-\frac{1}{5}$	B	$\frac{1}{10}$	C	$\frac{1}{5}$	D	0
Q19.	The value of $\tan 15^\circ$							
	A	$2 - \sqrt{3}$	B	$2 + \sqrt{3}$	C	$\sqrt{3} - 2$	D	$\frac{1}{2\sqrt{3}}$
Q20.	A wheel makes 360 revolutions in one minute. Through how many radians does it turn in one second?							
	A	π	B	3π	C	6π	D	12π
Q21.	If $\left(\frac{2x+1}{3}, 2x+3y\right) = (3, 2)$, then values of x and y.							
	A	$x = 4, y = -2$	B	$x = -4, y = 1$	C	$x = -4, y = -1$	D	$x = 4, y = 1$

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>i and ii</i>	B	<i>ii and iv</i>	C	<i>i, ii, iii and iv</i>	D	<i>none of these</i>
Q23.	Range of the function $f(x) = \frac{x^2}{x^2+1}$							
	A	$\{1, 2\}$	B	$[0, \infty)$	C	$[0, 1)$	D	$(-\infty, 1)$
Q24.	The domain and range of the function $f(x) = \sqrt{9 - x^2}$							
	A	Domain: $[0, 3]$ Range: $[0, 3]$	B	Domain: $[-3, 3]$ Range: $[0, 3]$	C	Domain: $\{0, 3\}$ Range: $\{0, 3\}$	D	Domain: $\{-3, 3\}$ Range: $\{0, 3\}$
Section A-Case Study based questions								
Q25.	<p style="text-align: center;">CASE STUDY QUESTIONS</p> <p>In a group of 50 students, the number of students studying Physics, Biology and Mathematics were found to be as follows. Physics – 17, Biology – 13, Mathematics – 15, Physics and Biology – 9, Biology and Mathematics – 4, Physics and Mathematics – 5, All three subjects – 3.</p> <p>Based on the above information answer the following questions.</p> <p style="text-align: center;">(ANSWER ANY FOUR QUESTIONS)</p>					 <p style="text-align: right;">4 Marks</p>		
	<p>Find the number of students</p> <p>i) who study none of the three subjects. A) 20 B) 27 C) 30 D) 10</p> <p>ii) who study Physics and Biology but not Mathematics. A) 9 B) 12 C) 6 D) 10</p> <p>iii) Who study exactly one of the subjects. A) 30 B) 20 C) 21 D) 18</p> <p>iv) Who study at least one of the subjects. A) 37 B) 30 C) 20 D) 34</p> <p>v) Who study exactly two of the three subjects. A) 3 B) 12 C) 8 D) 9</p>							

<p>Q26.</p>	<p>Sherlin and Danju are playing Ludo. While rolling the dice, Sherlin's sister Raji observed and noted the possible outcomes of the throw every time belongs to set $\{1,2,3,4,5,6\}$. Let A be the set of players while B be the set of all possible outcomes.</p> <p>Answer the following questions based on the above informations:</p>	
	<p>a. Let R be a relation from B to B such that $R = \{(a, b) : a \text{ divides } b, a, b \in B\}$. Write R in roster form.</p> <p>b. Is the relation R a function? Why? Justify your answer. 4 marks</p>	
<p>SECTION B (2marks)</p>		
<p>Q27.</p>	<p>Let A and B are two finite sets such that $n(A) = m$ and $n(B) = n$. If the difference of number of subsets of A and B is 120, find the values of m and n. ($m > n$)</p>	
<p>Q28.</p>	<p>Solve: $x - 2 \leq 3$ OR Solve: $\frac{x}{3} + \frac{x}{4} + x < 19$</p>	
<p>Q29.</p>	<p>If $A = \{0, 1, 2, 3, 4, 5\}$ and a relation R is defined as $R = \{(x, y) : x, y \in A, x + y > 7\}$. Express the relation as set of ordered pairs and determine the domain and range of R.</p>	
<p>Q30.</p>	<p>The water acidity in a pool is considered normal when the average p^H reading of three daily measurements is between 8.2 and 8.5. If the first two readings are 8.4 and 8.3 then find the range of p^H value for the third reading that will result in the acidity level being normal.</p>	
<p>Q31.</p>	<p>For three sets A, B and C shade the following using a Venn diagram: $(A \cap B) \cup C$</p> <p style="text-align: center;">OR</p> <p>If A and B are two sets containing 3 elements and 6 elements respectively. What can be the maximum number of elements in $A \cup B$? Find also the minimum number of elements in $A \cup B$.</p>	
<p>Q32.</p>	<p>Write the domain and range of the function $f(x) = x - 2$</p>	
<p>Q33.</p>	<p>Prove: $\frac{\tan(\frac{\pi}{4} + x)}{\tan(\frac{\pi}{4} - x)} = \left(\frac{1 + \tan x}{1 - \tan x}\right)^2$.</p> <p style="text-align: center;">OR</p> <p>Prove: $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$</p>	
<p>Q34.</p>	<p>Find all pairs of consecutive odd natural numbers, both of which are larger than 10, such that their sum is less than 29.</p>	

