THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

SAMPLE PAPER FOR FIRST TERM EXAMINATION 2023-24

CLASS 11   **MARKS:80**

General Instructions:

1. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.

2. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.

3. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.

4. Section C has 6 Short Answer (SA)-type questions of 3 marks each.

5. Section D has 4 Long Answer (LA)-type questions of 5 marks each.

6. Section E has 3 source based/case based/passage based/integrated units of assessment of 4 marks each with sub-parts

	SECTION A	
1	Evaluate :- $\tan\left(\frac{13\pi}{12}\right)$	
2	Solve for x: $24x < 100$, x is a real number. a) {1,2,3,4} b) {......-2,-1,0,1,2,3,4} c) $(-\infty, 25/6)$ d)) $(-\infty, 25/6]$	
3	If A = {1, 2, 4}, B = {2, 4, 5}, C = {2, 5} then (A − B) × (B − C) a) {(1, 2), (1, 5), (2, 5)} ; b) {(1, 4)} c) {1, 4} ; d) None	
4	If $(1 - i)^n = 2^n$, then the value of n is (a) 1 (b) 2 (c) 0 (d) None of these	
5	Which of the following is a singleton set? (a) {x : |x| = 5, x ∈ N} (b) {x : |x| = 6, x ∈ Z} (c) {x : x2 + 2x + 1 = 0, x ∈N} (d) {x : x2 = 7, x ∈N}	

6	If A = {x : x = n^2 , n = 1, 2, 3}, then number of proper subsets is (a) 3 (b) 8 (c) 7 (d) 4	
7	In a group of 52 persons, 16 drink tea but not coffee, while 33 drink tea. How many persons drink coffee but not tea ? (a) 17 (b) 36 (c) 23 (d) 19	
8.	Let A = {1, 2, 3}. The total number of distinct relations that can be defined over A, is (a) 512 (b) 6 (c) 8 (d) 2	
9.	If z = $(5i)(\frac{-3}{5}i)$, then z is equal to $3 + bi$. The value of b is (a) 1 (b) 2 (c) 0 (d) 3	
10.	Find the value of a) cos (-870)	
11.	A = {$\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{7}$......,$\frac{9}{19}$} in set-builder form is (a) A = { $x:x = \frac{n}{2n-1}$, n $\in$ N and $1 \le n \le 9$} (b) A = { $x:x = \frac{n}{2n+1}$, n $\in$ N and $1 \le n \le 9$} (c) A = { $x:x = \frac{n}{2n+1}$, n $\in$ Z and $1 \le n \le 19$} (d) A = { $x:x = \frac{n}{2n+1}$, n $\in$ z and $n \le 9$}	
12	If f (x) = ax + b, where a and b are integers, f(–1) = –5 and f(3) = 3, then the value of 'a' is (a) 3 (b) 0 (c) 2 (d) 1	
13	Write the value of $i + i^{10} + i^{20} + i^{30}$	
14	The domain and range of the relation R given by R = {(x, y) : y = x + 6 ; where x, y $\in$ N and x < 6} is (a) {1, 2, 3}, {7, 5} (b) {1, 2}, {7, 5} (c) {2, 3}, {5}	

	(d) None of these	
15	Express $\frac{5}{6}$ radian in degree measure.	
16	The domain and range of the function f given by $f(x) = 2 - |x - 5|$ is (a) Domain = R+ , Range = $(-\infty, 1]$ (b) Domain = R, Range = $(-\infty, 2]$ (c) Domain = R, Range = $(-\infty, 2)$ (d) Domain = R+ , Range = $[2, \infty)$	
17	Additive inverse of $1 - i$ is (a) $0 + 0i$ (b) $-1 - i$ (c) $-1 + i$ (d) None of these	
18	$i^{57} + \frac{i}{i^{25}}$ when simplified has the value (a) 0 (b) 2i (c) – 2i (d) 2	
	ASSERTION-REASON BASED QUESTIONS In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices. (a) Both (A) and (R) are true and (R) is the correct explanation of (A). (b) Both (A) and (R) are true but (R) is not the correct explanation of (A). (c) (A) is true but (R) is false. (d) (A) is false but (R) is true.	
19.	**Assertion :** If $3x + 8 > 2$, then $x \in \{-1, 0, 1, 2, \ldots\}$, when x is an integer. **Reason :** The solution set of the inequality $4x + 3 < 5x + 7$ $\forall\ x \in R$ is $[4, \infty)$.	
20.	**Assertion:** cosec x is negative in third and fourth quadrants. **Reason :** cot x decreases from 0 to $-\infty$ in first quadrant and increases from 0 to ∞ in third quadrant.	
	SECTION B	
21	Find a and b if $(a + b, 2a - b) = (8, 7)$	
22.	$\dfrac{\cos 4x \sin 3x - \cos 2x \sin x}{\sin 4x.\sin x + \cos 6x.\cos x} = \tan 2x.$	
23.	In the first four papers each of 100 marks, Rishi got 95, 72, 73, 83 marks. If he wants an average of greater than or equal to 75 marks be should score in fifth paper.	

24.	If n is any positive integer, write value of $\dfrac{i^{4n+1} - i^{4n-1}}{2}$
25.	A horse is tied to a post by a rope. If the horse moves along a circular path, always keeping the rope tight and describes 88 metres when it traces 72° at the centre, find the length of the rope.

<div align="center">SECTION C</div>

26.	Using venn diagram prove that A∩ (B∪C) = (A∩B) ∪(A∩C)

27.	Verify De'Morgan's laws :-
	        U = { 1,2,3,4,5,6,7,8,9,10 }
	        A = { 1,3,4,5,7,9,10,}
	        B = { 1,3,4,5,7,8,10 }

28.	If $(1+i)(1+2i)(1+3i)\dots\dots(1+ni) = x+iy$. Show, $2.5.10\dots\dots(1+n^2) = x^2 + y^2$
29.	If $(x+iy)^{\frac{1}{3}} = a+ib$ prove $\left(\dfrac{x}{a} + \dfrac{y}{b}\right) = 4\left(a^2 - b^2\right)$.
30.	Prove that $\tan 13x = \tan 4x + \tan 9x + \tan 4x \tan 9x \tan 13x$.
31.	Solve for x ; $2(2x+3)-10 < 6(x-2), \quad \dfrac{2x-3}{4}+6 \geq 4+\dfrac{4x}{3}$

<div align="center">SECTION D</div>

32.	Define a relation R on the set N of natural numbers by R = {(x, y) : y = x+5 ∀ x, y ∈ N, x ≤3}. Depict this relationship using roster form. Write down the domain, co-domain and range of R. Draw an arrow diagram of R.
33.	Prove that $\cos 10° + \cos 110° + \cos 130° = 0.$
34.	**Solve to the following system of inequalities and represent solution on number line:** 2x + y ≤ 24, x + y <11, 2x +5 y ≤ 40, x ≥ 0, y ≥ 0
35.	If $\left(\dfrac{1+i}{1-i}\right)^3 - \left(\dfrac{1-i}{1+i}\right)^3 = a+ib$, find a and b.

<div align="center">SECTION E</div>

[This section comprises of 3 case- study/passage based questions of 4 marks each with sub parts.

The first two case study questions have three sub parts (i), (ii), (iii) of marks 1,1,2 respectively.

The third case study question has two sub parts of 2 marks each.)

36 | There are three brands of masks available for sale in a city - brand A, brand B and brand C. In a town of 10000 families, it was found that 40% families buy brand A, 20% buy brand B and 10% buy brand C. Also 5% families buy brands A and B, 3% buy B and C and 4% buy A and C. If 2% families buy all the three brands.

Based on the above information answer the following:

(*i*) Number of families which buy the mask of brand A only, is
(a) 3030 (b) 3300 (c) 3003 (d) 4500

(*ii*) Number of families which buy the mask of exactly two brands, are
(a) 600 (b) 990 (c) 60 (d) 6000

(*iii*) What is the number of families which buy the mask of exactly one brand?
(a) 2500 (b) 5020 (c) 5200 (d) 2000

(*iv*) Number of families which buy the mask of brands A and C but not B is
(a) 20 (b) 2000 (c) 400 (d) 200

37. A survey is conducted by a career counsellor in a college to find career choice of students after the Intermediate. There are 100 students that goes for Engineering Courses, 50 wants to make their career in Medical, 100 students continue their further study in Arts. There are 10 students that go for both Engineering and Medical, and 3 goes for Medical and Arts. There are 3 students that do not go for any further studies.

(i)   Find the number of students that goes for Engineering or Art.

(ii) Find the number of students that goes for both Medical and Art.

38.
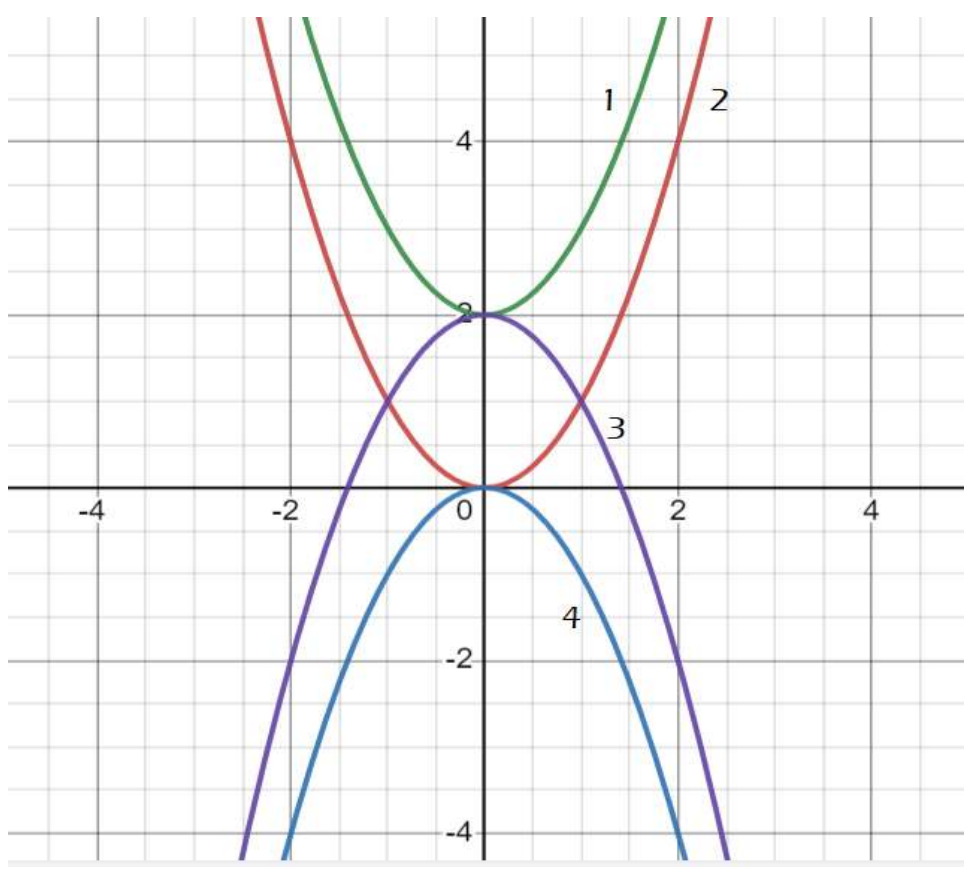
Write the equation of the curves;

1----------------------------

2 ----------------------------------

3 -------------------------------

4 ----------------------------