

**PRE-FINAL EXAMINATION (2022-23)**

**Set – A**

**Class : XI**  
**Sub: Maths (041)**

**M.M: 80**  
**Time: 3 hrs.**


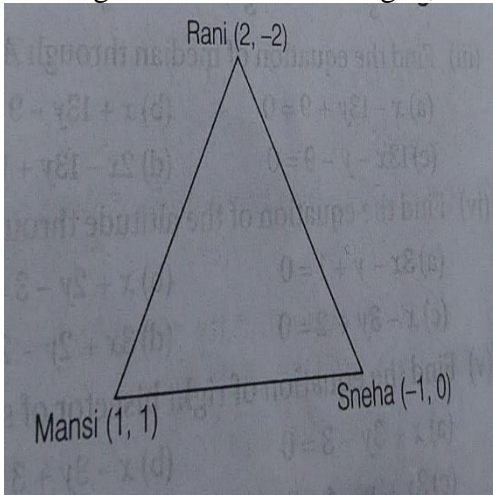
**General Instructions:**

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 (4 marks each) with sub parts.

<b>S. No.</b>	<b>Section-A</b> <b>(This section comprises of Multiple-choice answer type-questions (MCQ's) of 1 marks each)</b>	<b>Marks</b>
1.	For set A, $A \cup A = A$ , This is (a) Law of U (b) Law of identity element (c) Idempotent law (d) Commutative law	<b>1</b>
2.	Find the range of $f(x) = \frac{x-2}{x-1}$ (a) R (b) $R - \{1\}$ (c) $R - \{-1\}$ (d) None	<b>1</b>
3.	If $(2x, y - x) = (y + 3, 0)$ then the value of y is (a) 3 (b) -3 (c) x (d) -x	<b>1</b>
4.	The value of $\sin 50^\circ - \sin 70^\circ + \sin 10^\circ$ is (a) 1 (b) 0 (c) 1/2 (d) 2	<b>1</b>
5.	If $\alpha + \beta = \frac{\pi}{4}$ , then the value of $(1 + \tan \alpha)(1 + \tan \beta)$ is (a) 1 (b) 2 (c) -2 (d) none of these	<b>1</b>
6.	The value of $\sin \frac{31\pi}{3}$ is (a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{\sqrt{2}}$ (d) 1	<b>1</b>
7.	The modulus of $6 - i$ (a) 37 (b) $6 + i$ (c) 6 (d) $\sqrt{37}$	<b>1</b>
8.	If $a + ib = c + id$ then (a) $a^2 + b^2 = 0$ (b) $c^2 + b^2 = 0$ (c) $d^2 + b^2 = 0$ (d) $a^2 + b^2 = c^2 + d^2$	<b>1</b>
9.	If $-3x + 17 < -13$ , then (a) $x \in (10, \infty)$ (b) $x \in [10, \infty)$ (c) $x \in (-\infty, 10]$ (d) $x \in [-10, 10]$	<b>1</b>
10.	The number of 6 digit numbers, all digits of which are odd is (a) $5^6$ (b) $5^5$ (c) $6^5$ (d) $6^6$	<b>1</b>
11.	Using Binomial theorem, If $25^{15}$ is divided by 13 then remainder is (a) -12 (b) 12 (c) 1 (d) -1	<b>1</b>

12.	Find the value of k for which $-\frac{2}{7}, k, -\frac{7}{2}$ are in G.P. (a) $\pm 1$ (b)1 (c)-1 (d)None of these	1
13.	The 3 <sup>rd</sup> term of G.P. is 4, the product of its first 5 term is (a) $4^3$ (b) $4^4$ (c) $4^5$ (d)None of these	1
14.	The various numbers occurring in a sequence are called (a)Series (b)Terms (c)General term (d) None	1
15.	The slope of line making an angle of $45^0$ with x-axis clockwise is (a)1 (b)-1 (c) $\frac{1}{\sqrt{2}}$ (d) $-\frac{1}{\sqrt{2}}$	1
16.	Distance of point (-1,3) from the line $3x + 4y - 1 = 0$ (a) $\frac{8}{5}$ units (b) $-\frac{8}{5}$ units (c) $\frac{6}{5}$ units (d) $-\frac{6}{5}$ units	1
17.	The inclination of line $\sqrt{3}x + 3y = 5$ with x-axis is (a) $180^\circ$ (b) $60^\circ$ (c) $30^\circ$ (d) $150^\circ$	1
18.	The equation of YZ plane is (a) $x = 0$ (b) $y = 0$ (c) $z = 0$ (d) (0,0,0)	1
	<b>Assertion-Reason based Questions</b> 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.	<b>Assertion (A):</b> A total of 360 words can be generated using all the letters of 'BHARAT' (with or without meaning) <b>Reason(R) :</b> Total no. of combinations of n different things taken r at a time is given by $nCr$ .	1
20.	Assertion(A) :An angle of $\frac{11}{7}$ is equivalent to $90^0$ . Reason (R): Angle in radian =Angle in degree $\times \frac{\pi}{180^\circ}$	1
	<b>Section-B</b> <b>(This section comprises of very short answer type-questions (VSA) of 2 marks each)</b>	
21.	Prove that $2 \cos \frac{\pi}{13} \cos \frac{9\pi}{13} + \cos \frac{3\pi}{13} + \cos \frac{5\pi}{13} = 0$	2
22.	Evaluate : $\sum_{n=1}^{13} (i^n + i^{n+1})$ , where $n \in N$ <b>OR</b> If $(x + iy)^{1/3} = u + iv$ , where $x, y, u, v \in R$ then show that $\frac{x}{u} - \frac{y}{v} = -2(u^2 + v^2)$	2
23.	Solve the inequation $\frac{2x-3}{4} + 8 \geq 2 + \frac{4x}{3}$	2
24.	In how many ways can the letters of the word FAILURE be arranged so that the consonants may occupy only even position ? <b>OR</b> Find the number of different words that can be formed from the letters of the word 'TRIANGLE' ,so that no vowels are together .	2
25.	Find the angles between the lines $\sqrt{3}x + y = 1$ and $x + \sqrt{3}y = 1$ .	2

<b>Section-C</b> <b>(This section comprises of short answer type-questions (SA) of 3 marks each)</b>		
26.	A college awarded 38 medals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 men and only three men got medals in all the three sports, how many received medals in exactly two of the three sports ?	<b>3</b>
27.	If $f(x) = \frac{1+x}{1-x}$ show that $\frac{f(x).f(x^2)}{1+[f(x)]^2} = \frac{1}{2}$	<b>3</b>
28.	Prove that $\sin \theta \sin(60^\circ + \theta) \sin(60^\circ - \theta) = \frac{1}{4} \sin 3\theta$ , hence find k, if $\sin 20^\circ \sin 40^\circ \sin 80^\circ = k$ <b>OR</b> Prove that $\cos^2 x + \cos^2 \left(x + \frac{\pi}{3}\right) + \cos^2 \left(x - \frac{\pi}{3}\right) = \frac{3}{2}$	<b>3</b>
29.	A milkman has 80% milk in his stock of 1000 litres of adulterated milk. How much 100% pure milk is to be added to it so that purity is between 90% and 95%.	<b>3</b>
30.	A group consists of 4 girls and 7 boys, In how many ways can a team of 5 members be selected if the team has (i) No girl? (ii) At least one boy and one girl (iii) At least three girls	<b>3</b>
31.	Find the equation of the set of points P, the sum of whose distances from A(4,0,0) and B(-4,0,0) is equal to 10.	<b>3</b>
<b>Section-D</b> <b>(This section comprises of Long answer type-questions (LA) of 5marks each)</b>		
32.	If $\sin \alpha + \sin \beta = a$ and $\cos \alpha + \cos \beta = b$ , then prove that $\cos(\alpha - \beta) = \frac{a^2 + b^2 - 2}{2}$ <b>OR</b> Prove that $\sin 6^\circ \sin 42^\circ \sin 66^\circ \sin 78^\circ = \frac{1}{16}$	<b>5</b>
33.	Using Binomial theorem if a and b are distinct integers, prove that a-b is a factor of $a^n - b^n$ , whenever n is a positive integer.	<b>5</b>
34.	The ratio of A.M. and G.M. of two positive numbers a and b is m: n, show that $a:b = (m + \sqrt{m^2 - n^2}) : (m - \sqrt{m^2 - n^2})$	<b>5</b>
35.	If p and q are the lengths of perpendiculars from the origin to the lines $x \cos \theta - y \sin \theta = k \cos 2\theta$ and $x \sec \theta + y \operatorname{cosec} \theta = k$ , prove that $p^2 + 4q^2 = k^2$ .	<b>5</b>

<b>Section-E</b> <b>(This section comprises 3 case study/passage-questions of 4 marks each with two sub-parts. )</b>		
36.	<p>Five students Ajay, Syam, Rahul ,Ravi and Deepak are getting bored of their regular study. They go to playground and sit in a straight line.</p> <p>On the basis of above information ,answer the following :</p> 	<b>4</b>
(i)	Total number of ways of sitting arrangements of 5 students is	
(ii)	Total number of sitting if Ajay and Ravi can sit together is.	
37.	<p>In a survey of 60 people, it was found that 25 people read newspaper H, 26 read newspaper T, 26 read newspaper I, 9 read both H and I, 11 read both H and T, 8 read both T and I, 3 read all three newspapers. Find: (i) the number of people who read at least one of the newspapers. (ii) the number of people who read exactly one newspaper.</p>	<b>4</b>
38.	<p>Three girls, Rani, Mansi, Sneha are talking to each other while maintaining a social distance due to covid -19(in triangle form with coordinates ). They are standing on vertices of a triangle , whose coordinates are given.</p> 	<b>4</b>
(i)	Find the equation of lines formed by Rani and Mansi.	
(ii)	Find the equation of median of lines through Rani.	