Time -2hrs.   **Sub-Maths**   **Class-XI**   **MM-80**

1. Write the solution set of the equation $x^2 + x - 2 = 0$ in roster form. [4]

2. Draw appropriate Venn diagram for each of the following: [4]
(i) $(A \cup B)'$, (ii) $A' \cap B'$, (iii) $(A \cap B)'$, (iv) $A' \cup B'$

3. There are 200 individuals with a skin disorder, 120 had been exposed to the chemical C_1, 50 to chemical C_2, and 30 to both the chemicals C_1 and C_2. Find the number of individuals exposed to [4]
(i) Chemical C_1 but not chemical C_2 (ii) Chemical C_2 but not chemical C_1
(iii) Chemical C_1 or chemical C_2

4. Let A = {1, 2} and B = {3, 4}. Find the number of relations from A to B. [4]

5. Let f = {(1,1), (2,3), (0,–1), (–1, –3)} be a function from **Z** to **Z** defined by $f(x)$ [4]
$= ax +$ $b,$ for some integers a, b. Determine a, b.

6. Find the values of the trigonometric functions [4]
i. $\tan \dfrac{19\pi}{3}$ **ii.** $\cot\left(-\dfrac{15\pi}{4}\right)$

7. Find the general solution for each of the following equation: [4]
(I)$\cos 3x + \cos x - \cos 2x = 0$

8. Prove that $\cos^2 x + \cos^2\left(x + \dfrac{\pi}{3}\right) + \cos^2\left(x - \dfrac{\pi}{3}\right) = \dfrac{3}{2}$. [4]

9. Prove the following by using the principle of mathematical induction for all $n \in$ **N**:
(i) $1.3 + 3.5 + 5.7 + \ldots + (2n–1)(2n+1) = \dfrac{n(4n^2 + 6n - 1)}{3}$ [4]

10. Convert each of the complex numbers given in Exercises in the polar form: [4]
(**i**) $-1 - i$

11. Convert the complex number $z = \dfrac{i - 1}{\cos \dfrac{\pi}{3} + i \sin \dfrac{\pi}{3}}$ [4]

12. Solve the inequalities in real x. [4]
(i) $\dfrac{(2x - 1)}{3} \geq \dfrac{(3x - 2)}{4} - \dfrac{(2 - x)}{5}$

13. Solve the following system of inequalities graphically: [4]
(i) . $x + 2y \leq 10, x + y \geq 1, x - y \leq 0, x \geq 0, y \geq 0$

14. In how many ways can one select a cricket team of eleven from 17 players in which only 5 players can bowl if each cricket team of 11 must include exactly 4 bowlers? [4]

15. Find n, if the ratio of the fifth term from the beginning to the fifth term from the end in the [4]
expansion of $\left(\sqrt[4]{2} + \dfrac{1}{\sqrt[4]{3}}\right)^n$ $is \sqrt{6:1}.$

16. Find the sum of the following series up to n terms: [4]
$\dfrac{1^3}{1} + \dfrac{1^3 + 2^2}{1 + 2} + \dfrac{1^3 + 2^3 + 3^3}{1 + 2 + 5} + \ldots$

17. Passing through ($2, 2\sqrt{3}$) and inclined with the x-axis at an angle of 75°. Find the equation of the line passing through the point of intersection of the lines $4x + 7y - 3 = 0$ and $2x - 3y + 1 = 0$ that has equal intercepts on the axes. [4]

18. Find the equation of the circle passing through the points (2,3) and (–1,1) and whose centre is on the line $x - 3y - 11 = 0$. [4]

19. Find the equation of the circle with radius 5 whose centre lies on x-axis and passes through the point (2, 3). [4]

20. In each of the following Exercises find the equation for the ellipse that [4]
satisfies the given conditions:

(i) Major axis on the *x*-axis and passes through the points (4,3) and (6,2).