CBSE (CLASS – XI) MATHS PART TEST

FULL MARKS : 50 **MAX. TIME : 1 hrs 30 mins**

Section: A (1 * 10 = 10)

1. Write the set $A=\{x: x\in Z, x^2<20\}$ in the Roster form.

2. Write the set $B=\{\frac{1}{2},\frac{2}{5},\frac{3}{10},\frac{4}{17},\frac{5}{26},\frac{6}{37}\}$ in the Set-Builder form.

3. Write down all possible subsets of $\{\phi,\{\phi\}\}$.

4. Find the value of $8\cos^3\frac{\pi}{9}-6\cos\frac{\pi}{9}$.

5. Find the value of $\sin 150^\circ \cos 120^\circ + \cos 330^\circ \sin 660^\circ$.

6. If $|Z|=2$ and $\arg Z=\frac{\pi}{4}$, then $Z=$ _____.

7. The multiplicative inverse of $-i$ is _____.

8. Solve the equation: $x^2-(\sqrt{2}+1)x+\sqrt{2}=0$.

9. Draw venn diagram of $(A\cap B)'$ *if* $A\subset B$.

10. What is the remainder when 6^n-5n is divided by 25?

Section: B (4 * 7 = 28)

11. In a survey of 100 persons it was found that 28 read magazine A, 30 read magazine B, 42 read magazine C, 8 read magazines A and B, 10 read magazines A and C, 5 read magazines B and C and 3 read all three magazines. Find:

a) How many read none of three magazines?
b) How many read magazine C only?

12. Let A and B be two finite sets such that $n(A)=m$ and $n(B)=p$. If the ratio of number of elements of power sets of A and B is $64:1$ and $n(A)+n(B)=32$. Find the value of m and p.

13. Prove that, $\cos 2\theta\cos\frac{\theta}{2}-\cos 3\theta\cos\frac{9\theta}{2}=\sin 5\theta\sin\frac{5\theta}{2}$.

OR

Prove that, $2\cos\frac{\pi}{13}\cos\frac{9\pi}{13}+\cos\frac{3\pi}{13}+\cos\frac{5\pi}{13}=0$.

14. Solve the equation, $3\tan x+\cot x=5\cos ecx$.

15. Convert the complex number $z = \dfrac{i-1}{\left(\cos \pi/3 + i \sin \pi/3\right)}$ in polar form.

OR

Find the modulus and argument of the complex number $z = \dfrac{(1+i)^{13}}{(1-i)^{7}}$.

16. Show that the coefficient of the middle term in the expansion of $(1+x)^{2n}$ is equal to the sum of the coefficients of two middle terms in the expansion of $(1+x)^{2n-1}$.

17. Using Binomial Theorem show that $3^{3n} - 26n - 1$ is divisible by 676.

Section: C (6 * 2 = 12)

18. (i) Prove that, $\cos^2 x + \cos^2\left(x + \dfrac{\pi}{3}\right) + \cos^2\left(x - \dfrac{\pi}{3}\right) = \dfrac{3}{2}$

(ii) Show that, $\dfrac{\sin(A-C) + 2\sin A + \sin(A+C)}{\sin(B-C) + 2\sin B + \sin(B+C)} = \dfrac{\sin A}{\sin B}$

19. The coefficients of the $(r-1)^{th}, r^{th}$ and $(r+1)^{th}$ terms in the expansion of $(x+1)^n$ are in ratio $1:3:5$. Find n and r.