Final Paper (16 March 2016)
Class XI
Paper- MATHEMATICS
(Set-A)

Time: 3hrs. **M.M. 100**

Note: Attempt all questions.

1. **Q1 to Q6 carry 1 mark each.**
2. **Q7 to Q19 carry 4 marks each.**
3. **Q20 to Q26 carry 6 marks each.**

SECTION - A

Question number 1 to 10 carry 1 mark each.

Q1. If $P=\{1,2\}$, form the set $P\times P\times p$

Q2. Find the value of $\tan\left(\frac{19\pi}{3}\right)$

Q3. Write the following in set builder form $\{2,4,6----\}$

Q4. If $\frac{1}{8!}+\frac{1}{9!}=\frac{x}{10!}$ find value of 'x'

Q5. Solve $14x>72$ when x is natural number.

Q6. Find the slope of lines passing through points (3, -2) and (7, -2)

SECTION – B

Q7. Find domain of function: $f(x)=\frac{x^2+2x+1}{x^2-8x+12}$.

Q8. If $\left[\frac{1+\iota}{1-\iota}\right]=1,$, then find the least positive integral value of 'm'

Q9. Find number of arrangements of letters of the word INDEPENDENCE. In how many of these arrangements

i) do all vowels always occur together.

ii) do the vowels never occur together.

Q10. A committee of 7 has to be formed from 9 boys and 4 girls. In how many ways can this be done when committee consist of

i) at least 3 girls

ii) at most 3 girls

Q11. Find the coefficient of x^6y^3 in expansion of $(x+2y)^9$

Q12. Find the sum to 'n' terms of sequence 8, 88, 888, 8888, ...

Q13. Find the sum to 'n' terms of $(2n-1)^2$

Q14. Find angles between the lines $\sqrt{3}\,x+y=1$ *and* $x+\sqrt{3}\,y=1$

Q15. Find distance of point (3, -5) from line $3x - 4y - 26 = 0$

Q16. Find the equation of set of points P such that $(PA)^2 + (PB)^2 = 2k^2$ where A and B points (3, 4, 5) and (-1, 3, -7) respectively.

Q17. Find the derivative of (i) $(5x^3 + 3x - 1)(x - 1)$ (ii) $\dfrac{2x+3}{x-2}$

Q18. Rewrite the following statement with "if - then" in four different ways conveying the same meaning.

"If a natural number is odd, then its square is also odd".

Q19. One card is drawn from well shiffled deck of 52 cards. If each outcome is equally likely calculate the probability that card will be

i) diamond

ii) not an ace

iii) black card

iv) not a black card

SECTION - C

Q20. In a survey it was found 21 people liked product A, 26 liked product B and 29 liked product C. If 14 people liked products A and B 12 liked products C and A, 14 liked products B and C and 8 liked all the products. Find

(i) how many like product C only

(ii) how many like product A only

Q21. a) Find general solution for $Sin\,x + Sin\,3x + Sin\,5x = 0$

b) Prove that $(Cos\ x - Cos\ y)^2 + (Sin\,x - Sin\,y)^2 = 4\,Sin^2\ \dfrac{x-y}{2}$ (3, 3)

Q22. Solve the following system of inequalities graphically

$$3x + 2y \le 150$$
$$x + 4y \le 80$$
$$x \le 15 \qquad , y \ge 0,\ x \ge 0$$

Q23. Find co-ordinates of foci, the vertices, the length of major axis, minor axis, the eccentricity and length of latus rectum of ellipse $36x^2 + 4y^2 = 144$

Q24. Prove the following by using the Principle of Mathematical induction for all $n \in N$

$$1.3 + 3.5 + 5.7 + \ldots\ldots + (2n-1)(2+1) = \frac{n(4n^2 + 6n - 1)}{3}$$

Q25. Find mean deviation about median for the following data:

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of girls	6	8	14	16	4	2

Q26. Solve: $2x^2 - [3 + 7i]\,x - (3 - 9i) = 0\ over\ C$