

Final Paper (16 March 2016)

Class XI

Paper- MATHEMATICS

(Set - B)

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 $P = \{4, 3\}$, form the set $P \times P \times P$
- Q2. Find the value of $\sin\left(\frac{31\pi}{3}\right)$
- Q3. Write the following in set builder form $\{1, 4, 9, \dots, 100\}$
- Q4. If $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$ find value of 'x'
- Q5. Solve $5x - 3 < 3x + 1$ when x is real.
- Q6. Find the slope of line making inclination of 60° with positive direction of x – axis.

SECTION – B

- Q7. Find domain of function: $f(x) = \frac{x^2 + 3x + 5}{x^2 - 5x + 4}$.
- Q8. Find the real numbers x and y if $(x - iy)(3 + 5i)$, is the conjugate of $-6 - 24i$
- Q9. Find the number of different 8 – letter arrangements that can be made from the letters of word DAUGHTER so that
- i) all vowels occur together.
 - ii) all vowels do not occur together.
- Q10. A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected if team has
- i) at least one boy and one girl
 - ii) at least 3 girls
- Q11. Find the $(a + b)^4 - (a - b)^4$, Hence evaluate $(\sqrt{3} + \sqrt{2})^4 - (\sqrt{3} - \sqrt{2})^4$
- Q12. Find the sum to 'n' terms of sequence 7, 77, 777, 7777,
- Q13. Find the sum to 'n' terms of $n(n+1)(n+4)$
- Q14. Find angles between the lines $y - \sqrt{3}x - 5 = 0$ and $\sqrt{3}y - x + 6 = 0$

- Q15. Find distance of point (3, -5) from line $3x - 4y - 26 = 0$
- Q16. Find the equation of set of points P the sum of whose distances from A (4, 0, 0) and B (-4, 0, 0) is equal to 10.
- Q17. Find the derivative of (i) $(6x^3 + 9x)(5x + 10)$ (ii) $\frac{5x+4}{x-3}$
- Q18. Rewrite the following statement with "if - then" in four different ways conveying the same meaning.
"If a natural number is even, then its square is also even".
- Q19. One card is selected from pack of 52 cards,
- how many points are there in sample space
 - calculate probability that card is an ace of spades
 - calculate probability that card is king
 - calculate probability that card is black card

SECTION - C

- Q20. In a survey of 60 people, it was found that 25 people read news paper H, 26 read news paper T, 26 read news paper 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
- the number of people who read at least one of the news papers
 - the number of people who read exactly one newspaper
- Q21. a) Find general solution for $\cos 3x + \cos x - \cos 2x = 0$
- b) Prove that $(\cos x + \cos y)^2 + (\sin x - \sin y)^2 = 4\cos^2 \frac{x+y}{2}$ (3, 3)
- Q22. Solve the following system of inequalities graphically
- $$\begin{aligned} x - 2y &\leq 3 \\ 3x + 4y &\geq 12 \\ y &\geq 1 \end{aligned}, \quad x \geq 0$$
- Q23. Find co-ordinates of foci, the vertices, the length of major axis, minor axis, the eccentricity and length of latus rectum of ellipse $16x^2 + y^2 = 16$
- Q24. Prove the following by using the Principle of Mathematical induction for all $n \in \mathbb{N}$
- $$1.2.3 + 2.3.4 + \dots + n(n+1)(n+2) = \frac{n(n+1)(n+2)(n+3)}{4}$$
- Q25. Find mean deviation about median for the following data:

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	6	7	15	16	4	2

- Q26. Solve: $x^2 - (7-i)x + (18-i) = 0$ over C