

Sub: Mathematics
Class: XI

Max Marks: 50
Time: 90 min

SECTION A (1 X 6)

- ✓ Q1. Find the general solution of $\tan 5\theta = \cot 2\theta$
- ✓ Q2. Find the no. of words formed out of the letters of the word COMMITTEE.
- ✓ Q3. There are 12 points in a plane. Find the no. of straight lines formed by joining any two of them when 3 of them are collinear.
- Q4. Find the limit $\left(\frac{1}{1-n^2}\right) + \left(\frac{2}{1-n^2}\right) + \left(\frac{3}{1-n^2}\right) + \dots + \left(\frac{n}{1-n^2}\right)$ when $n \rightarrow \infty$.
- Q5. Differentiate 2^{3x} .
- Q6. In ΔABC if $a = 2, b = 3$ and $\sin A = \frac{2}{3}$, Find angle B.

SECTION B (4 X 5)

Q7 Prove that $a^2(\cos^2 B - \cos^2 C) + b^2(\cos^2 C - \cos^2 A) + c^2(\cos^2 A - \cos^2 B) = 0$

Q8. Find the no. of words formed out of the letters of the word BHARAT using 3 letters at a time.

Q9. Find the limit $\frac{\sqrt{a^2 - ax + x^2} - \sqrt{a^2 + ax + x^2}}{\sqrt{a+x} - \sqrt{a-x}}$ when $x \rightarrow 0$.

Q10. If $y = 1 - \frac{x}{1!} + \frac{x^2}{2!} - \frac{x^3}{3!} + \dots + \frac{x^n}{n!}$ then prove that $\frac{dy}{dx} - y + \frac{x^n}{n!} = 0$.

Q11. Find the no. of nos. greater than a million that can be formed with the digits 2,3,0,3,4,2,3.

SECTION C (6 X 4)

Q12. Solve $\tan \theta + \tan(\theta + \frac{\pi}{3}) + \tan(\theta + \frac{2\pi}{3}) = 3$.

Q13. In a ΔABC if $\frac{b+c}{12} = \frac{c+a}{13} = \frac{a+b}{15}$ then prove that $\frac{\cos A}{2} = \frac{\cos B}{7} = \frac{\cos C}{11}$.

Q14. Find the value of the expression ${}^{47}C_4 + \sum_{r=1}^5 {}^{52-r}C_3$.

Q15. Differentiate $e^{\sqrt{\tan x}}$ from 1st principle.