Sub: Mathematics
Class: XI

Max Marks: 50
Time: 90 min

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 $\left(\frac{1}{1-n^2}\right)+\left(\frac{2}{1-n^2}\right)+\left(\frac{3}{1-n^2}\right)+\ldots\ldots\ldots\ldots\left(\frac{n}{1-n^2}\right)$ when lt $n \to \infty$.

Q5 Differentiate $2^{\log x}$

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 $\dfrac{\sqrt{a^2 - ax + x^2} - \sqrt{a^2 + ax + x^2}}{\sqrt{a+x} - \sqrt{a-x}}$ when x→0.

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

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 $\tan\theta + \tan(\theta + \dfrac{\pi}{3}) + \tan(\theta + \dfrac{2\pi}{3}) = 3$.

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

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.