

CLASS : XI A/B/C
SUBJECT : MATHEMATICS

M:M : 50
TIME: 1 ½ hrs

SECTION - A

I. Each question carries 2 marks.

(2x3=6)

1. Solve the inequality $(x+5)(2x-3)^5(x-7)^3(3x+8)^2 > 0$.
2. How many terms are there in the G.P. 5, 20, 80, 5120.
3. If A.M and G.M of roots of a quadratic equation are 8 and 5 respectively, then find the quadratic equation.

SECTION - B

II. Each question carries 4 marks.

(4x5=20)

4. For what value of k the roots of the equation $(2k+3)x^2 + 2(k+3)x + (k+5) = 0$ are real and equal. Also solve the equation for these value of k

5. Evaluate $\frac{1}{\cos 290^\circ} + \frac{1}{\sqrt{3} \sin 250^\circ}$.

6. $\frac{x-1}{x-2} + \frac{x-3}{x-4} = \frac{x-5}{x-6} + \frac{x-7}{x-8}$ OR $2\left(x^2 + \frac{1}{x^2}\right) - 9\left(x + \frac{1}{2}\right) + 14 = 0$

7. If $A + B + C = \pi$, prove that $\cos A + \cos B - \cos C = -1 + 4 \cos \frac{A}{2} \cos \frac{B}{2} \sin \frac{C}{2}$

8. If $\log_3 2, \log_5 (2x - 3), \log_5 \left(\frac{37}{2} + 2^{x-1} \right)$ are in A.P, then find the value of x .

SECTION - C

II. Each question carries 6 marks.

(6x4=24)

9. Sum the series $\frac{1}{3.7.11} + \frac{1}{7.11.15} + \frac{1}{11.15.19} + \dots$ to n terms.

10. By using mathematical induction prove that

$$1.3 + 3.5 + 5.7 + \dots + (2n-1)(2n+1) = \frac{n(4n^2 + 6n - 1)}{3}, n \in N.$$

11. After striking the floor a certain ball rebounds to $\frac{4}{5}$ of the height from which it has fallen. Find the total distance that it travels before coming to rest if it is gently dropped from a height of 120 metres.

12. Show that $\sin^4 \frac{\pi}{8} + \sin^4 \frac{3\pi}{8} + \sin^4 \frac{5\pi}{8} + \sin^4 \frac{7\pi}{8} = \frac{3}{2}$.