

CLASS : XI A/B/C
SUBJECT : MATHEMATICS

M.M.: 50
TIME : 70 MIN

SECTION - A

I. Each questions carries 2 marks. Attempt all the question.

✓(a) If $\tan(A+B) = \frac{7}{23}$ and $\tan(A-B) = \frac{5}{3}$, find the value of $\tan 2A$.

✗(b) If $\log_x a, a^{\frac{3}{2}}$ and $\log_b x$ are in G.P find x .

✓(c) If α, β are the roots of the equation $3x^2 - 4x + 1 = 0$, find the value the value of $\alpha^2 - \beta^2$.

✓(d) If $\frac{\cos 17^\circ + \sin 17^\circ}{\cos 17^\circ - \sin 17^\circ} = \tan x^\circ$, find x .

✗(e) Evaluate $\sqrt{12 + \sqrt{12 + \sqrt{12 + \dots \infty}}}$

SECTION - B

II. Each question carries 3 marks. Attempt all the question.

✓(a) Solve the equation $5^{1+x} + 5^{1-x} = 26$

★(b) Find the value of $\frac{1}{\sin 10^\circ} - \frac{\sqrt{3}}{\cos 10^\circ}$ without using table.

(c) If the ratio of sums of n term of two A.P.'s is $3n - 13 : 5n + 21$. Find the ratio of their fifteenth terms.

✓(d) Prove that $\tan 70^\circ = 2 \tan 50^\circ + \tan 20^\circ$.

✓(e) Sum the series $11 + 103 + 1005 + \dots$ to n terms

SECTION - C

III. Each question carries 5 marks. Attempt all the question.

(a) Solve the equation $\frac{a}{ax-1} + \frac{b}{bx-1} = a + b$.

✓(b) Find the value of $\sin 20^\circ, \sin 40^\circ, \sin 60^\circ, \sin 80^\circ$.

(c) Using the principal of mathematics induction show that

$$1.4.7 + 2.5.8 + 3.6.9 + \dots \text{ to } n \text{ terms} = \frac{n}{4}(n+1)(n+6)(n+7)$$

(d) Find the sum of all number between 1 and 200 which are divisible by 3 or 7.

(e) Find the sum of the series $4 + 44 + 444 + \dots$ to n terms