

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  $\log_x a, a^{\frac{1}{2}}$  and  $\log_b x$  are in G.P find  $x$ .

✓(c) If  $\alpha, \beta$  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.

$1.4.7 + 2.5.8 + 3.6.9 + \dots$  to n 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.