

AI1110 Assignment 1

AI21BTECH11001

ICSE Grade 10 2014 paper

Question 3:

Without using trigonometric tables evaluate

$$\sin^2 34^\circ + \sin^2 56^\circ + 2 \tan 18^\circ \tan 72^\circ - \cot^2 30^\circ$$

Solution:

$$= \sin^2 34^\circ + \sin^2 56^\circ + 2 \tan 18^\circ \tan 72^\circ - \cot^2 30^\circ \quad (1)$$

$$\sin^2 56^\circ = \sin^2(90^\circ - 34^\circ) \quad (2)$$

$$\implies \sin^2 56^\circ = \cos^2(34^\circ) \quad (3)$$

$$2 \tan 18^\circ \tan 72^\circ = 2 \tan 18^\circ \tan(90 - 18)^\circ \quad (4)$$

$$\implies 2 \tan 18^\circ \tan 72^\circ = 2 \tan 18^\circ \cot 18^\circ \quad (5)$$

$$= \sin^2 34^\circ + \cos^2 34^\circ + 2 \tan 18^\circ \cot 18^\circ - \cot^2 30^\circ \quad (6)$$

$$= 1 + 2 \times \tan 18^\circ \times \frac{1}{\tan 18^\circ} - (\sqrt{3})^2 \quad (7)$$

$$= 1 + 2 - 3 = 0 \quad (8)$$