

## Comprehensive Test Series-01

### CHAPTER-2(Inverse – Trigonometric Functions)

TIME: 1hr

MM:

#### General Instructions:

- All Questions are compulsory.
  - Marks are given alongwith the questions individually.
  - Use of calculator is not permitted.
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Q.1 Find the principal value of following:

(i)  $\operatorname{cosec}^{-1}(-\sqrt{2})$

Q.2 Find the value of following

(i)  $\tan^{-1}(1) + \cos^{-1}\left(\frac{-1}{2}\right) + \sin^{-1}\left(\frac{-1}{2}\right)$

Q.3 Express  $\tan^{-1}\left(\frac{\cos x}{1-\sin x}\right)$ ,  $-\frac{\pi}{2} < x < \frac{\pi}{2}$  in the simplest form.

Q.4 Prove that  $\tan^{-1} x + \tan^{-1} \frac{2x}{1-x^2} = \tan^{-1} \left( \frac{3x-x^3}{1-3x^2} \right)$ ,  $|x| < \frac{1}{\sqrt{3}}$

Q.5  $\tan^{-1}\left(\frac{3a^2x-x^3}{a^3-3ax^2}\right)$ ,  $a > 0$ ;  $\frac{-a}{\sqrt{3}} \leq x \leq \frac{a}{\sqrt{3}}$

Q.6  $\tan \frac{1}{2} \left[ \sin^{-1} \frac{2x}{1+x^2} + \cos^{-1} \frac{1-y^2}{1+y^2} \right]$ ,  $|x| < 1$ ,  $y > 0$  and  $xy < 1$

Q.7 If  $\sin\left(\sin^{-1} \frac{1}{5} + \cos^{-1} x\right) = 1$ , then find the value of x.

Q.8 If  $\tan^{-1} \frac{x-1}{x-2} + \tan^{-1} \frac{x+1}{x+2} = \frac{\pi}{4}$ , then find the value of x.

Q.9 Find the value  $\tan^{-1} \left( \tan \frac{3\pi}{4} \right)$ .

Q.10 Show that  $\sin^{-1} \frac{12}{13} + \cos^{-1} \frac{4}{5} + \tan^{-1} \frac{63}{16} = \pi$

Q.11 Find the value  $\cos^{-1} \frac{4}{5} + \cos^{-1} \frac{12}{13} = \cos^{-1} \frac{33}{65}$ .

Q.12 Prove that

(i)  $\cot^{-1} \left[ \frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} \right] = \frac{x}{2}, x \in \left( 0, \frac{\pi}{4} \right)$

(ii)  $\tan^{-1} \left( \frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}} \right) = \frac{\pi}{4} - \frac{1}{2} \cos^{-1} x, -\frac{1}{\sqrt{2}} \leq x \leq 1$

(iii)  $\frac{9\pi}{8} - \frac{9}{4} \sin^{-1} \frac{1}{3} = \frac{9}{4} \sin^{-1} \frac{2\sqrt{2}}{3}$

Q.13 solving the following equation:

$$2 \tan^{-1}(\cos x) = \tan^{-1}(2 \cos ecx)$$