



# RISE OF NATION ACADEMY

"We Create the Impeccable Creature"

## Test Paper

Standard – XIIth

Subject – Mathematics

Date – 11/07/2019

Max. Marks - 27

Min. Marks – 13.5

Q.1 Prove that:  $\tan^{-1} \frac{2}{11} + \tan^{-1} \frac{7}{24} = \tan^{-1} \frac{1}{2}$ . (2)

Q.2 Evaluate the following: (i)  $\sin^{-1}(\sin 10)$  (ii)  $\cos^{-1}(\cos 10)$  (2)

Q.3 Prove that:

(i)  $\tan^{-1} \left\{ \frac{\sqrt{1+\cos x} + \sqrt{1-\cos x}}{\sqrt{1+\cos x} - \sqrt{1-\cos x}} \right\} = \frac{\pi}{4} - \frac{x}{2}$ , if  $\pi < x < \frac{3\pi}{2}$ . (4)

(ii)  $\cot^{-1} \left\{ \frac{\sqrt{1+\sin x} + \sqrt{1-\sin x}}{\sqrt{1+\sin x} - \sqrt{1-\sin x}} \right\} = \frac{\pi}{2} - \frac{x}{2}$ , If  $\frac{\pi}{2} < x < \pi$ .

Q.4 (i) if  $\cos^{-1} \frac{x}{a} + \cos^{-1} \frac{y}{b} = \alpha$ , prove that,  $\frac{x^2}{a^2} - \frac{2xy}{ab} \cos \alpha + \frac{y^2}{b^2} = \sin^2 \alpha$ . (3)

(ii) if  $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = \pi$  prove that  $x^2 + y^2 + z^2 + 2xyz = 1$ . (3)

Q.5 Prove that:  $\tan \left\{ \frac{\pi}{4} + \frac{1}{2} \cos^{-1} \frac{a}{b} \right\} + \tan \left\{ \frac{\pi}{4} - \frac{1}{2} \cos^{-1} \frac{a}{b} \right\} = \frac{2b}{a}$ . (3)

Q.6 Find the value of  $\tan^{-1} \left( \frac{x}{y} \right) - \tan^{-1} \left( \frac{x-y}{x+y} \right)$ . (2)

Q.7 Write the value of  $\tan^{-1} \frac{a}{b} - \tan^{-1} \left( \frac{a-b}{a+b} \right)$ . (2)

Q.8 Write the value of  $\tan^{-1} \left\{ 2 \sin \left( 2 \cos^{-1} \frac{\sqrt{3}}{2} \right) \right\}$ . (2)

Q.9 If  $\cos^{-1} \frac{x}{2} + \cos^{-1} \frac{y}{3} = \theta$ , then  $9x^2 - 12xy \cos \theta + 4y^2$  is equal to? (2)

Q.10  $\tan^{-1} \left( \frac{\cos x}{1 - \sin x} \right), -\frac{\pi}{2} < x < \frac{\pi}{2}. \quad (2)$