Note:-
1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1 Select and write the correct answer. **(4)**

1. If $\sqrt{3}\cos x - \sin x = 1$, then general value of x is _____

   A) $2n\pi \pm \dfrac{\pi}{3}$ B) $2n\pi \pm \dfrac{\pi}{6}$

   C) $2n\pi \pm \dfrac{\pi}{3} - \dfrac{\pi}{6}$ D) $n\pi \pm (-1)^n \dfrac{\pi}{3}$

2. If cos pθ = cos qθ, p $\neq$ q then _____

   A) $\theta = \dfrac{2n\pi}{p \pm q}$ B) θ = 2nπ

   C) θ = 2nπ ± p D) nπ ± q

Q.2 Answer the following.

(3)

1. Find the general solutions of $\cot\theta = 0$

2. Find the general solutions of $\cos\theta = \dfrac{\sqrt{3}}{2}$

3. Find the general solutions of $\tan\theta = \dfrac{1}{\sqrt{3}}$

Section B
Attempt any Four

Q.3 Show that $\tan^{-1}\dfrac{1}{2} - \tan^{-1}\dfrac{1}{4} = \tan^{-1}\dfrac{2}{9}$ **(2)**

Q.4 If x, y, z, are positive then prove that **(2)**
$\tan^{-1}\dfrac{x - y}{1 + xy} + \tan^{-1}\dfrac{y - z}{1 + yz} + \tan^{-1}\dfrac{z - x}{1 + zx} = 0$

Q.5 Find the principal value of $\cos^{-1}\left(-\dfrac{1}{2}\right)$ **(2)**

Q.6 Find the general solutions of $\tan\dfrac{2\theta}{3} = \sqrt{3}$ **(2)**

Q.7 Find the principal solutions of $\cos\theta = \dfrac{1}{2}$ **(2)**

Q.8 Find the principal value of $\sin^{-1}\left(\dfrac{1}{2}\right)$ **(2)**

Section C
Attempt any Two

Q.9 Find the cartesian co-ordinates of the point whose polar co-ordinates are $\left(\dfrac{1}{2}, \ \dfrac{7\pi}{3} \right)$ **(3)**

Q.10 Prove that $\sin^{-1}\left(\dfrac{1}{\sqrt{2}} \right) - 3\sin^{-1}\left(\dfrac{\sqrt{3}}{2} \right) = \dfrac{-3\pi}{4}$ **(3)**

Q.11 Find the principal solutions of $\tan 5\theta = -1$ **(3)**

Section D
Attempt any One

Q.12 In $\triangle ABC$ if $\angle A = 45^\circ$, $\angle B = 60^\circ$ then find the ratio of its sides. **(4)**

Q.13 Show that $2\cot^{-1}\dfrac{3}{2} + \sec^{-1}\dfrac{13}{12} = \dfrac{\pi}{2}$ **(4)**