10. Let z and ω be two non zero complex numbers such that $|z| = |\omega|$ and $\text{Arg}\, z + \text{Arg}\, \omega = \pi$, then z equals *(1995S)*

(a) ω (b) $-\omega$ (c) $\overline{\omega}$ (d) $-\overline{\omega}$

(b) Let $|z| = |\omega| = r$

$\therefore z = re^{i\theta}, \ \omega = re^{i\phi}$ where $\theta + \phi = \pi$.

$\therefore z = re^{i(\pi - \phi)} = re^{i\pi} . e^{-i\phi} = -re^{-i\phi} = -\bar{\omega}$. $[\because \ \bar{\omega} = re^{-i\phi}]$

11. If z_1 and z_2 are two non- zero complex numbers such that $|z_1 + z_2| = |z_1| + |z_2|$, then arg z_1 − arg z_2 is equal to

[2005]

(a) $\frac{\pi}{2}$ (b) $-\pi$ (c) 0 (d) $\frac{-\pi}{2}$

1. (c) $|z_1 + z_2| = |z_1| + |z_2| \Rightarrow z_1$ and z_2 are collinear and are to the same side of origin; hence arg z_1 − arg $z_2 = 0$.

7. Let z and w be complex numbers such that $\bar{z} + i\bar{w} = 0$ and $\arg zw = \pi$. Then $\arg z$ equals [2004]

(a) $\frac{5\pi}{4}$ (b) $\frac{\pi}{2}$ (c) $\frac{3\pi}{4}$ (d) $\frac{\pi}{4}$

7. (c) $\arg zw = \pi \Rightarrow \arg z + \arg w = \pi$...(1)

$\bar{z} + i\bar{w} = 0 \Rightarrow \bar{z} = -i\bar{w}$

$\therefore z = iw \Rightarrow \arg z = \frac{\pi}{2} + \arg w$

$\Rightarrow \arg z = \frac{\pi}{2} + \pi - \arg z$ (from(1)) $\therefore \arg z = \frac{3\pi}{4}$