3. $X_C = \frac{1}{j2\pi fC}$

$\therefore X_C \propto \frac{1}{fC}$

$$V_{out} = \frac{X_C}{X_C + R} \cdot V_{in}$$

$\Rightarrow V_{out} \propto \frac{f}{f+R} . V_{in}$ $\quad f \to 0 \quad V_{out} \to 0$

$\quad f \to \infty \quad V_{out} \to 1 . V_{in}$

As frequency (of input sine) is increased, the output voltage of the given circuit will increase.

4. $V_{out} = 0.3\ V$, reading $= -10$ dB(RMS) $\quad$ VU = 0

$\therefore 20\log\left(\frac{0.3}{V_{ref}}\right) = -10$

$\Rightarrow V_{ref} = 0.3\sqrt{10} = 0.9486\ V$

$\therefore$ dBV is the reference voltage

5. Mixer input level +4dBu

$20\log\left(\frac{V_{in}}{0.775}\right) = 4$

$\Rightarrow V_{in} = 1.228\ V$

BO-8 meter reads 0 VU at Voltage = 0.3

$\therefore$ mixer VU will read $= 20\log\left(\frac{0.3}{1.228}\right) = -12.24$ dB