Lecture 47

1. Discuss in brief how wattmeter readings vary
   i) when pf of the load is unity
   ii) when pf of the load is > 0.5
   iii) when pf of the load = 0.5
   iv) when pf of the load is < 0.5

Solution:

Phase Angle, ϕ	Load Power factor, cosϕ	$W_1 = V_L I_L \cos(30+\phi)$	$W_2 = V_L I_L \cos(30-\phi)$	Comments
0°	1	$\frac{\sqrt{3}V_L I_L}{2}$	$\frac{\sqrt{3}V_L I_L}{2}$	$W_1 = W_2$
30°	0.866 Lag	$\frac{V_L I_L}{2}$	$V_L I_L$	$W_1 = \frac{W_2}{2}$
60°	0.5 Lag	0	$\frac{\sqrt{3}V_L I_L}{2}$	$W_1 = 0$; $W_2 = P_{3-phase}$
>60°	< 0.5 Lag	Negative	Positive	W_1 = -ve; W_2 = +ve