97. Solution: C

We are given $f(t_1, t_2) = 2/L^2$, $0 \le t_1 \le t_2 \le L$.

Therefore, $E[T_1^2 + T_2^2] = \int_0^L \int_0^{t_2} (t_1^2 + t_2^2) \frac{2}{L^2} dt_1 dt_2 =$

$$\frac{2}{L^2}\left\{\int_0^L \left[\frac{t_1^3}{3} + t_2^2 t_1\right]_0^{t_2} dt_1\right\} = \frac{2}{L^2}\left\{\int_0^L \left(\frac{t_2^3}{3} + t_2^3\right) dt_2\right\}$$

$$= \frac{2}{L^2}\int_0^L \frac{4}{3} t_2^3 dt_2 = \frac{2}{L^2}\left[\frac{t_2^4}{3}\right]_0^L = \frac{2}{3}L^2$$