**Derivation of initial counter value:**

02.

XTAL = 16MHz → Txtal \_clock = 1 /16 µs

Maximum pre scalar is 1:1024. So,

Prescaler = 1:1024 → Tcounter\_clock = 1024 × 1 /16 µs = 64µs

Counter increments needed = 500 000µs / 64µs = 7812.5 increments

But the maximum increment value is 256. So this delay can not be performed.

03.

XTAL = 16MHz → Txtal \_clock = 1 /16 µs

Maximum pre scalar is 1:1024. So,

Prescaler = 1:1024 → Tcounter\_clock = 1024 × 1 /16 µs = 64µs

Maximum delay = 256 x 64µs = 16384 µs