Q4) Find the stochastic differentiation of $W^2(t)$?

Ans) Using Ito - Doblin Integration formula for stochastic calculus, we get

$$dW^2(t) = dt + 2\,W(t)\,dW(t)$$

Using equivalent integral condition $W(0) = 0$, we get

$$W^2(t) = t + 2\int_0^t W(t)\,dW(t)$$

$$\int_0^T W(t)\,dW(t) = \frac{1}{2}W^2(t) - \frac{t}{2}$$

$\therefore W(t)$ is Ito process