

↳ of sample exam



$$u(q + \delta q, t) = u(q, t) + u_q \cdot [(q + \delta q) - q] + \text{HOT}$$

$$u(q + \delta q, t) \cong u(q, t) + \underbrace{u_q \cdot \delta q}$$

$$\boxed{\delta u = u_q \cdot \delta q}$$



$$\delta(a^T b) = a^T \cdot \delta b + b^T \cdot \delta a$$

$$(a^T b)_q = a^T \cdot b_q + b^T \cdot a_q$$

$$\delta(a^T b) = (a^T b)_q \cdot \delta q = (a^T b_q + b^T a_q) \cdot \delta q$$

$$= \underbrace{a^T b_q \cdot \delta q}_{\delta b} + \underbrace{b^T a_q \cdot \delta q}_{\delta a} = a^T \delta b + b^T \delta a$$