

حل التمرين 01

حالة الدوران حول محور ثابت	حالة الإزاحة	
$E_c = \frac{1}{2} J_{\Delta} \omega^2$ $\omega(\text{rd.s}^{-1}) \quad J_{\Delta}(\text{kg.m}^2) \quad E_c(\text{J})$	$E_c = \frac{1}{2} mv^2$ $v(\text{m.s}^{-1}) \quad m(\text{kg}) \quad E_c(\text{J})$	تعبير الطاقة الحركية
$E_{c_f} - E_{c_i} = \sum W(\vec{F}_{ext})$ $\frac{1}{2} J_{\Delta} \omega_f^2 - \frac{1}{2} J_{\Delta} \omega_i^2 = \sum W(\vec{F}_{ext})$	$E_{c_f} - E_{c_i} = \sum W(\vec{F}_{ext})$ $\frac{1}{2} mv_f^2 - \frac{1}{2} mv_i^2 = \sum W(\vec{F}_{ext})$	مبرهنة الطاقة الحركية

$$E_c = \frac{1}{2} \times 9,11 \cdot 10^{-31} \times (10^5)^2 \Rightarrow E_c = 4,55 \cdot 10^{-21} \text{ J} \quad -1$$

$$E_c = \frac{1}{2} \times 150 \cdot 10^3 \times \left(\frac{900 \cdot 10^3}{3600}\right)^2 \Rightarrow E_c = 4,69 \cdot 10^9 \text{ J} \quad -2$$

-3

$$E_c = \frac{1}{2} J_{\Delta} \omega^2 = \frac{1}{2} \frac{2}{5} M_T R_T^2 \cdot \left(\frac{2\pi}{T}\right)^2$$

$$E_c = \frac{1}{5} \times 6 \cdot 10^{24} \times (6400 \cdot 10^3)^2 \times \frac{4\pi^2}{(23 \times 3600 + 56 \times 60 + 4)^2}$$

$$E_c = 2,6 \cdot 10^{29} \text{ J}$$

-4

$$E_c = \frac{1}{2} J_{\Delta} \omega^2 = \frac{1}{2} \frac{1}{2} mr^2 \omega^2$$

$$E_c = \frac{1}{4} \times 1 \times (10 \cdot 10^{-2})^2 \times \left(\frac{1800 \times 2\pi}{60}\right)^2$$

$$E_c \approx 89 \text{ J}$$