

# ESERCIZIO

MOTORE 4T  $\Rightarrow E = 2$

Z: NUMERO CILINDRI = 6

$P_{e_{TOT}} = 55 \text{ kW} = 55 \cdot 10^3 \text{ W}$

$n = 3500 \text{ giri/min}$

$p_{mi} = 7.6 \text{ bar} = 7.6 \cdot 10^5 \text{ Pa}$

$D = 80 \text{ mm} = 0.08 \text{ m}$

$C = 100 \text{ mm} = 0.1 \text{ m}$

$H_i = 41 \frac{\text{MS}}{\text{kg}} = 41 \cdot \frac{10^6 \text{ S}}{\text{kg}}$

$M_{se} = 280 \text{ g/kWh}$

$M_m = ? \text{ V}$

$P_i = ? \text{ V}$

$\eta_m = ? \text{ V}$

$m_h = ? \text{ V}$

$\eta_f = ? \text{ V}$

$V = \frac{\pi D^2}{4} \cdot C = \frac{\pi}{4} \cdot 0.08^2 \cdot 0.1 = 5.03 \cdot 10^{-4} \text{ m}^3$

$V_{TOT} = Z \cdot V = 6 \cdot 5.03 \cdot 10^{-4} \text{ m}^3 = 3.02 \cdot 10^{-3} \text{ m}^3$

$P_{i_{TOT}} = \frac{p_{mi}}{60 \text{ s}} \cdot V_{TOT} = \frac{7.6 \cdot 10^5 \text{ Pa}}{60 \text{ s}} \cdot 3.02 \cdot 10^{-3} \text{ m}^3 \cdot \frac{3500}{60 \cdot 2}$

$= 66943 \text{ W} = 66.94 \text{ kW}$

$P_e = M_m \omega = M_m \frac{2\pi n}{60} \Rightarrow M_m = \frac{P_e \cdot 60}{2\pi n} = \frac{55 \cdot 10^3 \text{ W} \cdot 60}{2\pi \cdot 3500}$

$= 150 \text{ N}\cdot\text{m}$

$\eta_m = \frac{L_e}{L_i} = \frac{P_e \cdot t}{P_i \cdot t} = \frac{55 \cdot 10^3 \text{ W}}{66.94 \cdot 10^3 \text{ W}} = 0.82 \Rightarrow 82\%$

$P_e = \frac{L_e}{t}$

$P_i = \frac{L_i}{t}$

$$m_{sc} = \frac{3600}{\eta_g \cdot H_i} \quad [g/kWh]$$

$$1 \text{ kW} = 3600 \text{ kJ}$$

$$\eta_g = \frac{3600}{m_{sc} \cdot H_i} = \frac{3600}{0.280 \frac{\text{kg}}{\text{kWh}} \cdot 41 \cdot 10^3 \frac{\text{kJ}}{\text{kg}}} = 0.314 \Rightarrow 31.4 \%$$

$$m_{sc} \quad [g/kWh]$$

$$m_n = m_{sc} \cdot P_e = 280 \frac{g}{kWh} \cdot 55 \text{ kW} = 15400 \text{ g/h} = 15.4 \text{ kg/h}$$