

1 (1) 角速度 $\omega = 8.0 \text{ rad/s}$

$$\omega = \frac{2\pi n}{60} \rightarrow n = \frac{60\omega}{2\pi} = \frac{60 \times 8.0}{2\pi} = 76.4 \text{ rpm}$$

(2) 回転数 $n = 50 \text{ rpm}$

$$\omega = \frac{2\pi n}{60} = \frac{2\pi \times 50}{60} = 5.24 \text{ rad/s}$$

(3) 角速度 $\omega = 6.0 \text{ rad/s}$

$$v = r\omega = 5 \times 10^{-3} [\text{m}] \times 6.0 [\text{rad/s}] = 0.03 \text{ m/s}$$

(4) 回転数 15 rpm

$$v = r\omega = r \times \frac{2\pi n}{60} = 0.4 \times 10^{-2} [\text{m}] \times \frac{2\pi \times 15}{60} = 6.28 \times 10^{-3} \text{ m/s}$$

2 (1) $F = Mg = 50 [\text{kg}] \times 9.8 [\text{m/s}^2] = 490 [\text{N}]$

$$P = Fv = 490 [\text{N}] \times 3 [\text{m/s}] = 1470 [\text{W}]$$

(2) $T = F \times r = 490 [\text{N}] \times 150 \times 10^{-3} [\text{m}] = 73.5 [\text{N}\cdot\text{m}]$

(3) $v = r\omega \rightarrow \omega = \frac{v}{r} = \frac{3.0 [\text{m/s}]}{0.15 [\text{m}]} = 20 [\text{rad/s}]$

(4) $P = T\omega = 73.5 [\text{N}\cdot\text{m}] \times 20 [\text{rad/s}] = 1470 [\text{W}]$