Lösungen

1

Daten

```
m1 = 15 ug;      ug = 1 / 1000 ukg;
r = 20 ucm;      ucm = 1 / 100 um;
u = 160 / uMin;  uMin = 60 usec;
n = 120;
M = n * m1;

{m1, r, u, n, M} // N
```

$$\left\{0.015\,\text{ukg},\ 0.2\,\text{um},\ \frac{2.66667}{\text{usec}},\ 120.,\ 1.8\,\text{ukg}\right\}$$

a

```
Traegheitsmoment = M * r^2 // N
```

$$0.072\,\text{ukg}\,\text{um}^2$$

b

```
ω = u 2 Pi
```

$$\frac{16\,\pi}{3\,\text{usec}}$$

```
ω // N
```

$$\frac{16.7552}{\text{usec}}$$

```
Energie = 1 / 2 Traegheitsmoment * ω^2
```

$$\frac{10.1065\,\text{ukg}\,\text{um}^2}{\text{usec}^2}$$

c

```
α = ω / usec // N
```

$$\frac{16.7552}{\text{usec}^2}$$

Moment = Traegheitsmoment * α

$$\frac{1.20637\ \text{ukg um}^2}{\text{usec}^2}$$

2

Daten

```
m1 = 10 ug;      ug = 1 / 1000 ukg;
r = 25 ucm;      ucm = 1 / 100 um;
u = 140 / uMin;  uMin = 60 usec;
n = 110;
M = n * m1;

{m1, r, u, n, M} // N
```

$$\left\{0.01\ \text{ukg}, 0.25\ \text{um}, \frac{2.33333}{\text{usec}}, 110., 1.1\ \text{ukg}\right\}$$

a

```
Traegheitsmoment = M * r^2 // N
```

$$0.06875\ \text{ukg um}^2$$

b

```
ω = u 2 Pi
```

$$\frac{14\ \pi}{3\ \text{usec}}$$

```
ω // N
```

$$\frac{14.6608}{\text{usec}}$$

```
Energie = 1 / 2 Traegheitsmoment * ω^2
```

$$\frac{7.3885\ \text{ukg um}^2}{\text{usec}^2}$$

c

```
α = ω / usec // N
```

$$\frac{14.6608}{\text{usec}^2}$$

Moment = Traegheitsmoment * α

$$\frac{1.00793\ \text{ukg}\ \text{um}^2}{\text{usec}^2}$$