Question 2.

relative error rate = $\frac{\text{error}}{\text{approximate value.}}$ (FORMULAR)

(a.)

$V = 10.8 \pm 0.6$ km/h

relative error rate of $V = \frac{0.6}{10.8} \approx 5.56\%$

$t = 3.5 \pm 0.1$ h

relative error rate of $t = \frac{0.1}{3.5} \approx 2.86\%$

$\gamma = 0.001 \pm 0.000025$ kg/m²

relative error rate of $\gamma = \frac{0.000025}{0.001} = 2.5\%$

$W = 25 \pm 0.5$ m

relative error rate of $W = \frac{0.5}{25} = 2\%$

(b.)

$V = 10.8 \pm 0.6$ km/h $= 3 \pm 0.1667$ m/s

relative error rate of V in m/s $= \frac{0.1667}{3} \approx 5.56\%$

$t = 3.5 \pm 0.1$ h $= 12600 \pm 360$ s

relative error rate of t in s $= \frac{360}{12600} \approx 2.86\%$

Conclusion:
relative error rate will not change. if we convert unit.

(c.)

$$a = V \times t \times W$$

$$= (3 \pm 0.1667) \times (12600 \pm 360) \times (25 \pm 0.5)$$

$$= (3 \times 12600 \pm \underbrace{3 \times 360 \pm 12600 \times 0.1667}_{\text{error}} \pm \underbrace{0.1667 \times 360}_{\text{will be omitted}}) \times (25 \pm 0.5)$$

$$= (37800 \pm 1080 \pm 2100.42) \times (25 \pm 0.5)$$

$$= (37800 \pm 3180.42) \times (25 \pm 0.5)$$

$$= \underbrace{37800 \times 25 \pm 37800 \times 0.5 \pm 3180.42 \times 25}_{\text{error}} \pm \underbrace{3180.42 \times 0.5}_{\text{will be omitted}}$$

$$= 945000 \pm 18900 \pm 79510.5$$

$$= 945000 \pm 98410.5 \ m^2$$

$$\text{error} = \pm 98410.5 \ m^2$$

$$\text{relative error rate} = \frac{98410.5}{945000} \approx 10.41\%$$

(d.)

$$P = a \times r \ kg$$

$$= (945000 \pm 98410.5) \times (0.001 \pm 0.000025)$$

$$= 945000 \times 0.001 \pm \underbrace{943000 \times 0.000025 \pm 98410.5 \times 0.001}_{\text{error}}$$

$$= 945000 \times 0.001 \pm 0.000025$$

$\pm$ 9845.5 x 0.[illegible]

will be omitted

$= 945 \pm 23.625 \pm 98.4105$

$= 945 \pm 122.0355$ kg

error $= \pm 122.0355$ kg

relative error rate $= \frac{122.0355}{945} \approx 12.91\%$

(e.) Brett need at least $945 + 122.0355 = 1067.0355$ kg

(f.) maximum amounts of leftover is

$122.0355 \times 2 = 244.071$ kg