

42. (a) We use Eq. 9-42. The thrust is

$$\begin{aligned} R v_{\text{rel}} &= Ma \\ &= (4.0 \times 10^4 \text{ kg}) (2.0 \text{ m/s}^2) \\ &= 8.0 \times 10^4 \text{ N} . \end{aligned}$$

(b) Since  $v_{\text{rel}} = 3000 \text{ m/s}$ , we see from part (a) that  $R \approx 27 \text{ kg/s}$ .