

9(a) (i) Thrust = weight of oil 5

$$= \rho Vg$$

$$= 850 \cdot \frac{22}{7} \cdot \frac{7}{4} \cdot 4 \cdot 10 \quad 5$$

$$= 327250 \text{ N} \quad 5 \quad 15$$

(ii) Volume = mass ÷ density

$$= 750 \div 2500 \quad 5$$

$$= 0.3 \text{ m}^3$$

Let x be new depth of oil

$$\Rightarrow \pi r^2(x - 4) = 0.3$$

$$(x - 4) = (0.3) \cdot \frac{7}{22} \cdot \frac{1}{3.0625} \quad 5$$

$$= 0.031$$

$$x = 4.031 \text{ m} \quad 5 \quad 15$$

(b) weight of displaced liquid = weight of hydrometer 5

$$1200 \cdot V \cdot g = 0.06g \quad 5, 5$$

$$\Rightarrow V = 0.00005 \text{ m}^3 \text{ or } 50 \text{ cc} \quad 5 \quad 20$$