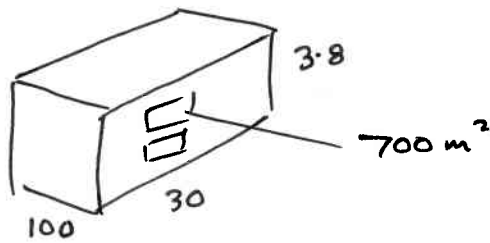


Qu. 2



$$\Delta T = 19 - (-1) \\ = 20 \text{ K}$$

	U-value	Area	UA ΔT
Floor	0.15	100 x 30	9000
Roof	0.90	100 x 30	54000
Glazing	5.6	700	78400
Walls	1.1	2 x 130 x 3.8 - 700	6336

(W/m²K)

(m²)

147,736 Watts

or 147.7 kW

Ventilation losses :-

Assume $\rho_{\text{air}} = 1.2 \text{ kg/m}^3$

$$\dot{m}_v = \frac{100 \times 30 \times 3.8 \times 1.2}{3600} \times 3$$

$$= 3.80 \text{ kg/s} \times 3$$

$$= \underline{\underline{11.4 \text{ kg/s}}}$$

$$\therefore \dot{Q}_{\text{vent}} = \dot{m}_v C_p \Delta T$$

$$= 11.4 \times 1.01 \times 20 = \underline{\underline{230.3 \text{ kW}}}$$

$$\therefore \text{Total heating load} = 147.7 + 230.3$$

$$= \underline{\underline{378 \text{ kW}}}$$