Question 3

Given data.

S/No	Days.	Average Ambient temperature: Day	Night
1	Monday 17/02/20	35°C	25°C
2	Tuesday 18/02/20	36°C	25°C
3	Wednesday 19/02/20	35°C	25°C
4	Thursday 20/02/20	36°C	25°C
5	Friday 21/02/20	37°C	25°C

179°C (Typical)

To Calculate Thermal Energy (J).

$Q = mc\Delta T$ where Q = Thermal Energy (J)

m = mass (kg)

c = Specific heat (J/kg°C)

ΔT = Change in temperature °C

Step 1 → Calculate ΔT.

For Monday $(\Delta T) = 35 - 25 = 10°C$

Tuesday $(\Delta T) = 36 - 25 = 11°C$

Wednesday $(\Delta T) = 35 - 25 = 10°C$

Thursday $(\Delta T) = 36 - 25 = 11°C$

Friday $(\Delta T) = 37 - 25 = 12°C$.

Step 2 → Taking the following Assumptions.

Area of land in Abuad $(A) = 1{,}300{,}000m^2$

Recall the formular form $\rho_A = m/A$

where ρ_A = Average Area density

m = mass of object.

A = Area of Object is $1.67 kg/m^2$

$\therefore \rho_A = m/A$,

$m = \rho_A \times A = 1.67 \times 1{,}300{,}600 = 2{,}171{,}000 kg$.

Recall the Specific heat Capacity table for Air.

At ~~temperature~~ 450K

Specific heat Capacity of Air is 1020 J/kg°C

~~For~~ Step 3. -> Calculate the thermal Energy

For monday.

$Q = mc\Delta T$.

$= 2171000 \times 1020 \times 10 = 22,144,200,000$ J.

For Tuesday.

$Q = mc\Delta T$

$= 2171000 \times 1020 \times 11 = 24,358,620,000$ J

For wednesday

$Q = mc\Delta T$

$= 2171000 \times 1020 \times 10 = 22,144,200,000$ J

For Thursday

$Q = mc\Delta T$.

$= 2171000 \times 1020 \times 11 = 24,358,620,000$ J

For Friday

$Q = mc\Delta T$.

$= 2171000 \times 1020 \times 12 = 26,573,040,000$ J

Therefore the Average thermal Energy of Aboud is

$$\frac{22,144200,000 + 24658629000 + 22,144200000 + 24868620000 + 26573040000}{5}$$

$$= \frac{119578680000}{5} = 23915736000 \text{ J.}$$