$T_{cell\,eff} = T_A + K\left(80\,H_{DAILY} + 15°C\right)$

SELECT THE TEMPERATURE LINE

K = TEMPERATURE COEFFICIENT OF THE MODULE

$\simeq 0.3\ (°C/w\text{-}m^2)$

H_{DAILY} = IRRADIATION ON TILTED PLANE

$T_{cell\,eff}$ = AVERAGE DAILY EFFECTIVE CELL TEMPERATURE

E

AT

V

RATURE

C

25°C

V

GING VOLTAGE

pb/ CALCULATE DAILY ENERGY OUT PUT OF 77 W MODULE FOR LEAD ACID BATTERY CHARGING. AMBIENT TEMPERATURE = 25°C

$f_{derate} = 1$, $V_{MODULE} = 14V$, IRRADIATION = $4\ wh/m^2$

MAXIMUM MODULE POWER RATING = 72 W, NOCT = 49°C

$H_{DAILY} = 4$

$E_{MODULE} = ?$

$E_{MODULE} = \underbrace{V_{MODULE}}_{14V} \times I_{TV} \times f_{man} \times \underbrace{f_{dirt}}_{f_{derate}=1} \times \underbrace{H_{daily}}_{4}$

$$\boxed{f_{man} = \frac{\text{MODULE POWER}}{\text{ENERGY OUTPUT}}} = \frac{72}{77} = 0.94$$

T_{cell}

K =

T_{cell}

I_{TV}

4.8 Amp

...ERGY OUT PUT OF 77 W MODULE FOR
CHARGING. AMBIENT TEMPERATURE = 25°C

...$= 14V$, IRRADIATION = $4\ \mathrm{Wh/m^2}$

...DULE

...WER RATING = 72 W, NOCT = 49°C

$f_{derate} = 1$

4

$\times I_{TV} \times f_{man} \times f_{dirt} \times H_{daily}$

$= \frac{72}{77} = 0.94$

...UT

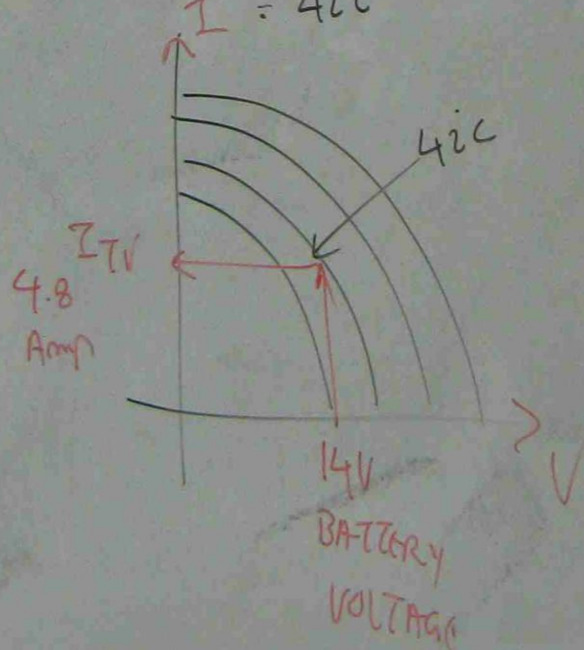
$$T_{cell} = T_A + k(80\ H_{daily} + 150)$$

$=$

$$K = \frac{NOCT - 20}{800} = \frac{49-20}{800} = 0.03625$$

$$T_{cell} = 25 + 0.03625(80 \times 4 + 150)$$

$= 42°C$



$E_{module} = 14 \times 4.8 \times 0.94 \times 1 \times$ ...

$= 253$ W-hr

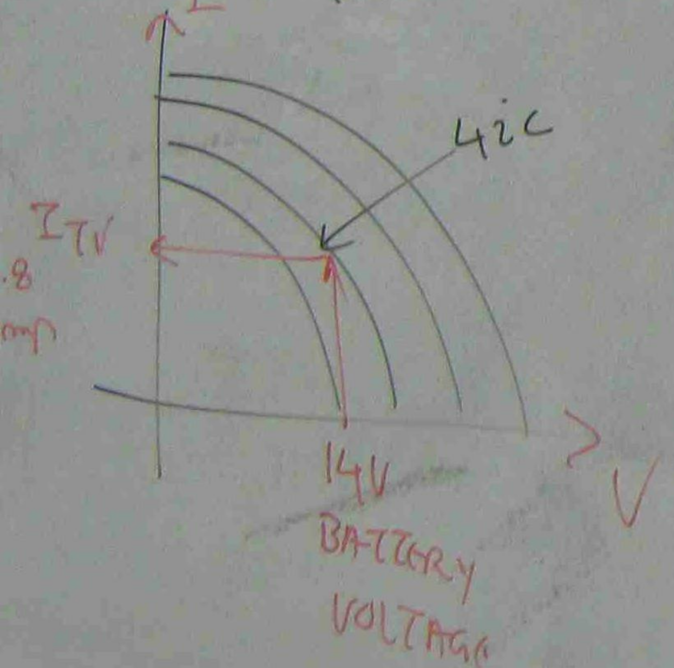
$$T_{cell} = T_A + k\,(80\;H_{daily} + 150)$$

$$=$$

$$k = \frac{NOCT - 20}{800} = \frac{49 - 20}{800} = 0.03625$$

$$T_{cell} = 25 + 0.03625\,(80 \times 4 + 150)$$

$$I = 42C$$



$$E_{module} = 14 \times 4.8 \times 0.94 \times 1 \times 4$$

$$= \underline{253\ \text{W-hr}}$$