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AE 4361 HW 8 Workspace

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```
clear
close all
clc
```

Q1

Part a

```
mf = 1000;           % [kg]
ve = 4400;           % [m/s]
dv = 9400+3260+680+1730; % [m/s]
```

```
mi = mf/(exp(-dv/ve))
```

```
% Part b
mass_fac = (exp(-dv/ve))*100
```

```
% Part c
dv_intercept = 9400+3260;           % [m/s]
mi_intercept = mf/(exp(-dv_intercept/ve))
```

```
% Part d
dv_int_surf = 680+1730;           % [m/s]
mi_int_surf = mf/(exp(-dv_int_surf/ve))
```

```
% Part e
mass_fac_e = mf*100/(mi_int_surf+mi_intercept-1000)
```

```
mi =
```

```
3.0723e+04
```

```
mass_fac =
```

```
3.2549
```

```
mi_intercept =
```

1.7766e+04

mi_int_surf =

1.7293e+03

mass_fac_e =

5.4068

Q3

```
a = 0.6;
e = 0.8;
SB_const = 5.67E-8; % [W/(m^2 K^4)]
A_in_min = 0.1^2; % [m^2]
A_in_max = 0.01299; % [m^2]
A_out = 6*0.1^2; % [m^2]
I_earth = 1366; % [W/m^2]

% Part a
P_in_min = I_earth * a * A_in_min; % [W]
P_in_max = I_earth * a * A_in_max; % [W]

P_o = e*SB_const*A_out;

T_min_K = ((P_in_min)/(P_o))^(1/4); % [K]
T_max_K = ((P_in_max)/(P_o))^(1/4); % [K]

T_min = T_min_K -273.15 % [C]
T_max = T_max_K -273.15 % [C]

% Part b
P_int = 8;
T_min_K = ((P_in_min+P_int)/(P_o))^(1/4); % [K]
T_max_K = ((P_in_max+P_int)/(P_o))^(1/4); % [K]

T_min_b = T_min_K -273.15 % [C]
T_max_b = T_max_K -273.15 % [C]

% Part c
I_mars = I_earth/1.5^2;
P_int_mars = P_int/1.5^2;

P_in_min_mars = I_mars * a * A_in_min; % [W]
P_in_max_mars = I_mars * a * A_in_max; % [W]
T_min_K = ((P_in_min_mars+P_int_mars)/(P_o))^(1/4); % [K]
T_max_K = ((P_in_max_mars+P_int_mars)/(P_o))^(1/4); % [K]
```

```
T_min_mars = T_min_K -273.15      % [C]
T_max_mars = T_max_K -273.15      % [C]
```

```
T_min =
    -38.8920
```

```
T_max =
    -23.0580
```

```
T_min_b =
     4.5948
```

```
T_max_b =
    14.5539
```

```
T_min_mars =
   -46.3724
```

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