Question: Problem HW4P4 (16 points) Early explorers often estimated alt...

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this is a matlab question

Problem HW4P4 (16 points)

Early explorers often estimated altitude by measuring the temperature of boiling water. The relationship between the height, pressure and boiling temperatures is shown by the following two equations.

$$p = 29.921(1 - 6.8753 \times 10^{-6}h), \quad T_b = 49.161 \ln p + 44.932$$

where p is atmospheric pressure in inches of mercury, T_b is the boiling temperature in °F, and h is the altitude in ft.

a) (8 pts) Write a script file HW4P4a.m that does the following:

1. (1 pt) Creates a variable H for the altitude which must go from −500 ft to 10,000 ft at an increment of 500 ft,
2. (3pts) Uses the previous 2 equations to determine P and T_b,
3. (2 pts) Creates a table of three columns, the first is the altitude in ft, the second is the pressure in inches of mercury and the third is the boiling temperature in °F,
4. (2 pts) Saves the table values in an ascii file format called HW4P4a.txt.

If it is required to convert all the units to SI system where the height will be in meters, the pressure in bar and the temperature in °C. This can be done using the following conversion equations:

$$h(m) = h(ft) \times 0.3048$$
$$p(bar) = b(inch\ mercury) \times 0.03386$$
$$T(°C) = (T(°F) - 32) \times 5/9$$

b) (8 pts) Write another script file HW4P4b.m that does the following:

1. (1 pt) Loads the data file HW4P4a.txt and assign it to a variable HPT_En,
2. (2 pts) Assigns the first column to a variable H_ft, the second column to a variable P_inHg and the third column to a variable T_F,
3. (3 pts) Uses the previous equations to find the corresponding variables in SI, H_m, P_bar and T_C.
4. (2 pts) Creates a Table_SI of the SI variables and displays this table in the Command Window without using neither the **`disp`** function nor the **`fprintf`** function.

Use format `short g` for this problem.

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Expert Answer

Peter Adams answered this
796 answers

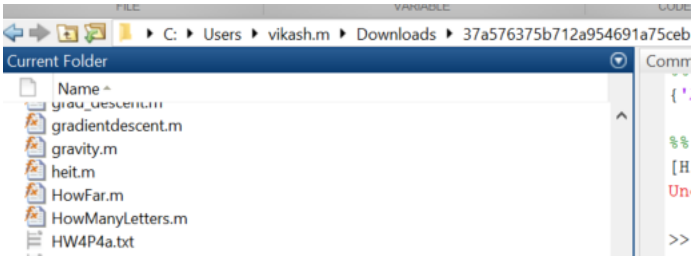
Was this answer helpful? 0 0

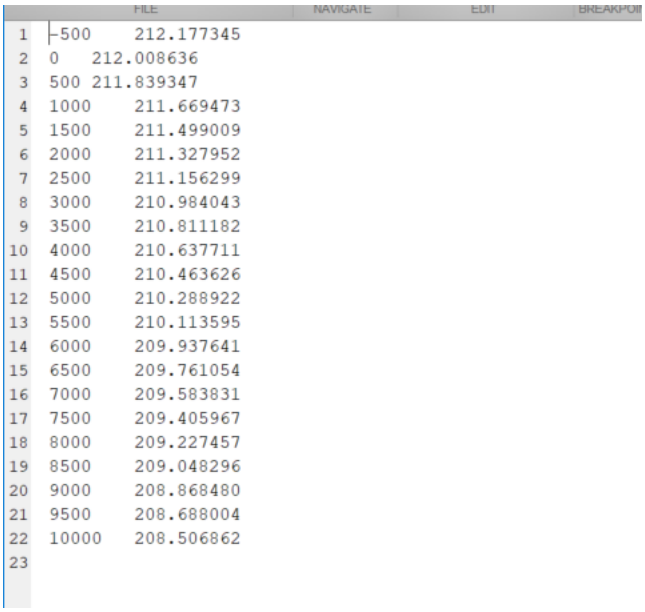
a)

Program code screen shot: HW4P4.m

```
%% The relationship between the height, pressure
%% and boiling temperature
%% The pressure equation to determine the pressure
p = @(h) 29.921*(1 - 6.8753*10^(-6)*h);

%% The temperature equation to determine the temperature
T = @(p) 49.161*log(p)+ 44.932;

%% save the file HW4Prob4.txt
fid = fopen('HW4P4a.txt','w');

%% Create the variable H for the altitude which
%% must go from -500ft
%% to 10,000 ft with increment of 500 ft
for H = -500:500:10000

    %% write the values into the file
    fprintf(fid,'%d\t%f\n',H,T(p(H)));
end
```

Sample output:





```
-500    212.177345
0   212.008636
500 211.839347
1000    211.669473
1500    211.499009
2000    211.327952
2500    211.156299
3000    210.984043
3500    210.811182
4000    210.637711
4500    210.463626
5000    210.288922
5500    210.113595
6000    209.937641
6500    209.761054
7000    209.583831
7500    209.405967
8000    209.227457
8500    209.048296
9000    208.868480
9500    208.688004
10000   208.506862
```

Program code to copy:

%% The relationship between the height, pressure

%% and boiling temperature

%% The pressure equation to determine the pressure

p = @(h) 29.921*(1 - 6.8753*10^(-6)*h);

%% The temperature equation to determine the temperature

T = @(p) 49.161*log(p)+ 44.932;

%% save the file HW4Prob4.txt

fid = fopen('HW4P4a.txt','w');

%% Create the variable H for the altitude which

%% must go from -500ft

%% to 10,000 ft with increment of 500 ft

for H = -500:500:10000

  %% write the values into the file

  fprintf(fid,'%d %f ',H,T(p(H)));

end

---

b)

Program code screen shot:

```
%% Load the HW4P4a.txt data file
load('HW4P4a.txt');

%% Change the display the style format to short g
format short g;

%% by the help of HLoaded to copy the 1st column
Hloaded = HW4P4a(:,1);

%% by the help of TLoaded to copy the 1st column
Tloaded = HW4P4a(:,2);

%% Display the result from this message
{'Altitude','Boiling Temperature';'(ft)','(degF)'}

%% Display the result without using disp or fprintf
[Hloaded Tloaded]
```

Sample output:

```
ans =

  2×2 cell array

    'Altitude'    'Boiling Temperature'
    '(ft)'        '(degF)'


ans =

        -500       212.18
           0       212.01
         500       211.84
        1000       211.67
        1500        211.5
        2000       211.33
        2500       211.16
        3000       210.98
        3500       210.81
        4000       210.64
        4500       210.46
        5000       210.29
        5500       210.11
        6000       209.94
        6500       209.76
        7000       209.58
        7500       209.41
        8000       209.23
        8500       209.05
        9000       208.87
        9500       208.69
       10000       208.51

>>
```

Program code to copy:

%% Load the HW4P4a.txt data file

load('HW4P4a.txt');

%% Change the display the style format to short g

```
format short g;

%% by the help of HLoaded to copy the 1st column

Hloaded = HW4P4a(:,1);

%% by the help of TLoaded to copy the 1st column

Tloaded = HW4P4a(:,2);

%% Display the result from this message

{'Altitude','Boiling Temperature';'(ft)','(degF)'}

%% Display the result without using disp or fprintf

[Hloaded Tloaded]
```

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Q: MATLAB problem. Would like a detailed answer line by line.

A: See answer 100% (1 rating)

Q: NAME: LAB SECTION: Problem HW5P3 (20 points) Early explorers often estimated altitude by measuring the temperature of boiling water. The relationship between the altitude, pressure and boiling temperatures is shown by the following two equations. p=29.921(1 -6.8753 x 10-6h) (1). To = 49.161 lnp + 44.932 (2) where p is atmospheric pressure in inches of mercury, T) is the boiling...

A: See answer 100% (3 ratings)

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