Homework 3

Engineering

Question 3. 7 a) How many horsepower does a 100w household light bulb consume? Convert W to Kw = (100W)*(0. 001Kw/W 341hp/Kw)

= 0. 1341hp

b) How many kW does a 5hp lawn mower engine produce?

= 5hp *(0. 7457Kw/hp)

= 3. 729kW

Question 3. 13

a) Amount of fuel that was added(kg)

= 22, 300kg-(7, 682L)*(1. 77kg/L)

= 8, 702. 9KG

= 8. 703kg

b) Amount of fuel that ought to have been added(kg)

= 22, 300kg-(7682L)(1. 77lb/L)*[1/32. 2ft/s]*[14. 59kg/slug]

= 16, 139kg

c) Percent that the plane was under- fueled:

= [16139kg-8703kg]/16139kg* 100%

= 46. 07%

= 46. 1%

Question 3. 24

Verify that the Reynolds number is dimensionless using the SI. Reynolds number, ✕VD/ɨ̣,

In regard to the FLT system, the dimensions of the density, velocity, diameter and viscosity are depicted as FL-4T2, LT-1, L, and FL-2T respectively. Substituting these underlying dimensions into the corresponding definition of the Reynolds number:

In regard to the MLT sytem, the dimensions of the density, velocity, diameter

and visvosity are depicted as -3, LT-1, L, and ML-1T-1 respectively.

Substituting these underlying dimensions into the correponding definition of the Reynolds number:

Therefore, the Reynolds number is normally dimensionless regardless of the unit system utilized.

Question 3. 33

a) The number of cars that pass through an intersection of two busy streets during the evening committee on a typical work day

The average number will be 12, 500 automobiles assuming that all cars will be passing through the intersection ones

b) The number of bricks that form the exterior of a large building on a university campus

Assume that the size of the exterior of the large building is a square size measuring size 100 x 100 ft and the height as also taken as 100 ft. Also take the size of every brick to be 1ft x 6 inches. Therefore the number of the bricks will be

= (100*100*100)/ (1*6)

= 166, 666. 67

= 166, 167 bricks

c) The volume of concrete in the sidewalks on a university campus

Assume that the size of the exterior of the large building is a square size measuring size 100 x 100 ft and the height as also taken as 100 ft. Also assume that the sidewalks on a university campus are 300miles. Thus volume of the concrete will be

= (100*100*100)*300

= 300, 000, 000ft3

Work Cited

Pozrikidis, C. Fluid Dynamics: Theory, Computation, and Numerical Simulation. New York: Springer, 2009.