Unit 4 - Week 2

Assignment 2

The due date for submitting this assignment has passed. Due on 2019-08-21, 23:59 IST.
As per our records you have not submitted this assignment.

1) What is the dimension for drag coefficient? *1 point*

a) N/s
b) m/s
c) kg/N
d) Dimensionless

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
d

2) Bodies with a larger cross section will have_____ *1 point*

a) Lower drag
b) Higher drag
c) Same drag
d) No drag

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
b

3) Stokes' law is valid only when *1 point*

a) $Re_p \ll 1$
b) $Re_p \gg 1$
c) $Re_p = 1$
d) None of the these

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
a

4) Drag force acts in _____ as that of relative velocity. *1 point*

a) same direction
b) opposite direction
c) perpendicular
d) None of these

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
b

5) Drag coefficient predicted by Stokes' law is *1 point*

a) $C_D = \frac{64}{Re_p}$
b) $C_D = \frac{16}{Re_p}$
c) $C_D = \frac{24}{Re_p}$
d) None of these

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
c

6) For a streamlined body to achieve low drag coefficient, the boundary layer must_____ *1 point*

a) Flow over the body
b) Be attached to the body
c) Move away from the body
d) Move parallel to the body

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
b

7) The main property that affects a boundary layer is_____ *1 point*

a) Temperature
b) Pressure
c) Viscosity
d) Surface tension

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
c

8) The laminar boundary layer is a _____ *1 point*

a) Smooth flow
b) Rough flow
c) Uniform flow
d) Random flow

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
a

9) The turbulent boundary layer is a _____ *1 point*

a) Non-uniform with swirls
b) Uniform
c) Less stable
d) Smooth

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
a

10) For flow over a flat plate, the thickness of boundary layer increases in the _____ direction to the direction of flow. *1 point*

a) perpendicular
b) opposite
c) same
d) None of the above

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
c

11) A thin flat plate is placed parallel to a 4 m/s stream of water at 20° C. At what distance x from the leading edge, the boundary layer thickness will be 3.5 cm? (Kinematic viscosity of water at 20 °C= 10^{-6} m^2/s) *0 points*

a) 9.93 m
b) 15.8 m
c) 6.98 m
d) 13.43 m

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
a

12) Determine how far from the front edge of a flat plate the boundary layer becomes turbulent when the fluid approach velocity is 2.5 m/s. How thick is the boundary layer at this location? *2 points*

Assume $\vartheta = 1.5 \times 10^{-5}$ m^2/s and critical Reynolds number = 5×10^6 for turbulent condition.

a) 15.94 mm
b) 11.2 mm
c) 21.2 mm
d) 26.54 mm

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
c

13) Wind is blowing past a 4 mm-diameter electrical transmission line at 50 km/h. Calculate the drag force exerted on a 120 m long section of the wire. *2 points*

(Assume air density= 1.225 kg/m^3, kinematic viscosity = 1.470×10^{-5} m^2/s and take $C_D = 1.25$)

a) 62.98 N
b) 78.90 N
c) 64.34 N
d) 70.89 N

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
d

14) A viscous fluid is flowing over a flat plate such that the boundary layer thickness at a distance 2 m from the leading edge is 18 mm. Assuming laminar flow; calculate the boundary layer thickness at distances of 0.40 and 4.0 m from the leading edge, respectively. *2 points*

a) 0.006 m, 0.0624 m
b) 0.008 m, 0.0254 m
c) 0.004 m, 0.0325 m
d) 0.002 m, 0.0158 m

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
b

15) A cylinder, 6 m in diameter and 30 m long, is dropped in seawater and is settling at 2 m/s. Find the drag exerted on it. The drag coefficient for Reynolds number greater than 10^3 may be taken as 0.75. The density of seawater is given as 1035 kg/m^3 and the kinematic viscosity as 0.015 stokes. *2 points*

a) 877.473 kN
b) 948.210 kN
c) 821.102 kN
d) 988.347 kN

a
b
c
d

No, the answer is incorrect.
Score: 0
Accepted Answers:
a