قائمة الاسئلة

اختبار النهائي للعام الجامعي 2025/2024م-كلية الهندسة :: ميكانيكا الموائع2 - كلية الهندسة - قسم الميكانيك - المستوى الثالث - 3ساعات - درجة

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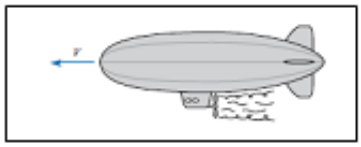
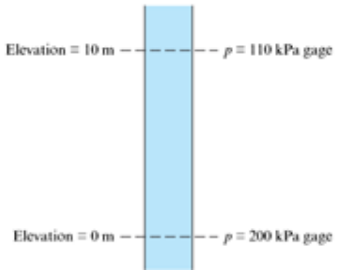
1) The identification of dimensionless groups that provide correspondence between model and prototype data is carried out through dimensional analysis
   1) + TRUE.
   2) - FALSE.
2) Similitude is the theory and art of predicting prototype performance from model observations.
   1) + TRUE.
   2) - FALSE.
3) Model analysis of airplanes and projectile moving at super-sonic speed are based on
   1) - Reynold number
   2) - Froude number
   3) + Mach number
   4) - Weber number.
4) A general study is to be made of the height of rise of liquid in a capillary tube as a function of time after the start of a test. Other significant variables include surface tension, mass density, specific weight, viscosity, and diameter of the tube. How many dimensionless groups are there
   1) + 4
   2) - 3
   3) - 5
   4) - 2
5) means that the model is an exact geometric replica of the prototype. * Consequently, if a 1:10 scale model is specified, all linear dimensions of the model must be 1/10 of those of the prototype.
   1) + Geometric similitude.
   2) - Common$\pi$-Groups.
   3) - dimensional analysis.
6) The drag characteristics of a blimp D=10 m, L=120 m, V= 20 m/s ; if 1/10 scale model is to be tested in a wind tunnel for dynamically similar condition, what speed in the wind tunnel ؟



   1) - 173 m/s
   2) - 108 m/s
   3) + 100 m/s
   4) - 113 m/s
7) is unimportant when gravity causes only a hydrostatic pressure distribution, such as in a closed conduit
   1) - Reynolds number
   2) + Froude number
   3) - Mach number
8) Darcy-Weisbach equation is used for either laminar flow or turbulent flow and only for round pipes
   1) - TRUE.
   2) + FALSE.
9) For laminar flow friction factor is dependent of relative roughness

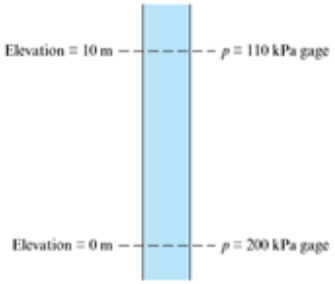
1) - TRUE.
2) + FALSE.

10) Liquid ($\gamma$ =10 kN/m^3) is flowing in a pipe at a steady rate but the direction of flow is unknown. If the pipe diameter is 12 mm and the liquid viscosity is $\mathbf{3.0 \times 10^{-3}}$ N·s/m2
Is the liquid moving …… in the pipe?
a) upward
b) downward



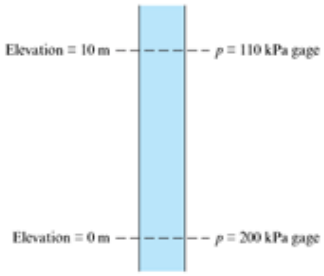

1) - a
2) + b

11) What is the head loss of the pipe?
a) 1m
b) 5m
c) 7m
d) 12m




1) + a
2) - b
3) - c
4) - d

12) if the magnitude of the mean velocity in the pipe =0.90m/s the flow is
a) turbulent
b) laminar

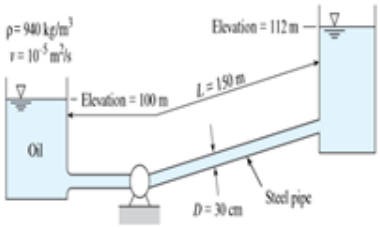



1) - a
2) + b

13)

What is the velocity of oil at a rate of 0.2 m^3/s?

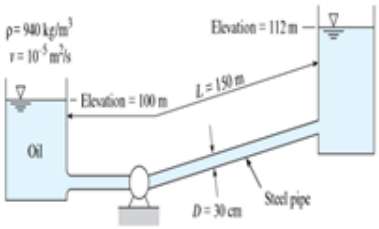
a) 6.65 m/s
b) 2.83 m/s
c) 5.66 m/s
d) 4.65 m/s




1) - a
2) + b
3) - c
4) - d

14) What is the Reynolds number of oil
(kinematic viscosity = $10^{-5}$ $m^2/s$)

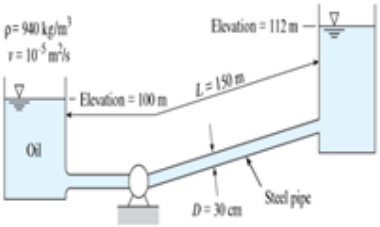
a) 5000
b) 10,000
c) 85000




1) - a
2) - b
3) + c

15) What is the head of the pump for Ke =0.03, KE=1and f=0.019?

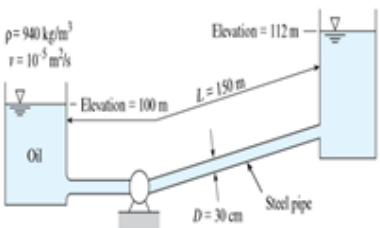
a) 16.3 m
b) 19.7 m
c) 20.6 m
d) 18.7 m




1) + a
2) - b
3) - c
4) - d

16) what power must be added to the water by the pump?

a) 30.1 kw
b) 34.8 kw
c) 24.5 kw
d) 66.54 kw

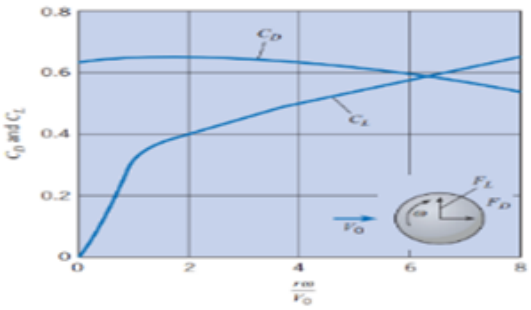


1) + a
2) - b
3) - c
4) - d

17) Drag is defined as the force exerted by a flowing fluid on a solid body
1) + in the direction of flow
2) - perpendicular to the direction of flow
3) - in the direction which is at an angle of 45° to the direction of flow

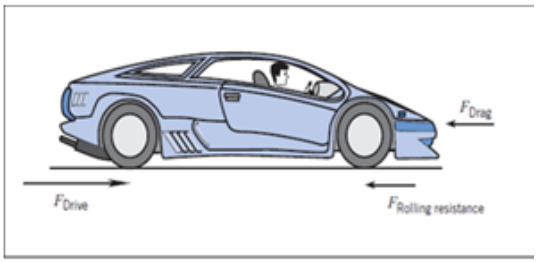
18) Lift force is defined as the force exerted by a flowing fluid on a solid body
1) - in the direction of flow
2) + perpendicular to the direction of flow
3) - at an angle of 45° to the direction of flow

19) A sphere of diameter 100 mm, rotating at a rate of 286 rpm, is situated in a stream of water (15°C) that has a velocity of 1.5 m/s. Determine the lift force (in newtons) on the rotating sphere.
a) 2.8 N
b) 3.82 N
c) 1.8 N
d) 3.98 N




1) + a
2) - b
3) - c
4) - d

20) A car with a mass of 1000 kg is driven and is moving at 30 m/s. The coefficient of rolling friction is 0.02, the drag coefficient is 0.4, and the cross-sectional area is 4 m². Find the power (in kW) needed for this condition..
a) 33.99 hp
b) 26.43 hp
c) 25 hp
d) 42.64 hp




1) - a
2) - b
3) - c
4) + d

21) The landing speed of an airplane is 8 m/s faster than its stalling speed. The lift coefficient at landing speed is 1.2, and the maximum lift coefficient (stall condition) is 1.4. Calculate landing speed.
1) - 127.3 m/s
2) + 107.8 m/s

3) - 137.8 m/s
4) - 117.3 m/s

22) A velocity traverse in a 24 cm oil pipe yields the data in the table.
What is the discharge

a) 0.196 m^3/s
b) 0.98 m^3/s
c) 0.78 m^3/s
d) 0.91 m^3/s

| r (cm) | V (m/s) | r (cm) | V (m/s) |
|---|---|---|---|
| 0 | 8.7 | 7 | 5.8 |
| 1 | 8.6 | 8 | 4.9 |
| 2 | 8.4 | 9 | 3.8 |
| 3 | 8.2 | 10 | 2.5 |
| 4 | 7.7 | 10.5 | 1.9 |
| 5 | 7.2 | 11.0 | 1.4 |
| 6 | 6.5 | 11.5 | 0.7 |

1) + a
2) - b
3) - c
4) - d

23) What is the mean velocity

a) 7.98 m/s
b) 4.33 m/s
c) 6.87 m/s
d) 5.95 m/s

| r (cm) | V (m/s) | r (cm) | V (m/s) |
|---|---|---|---|
| 0 | 8.7 | 7 | 5.8 |
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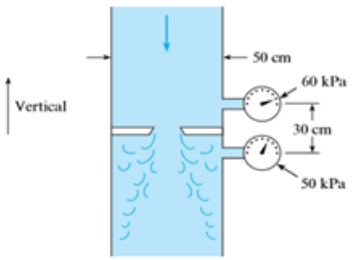
| 2 | 8.4 | 9 | 3.8 |
| 3 | 8.2 | 10 | 2.5 |
| 4 | 7.7 | 10.5 | 1.9 |
| 5 | 7.2 | 11.0 | 1.4 |
| 6 | 6.5 | 11.5 | 0.7 |

1) - a
2) + b
3) - c
4) - d

24) - If water (20°C) is flowing through this 4.3 cm orifice, estimate the rate of flow. Assume flow coefficient K = 0.6.

a) $2.44 \times 10^{-3}$ m³/s
b) $4.44 \times 10^{-3}$ m³/s
c) $7.44 \times 10^{-3}$ m³/s
d) $9.44 \times 10^{-3}$ m³/s

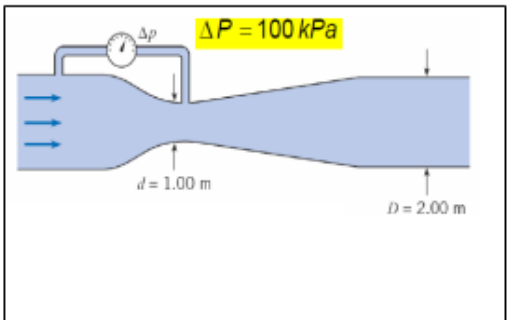



1) - a

2) + b
3) - c
4) - d

25) The pressure differential across this venturi meter is 100 kPa. What is the discharge of water through it?(v =1.31 x 10-6 m²/s). Assume that K=1.02

a) 11.13 m³/s
b) 14.44 m³/s
c) 17.14 m³/s
d) 19.44 m³/s




1) + a
2) - b
3) - c
4) - d