Assignment 5

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

1) Consider the figure given below.

![Diagram with spheres and ellipsoids]

Which of the following statements are true?

- Spheres is set 1 and set 2 are geometrically similar.
- Spheres is set 1 are geometrically similar and the shapes in set 2 are geometrically dissimilar.
- Spheres is set 1 are geometrically dissimilar and the shapes in set 2 are geometrically similar.
- Spheres is set 1 and 2 are geometrically dissimilar.

We need the table in 12 to comment about geometric similarity in set 1 and 2.

Comment about geometric similarity can be made only if the ratios of $V_1/V_2$, $V_2/V_3$, ..., etc. are known.

Comment about geometric similarity can be made only if the radius ratio is known and set.

No, the answer is incorrect.

Expected Answer:

No, the answer is incorrect.

Accepted Answer:

No, the answer is incorrect.

5 points

2) Which of the following statements is wrong?

- Kinematic similarity automatically implies geometric similarity.
- The motions of two systems are similar if homologous particles lie at homologous points at homologous times.
- The dynamic similarity ensures that all the forces are in the same ratio and have equivalent directions between the model and the prototype.
- Dynamic similarity automatically implies kinematic similarity.
- Kinematic similarity requires that the model and the prototype have the same length scale ratio and the same time scale ratio that the model.
- Two geometrically similar shapes, the absolute value of angles will also be same.
- Flow conditions for a model are completely similar if all relevant dimensionless parameters have the same corresponding values for the model and the prototype.
- All technical statements in this section are correct.
- All technical statements in this section are wrong.

No, the answer is incorrect.

Expected Answer:

Expected Answer:

No, the answer is incorrect.

5 points

3) Kinematic similarity automatically implies geometric similarity.

When tested in water at 20°C, a 3-ft-diameter sphere has a measured drag of 0.3. Use this information to make predictions for a 1.5-m-diameter weather balloon moved in sea-level standard to another dynamically similar conditions.

What will be the velocity of the balloon if the balloon is dynamically similar to the sphere? Report your answer in m/s.

No, the answer is incorrect.

Accepted Answer:

No, the answer is incorrect.

5 points

4) What will be the drag force on the balloon? Report your answer in lbf units.

No, the answer is incorrect.

Expected Answer:

5 points

5) A simple approach to consider the effect of particle shape in fluid particle systems is through SPHERICITY. Given a cube of dimension 1 cm x 1 cm x 1 cm, calculate its sphericity.

No, the answer is incorrect.

Expected Answer:

Expected Answer:

5 points

6) Consider a dust-like particle of 34 micron length and 10 micron diameter. The density of the particle is 1000 kg/m³. Calculate the specific surface area of the particle. Report your answer in m². 

No, the answer is incorrect.

Accepted Answer:

No, the answer is incorrect.

5 points