EI10 - Pre-Instructional Survey

Name: _____ Date: _____

1. Describe the following as they apply to flow measurement:

   Reynolds Number -

   High Accuracy -

   Applicable Range -

   Ideal Flowmeter -

   Cavitation -

2. Which is more accurate: flowmeter A, which has an accuracy of 1/2 percent of full scale, or flowmeter B, which has an accuracy of 1 percent of rate?

3. How are the following flowmeters affected by density and viscosity?

Flowmeter	**Density**	**Viscosity**
Orifice Plate		
Vortex Shedder		
Magnetic		
Thermal		
Positive Displacement		
Mass		

4. List possible causes of the following symptoms.

Symptom	**Possible Causes**
Low flow measurement Control valve wide open	
Orifice plate Bouncy analog signal	
Vortex shedder Max. flow confirmed Analog signal at 0%	

5. What percentage of flowmeter users are knowledgeable of the compromises necessary for flowmeter selection?

6. What color is the sky?

7. List some advantages of a mass flowmeter over the following:

   Orifice Plate -

   Vortex Shedder -

   Magnetic Flowmeter -

   Thermal Flowmeter -

   Positive Displacement -

8. List some advantages of the following over a mass flowmeter:

   Orifice Plate -

   Vortex Shedder -

   Magnetic Flowmeter -

Thermal Flowmeter -

Positive Displacement -

9. Why would a user purchase a mass flowmeter over another flowmeter?

10. Why would a user purchase a flowmeter other than a mass flowmeter?

11. Which flowmeter does a user buy?

EI10 - Pre-Instructional Survey Answer Sheet

1. Describe the following as they apply to flow measurement:

   Reynolds Number - Dimensionless number used to infer flow regime.

   High Accuracy - No definite meaning.

   Applicable Range - Flow rates over which the flowmeter must operate in the process.

   Ideal Flowmeter - Perfect flowmeter (that does not exist) - Accurate, linear, simple to install, not effected by fluid properties, no cost.

   Cavitation -Formation and subsequent implosion of bubbles formed when the liquid pressure falls below and subsequently rises above the liquid vapor pressure. The pressure drop and recovery are caused by the restoration of the flowmeter and can damage the flowmeter.

2. Which is more accurate: flowmeter A, which has an accuracy of 1/2 percent of full scale, or flowmeter B, which has an accuracy of 1 percent of rate?

   Flowmeter A: 50 - 100% of scale
   Flowmeter B: 0-50% of scale

3. How are the following flowmeters affected by density and viscosity?

Flowmeter	Density	Viscosity
Orifice Plate	- 1/2% per % change	R_D changes can effect measurement
Vortex Shedder	R_D changes can effect measurement	R_D changes can effect measurement
Magnetic	None	None
Thermal	Can effect thermal properties	None
Positive Displacement	None	Effects slippage

4. List possible causes of the following symptoms.

Symptom	Possible Causes
Low flow measurement Control valve wide open	pumping problem; obstruction in control valve
Orifice plate Bouncy analog signal	air in impulse line (liquid service) pulsating flow (gas service)
Vortex shedder Max. flow confirmed Analog signal at 0%	low temperature increases viscosity causing low R_D

5. What percentage of flowmeter users are knowledgeable of the compromises necessary for flowmeter selection?

   1-3%

6. What color is the sky?

   Depends on time of day and atmospheric conditions.

7. List some advantages of a mass flowmeter over the following:

   Orifice Plate - For mass applications, not effected by density, temp, R_D, fewer leak paths.

   Vortex Shedder - Not affected by density, temp, R_D.

   Magnetic Flowmeter - Not affected by density, temp.

   Thermal Flowmeter - Not affected by temp.

   Positive Displacement - Not affected by density, temp. Fewer moving parts.

8. List some advantages of the following over a mass flowmeter:

   Orifice Plate - Cost

   Vortex Shedder - Cost

   Magnetic Flowmeter – Cost

Thermal Flowmeter - Cost, low pressure gas applications

Positive Displacement - Precise volumetric measurement

9. Why would a user purchase a mass flowmeter over another flowmeter?

Precise mass flow application; not sure of fluid properties

10. Why would a user purchase a flowmeter other than a mass flowmeter?

Cost

11. Which flowmeter does a user buy?

Usually the first one that appears to work.