



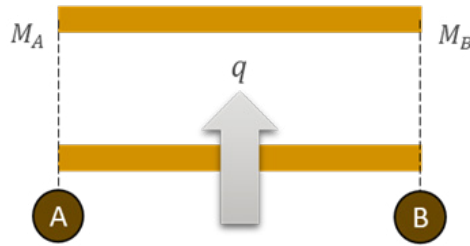
# Quiz Questions

## Internal Compressible Flows

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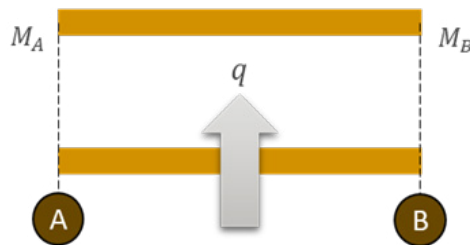
Edited by Ansys Academic Development Team

1. Consider a 1-D compressible flow through a pipe between points A and B, where the Mach number at point A is greater than 1. If heat is added to the flow between points A and B, which of the following is true?



- (1)  $M_B < M_A$
- (2)  $M_B > M_A$
- (3)  $M_B = M_A$
- (4) Insufficient information

2. Consider a 1-D compressible flow through a pipe between points A and B, where the Mach number at point A is less than 1. If heat is added to the flow between points A and B, which of the following is true?



- (1)  $M_B < M_A$
- (2)  $M_B > M_A$
- (3)  $M_B = M_A$
- (4) Insufficient information

3. In internal compressible flows, frictional effects \_\_\_\_\_ a supersonic flow, and \_\_\_\_\_ a subsonic flow.

- (1) decelerate, accelerate
- (2) decelerate, decelerate
- (3) accelerate, accelerate
- (4) accelerate, decelerate

4. For a quasi-1-D flow, which of the following equations best describes the area-velocity relation?

- (1)  $\frac{dA}{A} = (M - 1) \frac{du}{u}$
- (2)  $\frac{dA}{A} = (M^{-2} - 1) \frac{du}{u}$
- (3)  $\frac{dA}{A} = (M^2 - 1) \frac{du}{u}$
- (4)  $\frac{dA}{A} = (M^2 - 1) \frac{du}{u}$

5. Through a converging passage, a supersonic flow \_\_\_\_\_ and a subsonic flow \_\_\_\_\_.  
(1) accelerates, accelerates.  
(2) accelerates, decelerates.  
(3) decelerates, accelerates.  
(4) decelerates, decelerates.
6. A choked flow is referred to a situation where the mass flow rate through the passage is \_\_\_\_\_.  
(1) Maximum  
(2) Minimum  
(3) Zero  
(4) None of the above
7. In a converging-diverging nozzle operating at design conditions, which of the following is true?  
(1) The nozzle exit pressure is equal to ambient pressure.  
(2) The nozzle exit pressure is greater than ambient pressure.  
(3) The nozzle exit pressure is lesser than ambient pressure.  
(4) None of the above
8. When a flow is overexpanded through a CD nozzle, which of the following phenomenon occurs at the exit of the nozzle?  
(1) Expansion waves are formed.  
(2) A normal shock wave is formed.  
(3) Oblique shock waves are formed.  
(4) None of the above
9. The nozzle exit pressure of a gas in an under expanded flow through CD nozzle is \_\_\_\_\_ than the ambient pressure.  
(1) Lesser than  
(2) Greater than  
(3) Equal to
10. Along the characteristic lines, the governing equations of the fluid flow take the form of \_\_\_\_\_ equations referred to as the compatibility equations.  
(1) Partial differential  
(2) Ordinary differential  
(3) Algebraic equations  
(4) None of the above

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**ANSYS, Inc.**  
Southpointe  
2600 Ansys Drive  
Canonsburg, PA 15317  
U.S.A.  
724.746.3304  
[ansysinfo@ansys.com](mailto:ansysinfo@ansys.com)

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