

Unit 4 - Week 2: Wave Propagation in Compressible Medium

Course outline

How does an NPTEL online course work?

Week 0: Prerequisite

Week 1: Review Concepts of Fluid Mechanics and Thermodynamics

Week 2: Wave Propagation in Compressible Medium

Lec 4: Wave Propagation in Compressible Medium - I

Lec 5: Wave Propagation in Compressible Medium - II

Lec 6: Wave Propagation in Compressible Medium - III

Quiz : Assignment 2

Feedback form

Lecture Notes_Week 2

Sample solution- Assignment 2

Week 3: Quasi-One Dimensional Isentropic Flow

Week 4: Normal Shock Waves

Week 5: Expansion Waves and Oblique Shocks

Week 6: Interaction of Shocks and Expansion Waves

Week 7: Compressible Flow with Friction and Heat Transfer

Week 8: Measurement Diagnostics and Experimental Facilities for Compressible Flow

Live Session

Text Transcripts

Practice Questions for Examination

Assignment 2

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

Due on 2020-09-30, 23:59 IST.

1) In which gaseous medium, sound wave will travel faster at a given temperature?

2 points

- (A) Air
 (B) Helium
 (C) Argon
 (D) Equal in all medium

No, the answer is incorrect.
Score: 0

Accepted Answers:
(B) Helium

2) When the Mach number approaches to infinity, the limiting value of characteristics

2 points

Mach number for helium ($\gamma = 1.67$) is _____.

- (A) 0.166
 (B) 1
 (C) 2.0
 (D) 2.45

No, the answer is incorrect.
Score: 0

Accepted Answers:
(C) 2.0

3) When a space shuttle re-enters earth's atmosphere, the nature of the flow regime is _____.

2 points

- (A) transonic
 (B) sonic
 (C) supersonic
 (D) hypersonic

No, the answer is incorrect.
Score: 0

Accepted Answers:
(D) hypersonic

4) One can use the relation, $(p + \rho u^2)$ to calculate stagnation pressure of a Mach 5 flow.

2 points

- (A) TRUE
 (B) FALSE

No, the answer is incorrect.
Score: 0

Accepted Answers:
(B) FALSE

5) For Mach 5 air ($\gamma = 1.4$) flow, the ratio of kinetic energy to the internal energy is _____.

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 7

2 points

6) A supersonic stream of air is moving at Mach 2 in the test section of a wind tunnel. The Mach angle (in degree) for this flow field is _____.

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 30

2 points

7) The speed of sound (m/s) in a flow medium of superheated steam ($p = 500kPa$; $T = 300^\circ C$; $\rho = 0.5226kg/m^3$; $\gamma = 1.32$) is, _____.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 1123,1124

2 points

8) An aircraft is cruising with a Mach number of 1.5 at an altitude of 1000m. While watching the aircraft from the ground, the aircraft moves in a flyby. After how many seconds, the aircraft passes the overhead, one can hear the sound? The speed of sound can be approximated as, 343.3 m/s.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 2.15,2.2

2 points

The helium gas ($\gamma = 1.67$) is to be discharged at sonic velocity into the atmosphere (1 bar, 300 K) through a constant area duct from a reservoir. Based on the given data answer the following questions. (Q 09-Q10)

9) The minimum reservoir pressure (bar) is _____.

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 2.04,2.07

2 points

10) The minimum reservoir temperature (K) is _____.

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 390,402

2 points