Assignment 7

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. Due on 2019-03-20, 23:59 IST.

1) Which of the following statements is correct about compressible flows:

- Any flow involving gas is necessarily compressible flow
- Compressible flows require shock capturing or shock fitting methods for solution of governing equations.
- Compressible flow equations are linear
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers: None of the above

2) Which of the following flows can be considered compressible:

- Air flow over a train travelling at 180 kmph
- An underwater missile travelling at 300 kmph
- Flow over a tennis ball served at 225 kmph
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers: None of the above

3) How many partial differential equations are needed to describe compressible, three-dimensional flows:

- six
- five
- four
- three

No, the answer is incorrect.
4) Which of the following methods cannot be used for compressible flows:

- Streamfunction-vorticity approach
- MacCormack method
- Beam-Warming method
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

5) The conserved variables that are solved for in MacCormack method are:

- \( \rho, u, v, w, T \)
- \( \rho, u, v, w, i \)
- \( \rho, \rho u, \rho v, \rho w, \rho e_t \)
- \( \rho, \rho u, \rho v, \rho w, \rho h \)

No, the answer is incorrect.

Score: 0

Accepted Answers:

6) Which of the following statements is true about the evaluation of pressure in MacCormack scheme:

- pressure is obtained from the continuity equation
- pressure is obtained from the momentum equation
- pressure is obtained from the equation of state
- evaluation of pressure is not necessary for compressible flows

No, the answer is incorrect.

Score: 0

Accepted Answers:

7) Which of the following statements is true about the MacCormack scheme:

- It cannot be used for incompressible flows
- It is not applicable for viscous fluids
- It cannot be used for a system of partial differential equations
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

8) Which of the following describes the Beam-Warming method:

- Streamfunction-vorticity approach
- MacCormack method
- Beam-Warming method
- None of the above

No, the answer is incorrect.
Explicit, 2nd order accurate in time, 2nd order in space, conditionally stable

Implicit, 2nd order accurate in time, 2nd order in space, unconditionally stable

Implicit, 1st order accurate in time, 2nd order in space, unconditionally stable

Explicit, 1st order accurate in time, 2nd order in space, conditionally stable

No, the answer is incorrect.
Score: 0

Accepted Answers:
Implicit, 2nd order accurate in time, 2nd order in space, unconditional stable

9) One advantage of the Beam-Warming method over the MacCormack method is 1 point

- Larger time steps can be used
- It is applicable for coupled equations
- It is applicable for viscous fluids
- It accounts for non-linear effects

No, the answer is incorrect.
Score: 0

Accepted Answers:
Larger time steps can be used

10) Which of the following statements is true about the Beam-Warming method: 1 point

- It allows solution by marching forward from grid point to grid point
- It allows solution by marching forward in time from time step to time step
- It requires intermediate evaluations in going from one time step to the next
- All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
It requires intermediate evaluations in going from one time step to the next

11) The discretization template for the generic scalar transport equation cannot be used for compressible flows because 1 point

- the equations are coupled
- the equations are non-linear
- compressible flows may have shocks
- all of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
all of the above