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Unit 3 - Week 2

Week 2: Assignment

The due date for submitting this assignment has passed. **Due on 2017-02-07, 23:59 IST.**
As per our records you have not submitted this assignment.

1) When ratio of amplitude of ***complex pressure to*** amplitude of ***complex velocity*** is taken, what we will get _____? ***1 point***

- acoustic resonance.
- acoustic power.
- acoustic intensity.
- acoustic impedance.

No, the answer is incorrect.
Score: 0

Accepted Answers:
acoustic impedance.

2) What do you mean by Constant mass assumption _____. ***1 point***

- mass flow is constant.
- fluid can receive and expel energy.
- mass flow is constant and fluid can receive and expel energy.
- mass flow is not constant and fluid can neither receive nor expel energy.

No, the answer is incorrect.
Score: 0

Accepted Answers:
mass flow is constant and fluid can receive and expel energy.

3) when a sound wave passes through a gas Which thermodynamic process accurately captures the behavior of it ? ***1 point***

- Isobaric process.
- Isochoric process.
- Isothermal process.
- Adiabatic process.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Adiabatic process.

4) Which of the following is true for inviscid fluid? ***1 point***

- Inviscid fluids have viscosity.
- Inviscid fluids have no viscosity.
- Inviscid fluids can resist shear.
- Options b and c are correct.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Inviscid fluids have no viscosity.

5) Which of the following option is not required for deriving the 1-D Wave Equation? ***1 point***

- Newton's 2nd law of motion.
- Conservation of mass.
- Equilibrium of moment.
- Gas law.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Equilibrium of moment.

6) Particle acceleration during sound wave propagation in fluid media is directly proportional to _____? ***1 point***

- velocity gradient.
- pressure gradient.
- square of velocity gradient.
- square of pressure gradient.

No, the answer is incorrect.
Score: 0

Accepted Answers:
pressure gradient.

7) What is mass flux? ***1 point***

- Mass flow per unit area.
- Rate of mass flow per unit area.
- Rate of mass flow.
- All the options are correct.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Rate of mass flow per unit area.

8) What is the logic underlying the selection of adiabatic process for developing 1 D wave equation? ***1 point***

- Temperature during the sound propagation remains constant.
- Heat dissipation time is very low compared to the sound propagation time.
- Heat dissipation time is very high compared to the sound propagation time.
- Volume of the medium of propagation varies considerably when sound waves transverses.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Heat dissipation time is very low compared to the sound propagation time.

9) How does rate of change of pressure relate to rate of change of volume? ***1 point***

- $\frac{\partial p}{\partial t} = -\frac{\gamma P_0}{V_0}\frac{\partial \tau}{\partial t}$
- $\frac{\partial p}{\partial t} = \frac{\gamma P_0}{V_0}\frac{\partial \tau}{\partial t}$
- $\frac{\partial \tau}{\partial t} = -\frac{\gamma P_0}{V_0}\frac{\partial p}{\partial t}$
-

$\frac{\partial \tau}{\partial t} = \frac{\gamma P_0}{V_0} \frac{\partial p}{\partial t}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\frac{\partial p}{\partial t} = -\frac{\gamma P_0}{V_0} \frac{\partial \tau}{\partial t}$

10) The wave equation developed does not account for dissipation of energy due to eneration of heat. This is because ____. ***1 point***

- An assumption was made that the process is adiabatic.
- An assumption was made that the flow is continuous.
- An assumption was made that the fluid is inviscid.
- An assumption was made that the process adheres to Newton's second law.

No, the answer is incorrect.
Score: 0

Accepted Answers:
An assumption was made that the fluid is inviscid.

11) How is the adiabatic assumption for sound propagation verified ? ***1 point***

- Theoretically sound propagation cannot be isothermal, isobaric or isochoric process and hence adiabatic.
- Adiabatic assumption was assumed empirically.
- By comparing experimentally measured value of sound velocity with the theoretically obtained values.
- From the understanding of *Fanno* Flow (adiabatic flow through a constant area duct where the effect of friction is considered).

No, the answer is incorrect.
Score: 0

Accepted Answers:
By comparing experimentally measured value of sound velocity with the theoretically obtained values.

12) The expression for speed of sound in fluids is ____. ***1 point***

- $c = \sqrt{\frac{\gamma \cdot p_0}{\rho_0}}$
- $c = \sqrt{\frac{p_0}{\gamma \cdot \rho_0}}$
- $c = \sqrt{\frac{\gamma \cdot p_0}{2 \cdot \rho_0}}$
- $c = \sqrt{\frac{2 \cdot p_0}{\gamma \cdot \rho_0}}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$c = \sqrt{\frac{\gamma \cdot p_0}{\rho_0}}$

13) Which one of the option given below cannot be a solution for 1-D sound pressure wave equation ? ***1 point***

- $5cos(t - x)$
- $7e^{(t+\frac{x}{2})}$
- $(x - t)^4$

$20(8 - \frac{xt}{3})$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$20(8 - \frac{xt}{3})$

14) Which one of the following relation explicitly shows that 'c' represents the velocity of sound wave? ***1 point***

- $\frac{\partial^2 p}{\partial x^2} = \frac{1}{c^2}\frac{\partial^2 p}{\partial t^2}$
- $c = \sqrt{\frac{\gamma p_0}{\rho_0}}$
- $c = \sqrt{\frac{p_0}{\gamma \rho_0}}$
- $p(x,t) = f(t - \frac{x}{c}) + f(t + \frac{x}{c})$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$p(x,t) = f(t - \frac{x}{c}) + f(t + \frac{x}{c})$

15) ***1 point***

Choose the correct statement regarding a sound pressure wave represented by $p(x,t) = f(t - \frac{x}{c})$

- Sound wave travelling towards positive x direction.
- Sound wave travelling towards negative x direction.
- Sound wave travelling towards both positive and negative x directions.
- None of the options are correct.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Sound wave travelling towards positive x direction.

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