Assignment_1

The due date for submitting this assignment has passed.

Due on 2021-02-03, 23:59 IST.

As per our records you have not submitted this assignment.

1) The primary purpose of a silencer or muffler used in automobiles is to *1 point*

- reduce exhaust noise emission
- enhance heat insulation
- improve mileage (fuel consumption) efficiency
- provide flow stability

No, the answer is incorrect.
Score: 0

Accepted Answers:
reduce exhaust noise emission

2) The acoustic or small-signal wave equation is derived from fluid dynamics equations of ____, ____ and making assumptions on _____ *1 point*

- continuity, isentropicity, momentum
- continuity, momentum, isentropicity
- isentropicity, momentum, continuity
- momentum, continuity, isentropicity

No, the answer is incorrect.
Score: 0

Accepted Answers:
continuity, momentum, isentropicity

3) For planar acoustic waves propagating in a uniform area duct, the acoustic pressure and particle velocity have the following characteristics: *1 point*

- remain constant over the duct cross-section
- acoustic pressure is the same but velocity varies
- acoustic velocity remains constant but pressure varies
- cannot comment

No, the answer is incorrect.
Score: 0

Accepted Answers:
remain constant over the duct cross-section

4) An acoustic pulse is given by $\phi(x,t) = \phi(x - c_0 t)$ where c0 is the sound speed. The pulse propagates in ____ direction. Let c0 = 343 m s-1 . At t =10-3 seconds, the peak of the pulse will be located at ___. *1 point*

- forward, 0.343 m
- backword, 0.343m
- forward, 0.4m
- backward, 0.4m

No, the answer is incorrect.
Score: 0

Accepted Answers:
forward, 0.343 m

5) In an infinitely long duct, the initial acoustic pressure field is given by $\phi = \phi(x, t = 0)$ while the velocity is identically zero. The complete solution of the acoustic pressure field is given by *1 point*

- $\frac{1}{2}\{\phi(x - c_0 t) + \phi(x + c_0 t)\}$
- $\frac{1}{2}\{\phi(x - c_0 t) - \phi(x + c_0 t)\}$
- $\frac{1}{2}\phi(x - c_0 t) + \phi(x + c_0 t)$
- $\phi(x - c_0 t) + \frac{1}{2}\phi(x + c_0 t)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\frac{1}{2}\{\phi(x - c_0 t) + \phi(x + c_0 t)\}$

6) A sound wave having a frequency of 250 Hz is transmitted through air at The gas constant for air is 287 J/kg-K, and the specific heat ratio is The speed of sound is given by ____, the wavelength and the wavenumber are given by ____ and ___, respectively. *1 point*

- 346.1 m/s, 1.385 m, 4.538 m-1
- 446.1 m/s, 1.655 m, 2.56 m-1
- 346.1 m/s, 5.385 m, 3.538 m-1
- 346.1 m/s, 8.385 m, 4.538 m-1

No, the answer is incorrect.
Score: 0

Accepted Answers:
346.1 m/s, 1.385 m, 4.538 m-1

7) The characteristic impedance of a plane wave air medium having density $\rho_0 = 1.21\text{kg} \cdot \text{m}^{-3}$ and sound speed $c_0 = 343\text{m} \cdot \text{s}^{-1}$ is given by *1 point*

- 415.03 kg $m^{-2}s^{-1}$
- 2.41 x 10^{-3} kg $m^{-2}s^{-1}$
- 1.72 x 10^{5} kg $m^{-2}s^{-1}$
- 1.42 x 105 kg m-2s-1

No, the answer is incorrect.
Score: 0

Accepted Answers:
415.03 kg $m^{-2}s^{-1}$

8) The complete solution of Helmholtz equation for 1-D or plane wave propagation is given by $p(x,t) = (Ae^{-jk_0 x} + Be^{jk_0 x})e^{j\omega t}$ where the A and B are ___ which are to be determined from appropriate ___ conditions. *1 point*

- arbitrary constants, boundary
- functions, initial
- arbitrary constants, initial
- functions, boundary

No, the answer is incorrect.
Score: 0

Accepted Answers:
arbitrary constants, boundary