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(1)Q0 Two waves are described as follows:
16 Q0        y1(x,t) = 4 (x - v*t)
   Q0        y2(x,t) = 4 (x + v*t)
   Q0 At what position and time do these two waves cancel?
   Q0
   A1 At x = 0 and at any time t.
   A2 At x = 0 and at t = 0 only.
   A3 They never cancel (they always add up).
   A4 At t = 0 and at any position x.
   A5 They always cancel because v has opposite signs.
   Q0
(2)Q0 A sinusoidal wave is described as:
   Q0
16 Q0      y = (0.1 m) * sin[10*pi*(x/5 + t - 3/2)],
   Q0 where x is in meters and t is in seconds. What are
   Q0 the values of its frequency(f), and its velocity(v)?
   Q0
   A1 f=5 Hz, v = 5 m/s moving in -x-direction.
   A2 f=5 Hz, v = 5 m/s moving in +x-direction.
   A3 f=2 Hz, v = 1 m/s moving in -x-direction.
   A4 f=2 Hz, v = 1 m/s moving in +x-direction.
   A5 f=2 Hz, v = 5 m/s moving in -x-direction.
   Q0
(3)Q0 A transverse harmonic wave in a string is described
16 Q0 by:
   Q0          y(x,t) = (3.0 m) * sin(0.3 x - 8 t - Phi),
   Q0 where x is in meters and t is in seconds.
   Q0 At t = 0 and x = 0, a point on the string has a positive
   Q0 displacement and has velocity of 0.
   Q0 The phase constant (Phi) is:
   Q0
   A1  270 degrees.
   A2  180 degrees.
   A3  135 degrees.
   A4   90 degrees.
   A5   45 degrees.
   Q0
(4)Q0 The volume of a certain solid shrinks by 2 parts in 10**6
17 Q0 when it is subject to an external hydrostatic pressure of
   Q0 1 atm. The density of the solid is 8.0 grams/cm**3. What
   Q0 is the speed of a longitudinal wave through this material?
   Q0
   A1 2.5*10**3 m/s.
   A2 3.4*10**3 m/s.
   A3 1.5*10**3 m/s.
   A4 3.4*10**2 m/s.
   A5 2.5*10**2 m/s.
   Q0
(5)Q0 A point source uniformly radiates 440 W of sound in all
17 Q0 directions. How far, from the source, will the intensity
   Q0 level be 106 dB?
   Q0
   A1 29.7 m.
   A2 21.8 m.
   A3 32.5 m.
   A4 38.1 m.
   A5 52.5 m.
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   Q0
(6)Q0 During a time equal to the period of a certain vibrating
17 Q0 fork, the emitted sound wave travels a distance:
   Q0
   A1 of one wavelength.
   A2 equal to the length of the fork.
   A3 directly proportional to the frequency of the fork.
   A4 proportional to the frequency of the wave.
   A5 of about 331 meters.
   Q0
(7)Q0 A train approaches a mountain at a speed of 75 km/hr.
17 Q0 The train's engineer sounds a whistle that emits a
   Q0 frequency of 420 Hz. What will be the frequency of the
   Q0 echo that the engineer hears reflected off the mountain?
   Q0 (The speed of sound in air = 343 m/s).
   Q0
   A1 474 Hz
   A2 430 Hz
   A3 446 Hz
   A4 420 Hz
   A5 400 Hz
   Q0
(8)Q0 A standing wave is established in a 3.0-m-long string
18 Q0 fixed at both ends. The string vibrates in three segments
18 Q0 with an amplitude of 1.0 cm. If the wave speed is 100 m/s,
   Q0 what is the frequency?
   Q0
   A1  50 Hz
   A2 100 Hz
   A3  33 Hz
   A4  25 Hz
   A5  10 Hz
   Q0
(9)Q0 Organ pipe A, with both ends open, has a fundamental
18 Q0 frequency of 30 Hz. The third harmonic (n=3) of organ
   Q0 pipe B, with one end open, has the same frequency as
   Q0 the second harmonic (n=2) of pipe A. How long is pipe B?
   Q0 (The speed of sound in air = 343 m/s).
   Q0
   A1 4.3 m.
   A2 7.4 m.
   A3 2.1 m.
   A4 8.6 m.
   A5 0.4 m.
   Q0
10 Q0 Two harmonic waves are described by:
18 Q0                y1(x,t) = 4 sin(8 x - 300 t),
   Q0                y2(x,t) = 4 sin(8 x - 300 t - 2),
   Q0 where x is in centimeters and t is in seconds.
   Q0 What is the frequency of the resultant wave?
   Q0
   A1 48 Hz.
   A2 24 Hz.
   A3 33 Hz.
   A4 38 Hz.
   A5 75 Hz.
   Q0
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11 Q0 The maximum amplitude of a standing wave on a string,
18 Q0 with linear density = 3.00 grams/m and tension of 15.0 N,
   Q0 is 0.20 cm. If the distance between adjacent nodes is
   Q0 12.0 cm, what will be the wave function y(x,t) of the
   Q0 standing wave?
   Q0 (Note that x is in centimeters and t is in seconds.)
   Q0
   A1 y(x,t) = 0.20 sin(0.262 x) cos(1.85*10**3 t).
   A2 y(x,t) = 0.20 sin(0.421 x) cos(1.85*10**3 t).
   A3 y(x,t) = 0.40 sin(0.262 x) cos(1.11*10**3 t).
   A4 y(x,t) = 0.40 sin(0.421 x) cos(1.85*10**3 t).
   A5 y(x,t) = 0.20 sin(0.262 x) cos(2.20*10**3 t).
   Q0
12 Q0 Fahrenheit and Kelvin scales agree at a reading of:
19 Q0
   A1   574.
   A2   301.
   A3   273.
   A4  Zero.
   A5  -40.
   Q0
13 Q0 A bridge is made with segments of concrete 50 m long.
19 Q0 If the linear expansion coefficient of concrete is
   Q0 12.0*10**-6 (Celsius degree)**-1, how much spacing
   Q0 is needed to allow for expansion for an extreme
   Q0 change in temperature of 150 degrees Fahrenheit?
   Q0 (Assume that the linear expansion coefficient is not
   Q0 a temperature dependent)
   Q0
   A1 5.0 cm.
   A2 7.5 cm.
   A3 10  cm.
   A4 2.5 cm.
   A5 9.5 cm.
   Q0
14 Q0 One mole of an ideal gas has a temperature of 25 degree
19 Q0 Celsius. If the volume is held constant and the pressure
   Q0 is doubled, the final temperature will be:
   Q0
   A1 323 degree Celsius.
   A2 596 degree Celsius.
   A3 50  degree Celsius.
   A4 25  degree Celsius.
   A5 174 degree Celsius.
   Q0
15 Q0 A lead bullet, travelling at 200 m/s, strikes a tree and
20 Q0 comes to rest. If half the heat produced is retained by the
   Q0 bullet. The temperature of the bullet will be change by:
   Q0 (Specific heat of lead = 0.125*10**3 J/(kg*Celsius degree)
   Q0 (Assume that all the kinetic energy is converted to heat
   Q0 energy.)
   Q0
   A1  80  Celsius degree.
   A2 160  Celsius degree.
   A3  20  Celsius degree.
   A4  40  Celsius degree.
   A5 -80  Celsius degree.
```

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   Q0
16 Q0 Five moles of an ideal gas expands isothermally at 100
20 Q0 degree Celsius to five times its initial volume. Find
   Q0 the heat flow into the system.
   Q0
   A1 2.5*10**4 J
   A2 1.1*10**4 J
   A3 6.7*10**4 J
   A4 7.0*10**4 J
   A5 3.1*10**4 J
   Q0
17 Q0 Two kilograms of water, at 100 degree Celsius, occupy a
20 Q0 volume of 2.0*10**-3 m**3. When this amount of water is
   Q0 boiled, at atmospheric pressure, it becomes 3.3 m**3 of
   Q0 steam. Find the change in the internal energy.
   Q0
   A1   4.2*10**6 J.
   A2 - 4.2*10**6 J.
   A3   2.1*10**6 J.
   A4 - 2.1*10**6 J.
   A5   3.4*10**4 J.
   Q0
18 Q0 Which one of the following statements is FALSE:
21 Q0
   A1 When an isolated ideal gas expands its temperature
   A1 increases.
   A2 For an ideal gas the specific heat at constant volume
   A2 is less than the specific heat at constant pressure.
   A3 At 400K, the specific heat at constant volume for Oxygen is
   A3 equal to the specific heat at constant pressure for Helium.
   A4 The average energy per molecule of an ideal monatomic gas
   A4 increases linearly with temperature.
   A5 In an adiabatic compression there is no heat transfer
   A5 between the system and its surroundings.
   Q0
19 Q0 Two moles of helium (monatomic) gas are heated from 100
21 Q0 degree Celsius to 250 degree Celsius. How much heat is
   Q0 transferred to the gas if the process is isobaric?
   Q0
   A1 6.23*10**3 J.
   A2 2.63*10**3 J.
   A3 3.11*10**3 J.
   A4 1.51*10**2 J.
   A5 8.52*10**5 J.
   Q0
20 Q0 An ideal monatomic gas goes through the process in T-V
21 Q0 diagram of figure (1). At Point A, the temperature is
   Q0 400 K, and the volume is 2 liters. If the volume at
   Q0 point B is 10 liters, what is the temperature at point
   Q0 C be?
   Q0
   A1 1.17*10**3  K.
   A2 2.00*10**2  K.
   A3 4.00*10**3  K.
   A4 5.89*10**3  K.
   A5 2.00*10**3  K.
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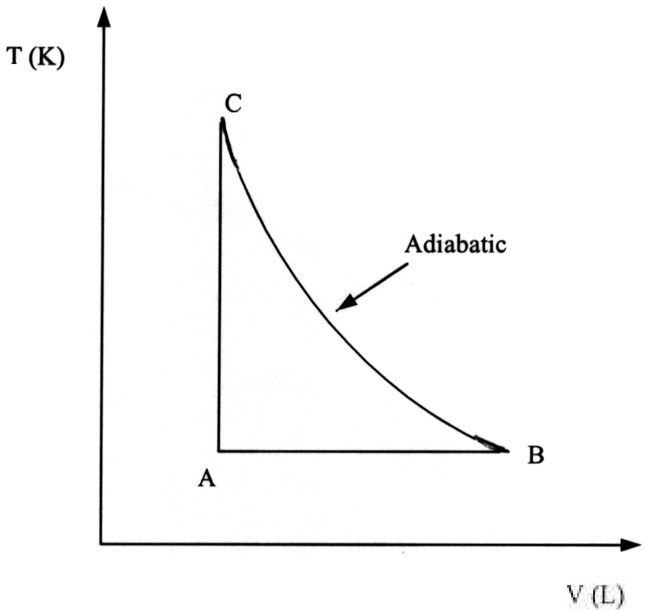
T (K)
C
Adiabatic
B
A
V (L)