

Kinetic Theory

Question 1.

A room temperature the r.m.s. velocity of the molecules of a certain diatomic gas is found to be 1930 m/sec. the gas is

- (a) H^2
- (b) F^2
- (c) O^2
- (d) Cl^2

▼ [Answer](#)

Answer: (a) H^2

Question 2.

Energy supplied to convert unit mass of substance from solid to liquid state at its melting point is called

- (a) Latent heat of fusion
- (b) Evaporation
- (c) Solidification
- (d) Latent heat of fission

▼ [Answer](#)

Answer: (a) Latent heat of fusion

Question 3.

One any planet, the presence of atmosphere implies [v_{rms} = root mean square velocity of molecules and v_e = escape velocity]

- (a) $v_{rms} \ll v_e$
- (b) $v_{rms} > v_e$
- (c) $v_{rms} = v_e$
- (d) $v_{rms} = 0$

▼ [Answer](#)

Answer: (a) $v_{rms} \ll v_e$

Question 4.

Calculate the RMS velocity of molecules of a gas of which the ratio of two specific heats is 1.42 and velocity of sound in the gas is 500 m/s

- (a) 727 m/s
- (b) 527 m/s
- (c) 927 m/s
- (d) 750 m/s

▼ [Answer](#)

Answer: (a) 727 m/s

Question 5.

The r.m.s. speed of the molecules of a gas in a vessel is 200 m/s. if 25% of the gas leaks out of the vessel, at constant temperature, then the r.m.s. speed of the remaining molecules will be

- (a) 400 m/s
- (b) 150 m/s

- (c) 100 m/s
- (d) 200 m/s

▼ Answer

Answer: (d) 200 m/s

Question 6.

A gas is taken in a sealed container at 300 K. it is heated at constant volume to a temperature 600 K. the mean K.E. of its molecules is

- (a) Halved
- (b) Doubled
- (c) Tripled
- (d) Quadrupled

▼ Answer

Answer: (b) Doubled

Question 7.

Moon has no atmosphere because

- (a) It is far away from the surface of the earth
- (b) Its surface temperature is 10°C
- (c) The r.m.s. velocity of all the gas molecules is more than the escape velocity of the moon's surface
- (d) The escape velocity of the moon's surface is more than the r.m.s velocity of all molecules

▼ Answer

Answer: (c) The r.m.s. velocity of all the gas molecules is more than the escape velocity of the moon's surface

Question 8.

A unit mass of solid converted to liquid at its melting point. Heat is required for this process is

- (a) Specific heat
- (b) Latent heat of vaporization
- (c) Latent heat of fusion
- (d) External latent heat

▼ Answer

Answer: (c) Latent heat of fusion

Question 9.

One mole of ideal gas required 207 J heat to rise the temperature by 10°K when heated at constant pressure. If the same gas is heated at constant volume to raise the temperature by the same 10°K the heat required is ($R = 8/3 \text{ J/mole } ^{\circ}\text{K}$)

- (a) 1987 J
- (b) 29 J
- (c) 215.3 J
- (d) 124 J

▼ Answer

Answer: (d) 124 J

Question 10.

The r.m.s velocity of the molecules of an ideal gas is C at a temperature of 100K . at what temperature is r.m.s. velocity will be doubled?

- (a) 200 K
- (b) 400 K
- (c) 300 K
- (d) 50 K

▼ Answer

Answer: (b) 400 K

Question 11.

One mole of an ideal gas requires 207 J heat to raise the temperature by 10 K , when heated at constant pressure. If the same gas is heated at constant volume to raise the temperature by 10K , then heat required is

- (a) 96.6 J
- (b) 124 J
- (c) 198.8 J
- (d) 215.4 J

▼ Answer

Answer: (b) 124 J

Question 12.

5 gm of air is heated from 273°K to 275°K . the change in internal energy of air will be ($C_V = 172\text{ cal/kg } ^\circ\text{K}$ and 4.2 J/cal)

- (a) 7.22 J
- (b) 5.22 J
- (c) 8.16 J
- (d) 3.5 J

▼ Answer

Answer: (a) 7.22 J

Question 13.

The specific heat of a gas in isothermal process is

- (a) Zero
- (b) Negative
- (c) Remains constant
- (d) Infinite

▼ Answer

Answer: (d) Infinite

Question 14.

The internal energy of one mole of an ideal gas depend upon

- (a) Volume of gas
- (b) Temperature of gas
- (c) Nature of gas
- (d) Density of gas

▼ Answer

Answer: (b) Temperature of gas

Question 15.

Which of the following is the unit of specific

- (a) J kg/°C
- (b) J/kg°C
- (c) kg °C/J
- (d) J kg/°C²

▼ Answer

Answer: (b) J/kg°C

Question 16.

For a gas, the r.m.s. speed at 800K is

- (a) Half the value at 200 K
- (b) Double the value at 200 K
- (c) Same as at 200 K
- (d) Four times the value at 200 K

▼ Answer

Answer: (b) Double the value at 200 K

Question 17.

$PV/3 = RT$, V represents volume of

- (a) Any amount of gas
- (b) 2 moles of gas
- (c) 3 moles of gas
- (d) 4 moles of gas

▼ Answer

Answer: (c) 3 moles of gas

Question 18.

The average kinetic energy of the molecules of a gas at 27°C is 9×10^{-20} J. what is its average K.E. at 227°C?

- (a) 5×10^{-20} J
- (b) 10×10^{-20} J
- (c) 15×10^{-20} J
- (d) 20×10^{-20} J

▼ Answer

Answer: (c) 15×10^{-20} J

Question 19.

At constant volume temperature is increased then

- (a) Collision on walls will be less
- (b) Collision frequency will be increases
- (c) Collision will be in straight line
- (d) Collision will not change

▼ Answer

Answer: (b) Collision frequency will be increases

Question 20.

Following gases are kept at the same temperature. Which gas possesses maximum r.m.s. speed?

- (a) Oxygen
- (b) Nitrogen
- (c) Hydrogen
- (d) Carbon dioxide

▼ [Answer](#)

Answer: (c) Hydrogen

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