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 [nrms = root mean square velocity of molecules and ne = escape velocity]
(a) nrms << ne
(b) nrms > ne
(c) nrms = ne
(d) nrms = 0

▼ Answer

Answer: (a) nrms << ne

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 form 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 then the escape velocity of the moons surface
(d) The escape velocity of the moons 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 then the escape velocity of the moons 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 J/mole °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 doubted?
(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 (CV = 172 cal/kg °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