

What is the average speed of
Oxygen gas molecules at
temperature of 300K?

- A) 45m/s
- B) 54m/s
- C)* 445m/s
- D) 545m/s

- The first Law of thermodynamics is expressed as:
- (A) $dw = du + dq$
- (B) * $du = dq - dw$
- (c) $dq = dw - du$
- (d) $dq = du - dw$

In NaCl, Na ions are positively charged and chlorine ions are negatively charged. In spite of the Coulomb's attraction between them, why do the two ions not collapse?

- (A) because of the presence of free electrons
- (B) because of its low melting point
- (C) because of its high specific heat
- (D)* because of short range repulsive forces.

applicable during coalescence of
curves at the point of inflexion in Van

If bodies A and B are each separated in thermal equilibrium with body C, then A and B are in thermal equilibrium with each other.

This concept is known as?

- (A) Avogadro's Law
- (B) Graham's Law
- (C) Charles's Law
- (D)* Zeroth's Law

Which of the following is not TRUE about molecules;

- (A) made up of atoms
- (B) posses both kinetic and potential energies
- (C) combination of molecules made up matter
- (D)* molecules of each substance are identical same structure but different masses

The differences observed in solids, liquids and gases may be accounted for by ?

- (A) the spacing and forces acting between the molecules
- (B) their relative masses
- (C)* the difference molecules in each of them
- (D) their melting points

At low humidity in the an environment, the human skin is usually ?

- (A) damp and smooth
- (B) dry and rough
- (C)* damp and rough
- (D) dry and smooth

If the pressure of the vapour on top of an enclosed liquid is equal to the atmospheric pressure, what will be the temperature of the liquid enclosed?

- (A) room temperature
- (B) boiling point
- (C)* freezing point
- (D) standard point

In the Van der waal's equation for real gas. The term $\frac{a}{V^2}$ is called?

- (A) Co-Volume
- (B) intermolecular force
- (C)* internal Pressure
- (D) Cohesive force

- Which of the following processes below can be explained using the kinetic theory?
- I Change of state
- II Diffusion
- III Radiation
- IV Osmosis
- (A) I, III and IV
- (B) * I, II and IV
- (C) I, II, III, and IV
- (D) I, II and III

$$\text{I } \frac{p}{V} \quad \text{II } \frac{P}{1/V}$$

- A fixed quantity of gas is subjected to various pressures of P and the corresponding volume V measured at a constant temperature. Which of the following graphs best represent the results?

- I $\frac{p}{V}$

- II $\frac{P}{V}$

-

-

-

$$\frac{1}{V}$$

- III $\frac{P}{V}$

- IV $\frac{P}{V}$

-

-

-

$$V$$

- (A) I, II

Which of the following is the correct equation for an ideal gas in isothermal process?

(A) $PV = nRT$

(B)[×] $W = nRT \ln \frac{V_f}{V_i}$

(C) $PV^\gamma = \text{constant}$

(D) $\left(P + \frac{a}{v^2}\right)(V - b) = RT$

A cylinder contains 12 L of oxygen at 20°C and 15 atm. The temperature is raised to 35°C , and the volume is reduced to 8.5 L. What is the final pressure of the gas in atm? Assume the gas is ideal

- (A) 12 atm
- (B) 14 atm
- (C)* 22 atm
- (D) 24 atm

- One mole of oxygen expands at a constant temperature of 310K from an initial volume of 12 L to a final volume of 19 L. How much work is done by the gas during the expansion?
- (A) 118J
- (B) 180J
- (C)* 1180J
- (D) 1810J

- Here are five numbers 5, 11, 32, 67 and 89.
What is the root means square value of
there numbers?
- (A)* 51.2
- (B) 40.8
- (C) 7.21
- (D) 6.39

- Which of the following equation is true about the average speed of the molecule?

- (A)* $V_{\text{avg}} = \frac{\sqrt{8RT}}{\pi M}$

- (B) $V_{\text{avg}} = \frac{\sqrt{3RT}}{M}$

- (C) $V_{\text{avg}} = \frac{\sqrt{2RT}}{M}$

- (D) $V_{\text{avg}} = \frac{\sqrt{3P}}{P}$

- The nature of the Van der Waals equation is that all isotherms below critical temperature have.....
- (A) Inflection point
- (B)* Two turning points
- (C) One turning point
- (D) Melting point

- Which of the following phenomena CANNOT be explained by the molecular theory of matter?
- (A) Expansion
- (B)* Evaporation
- (C) Radiation
- (D) Conduction

- 200g of water at 90°C is mixed with 100g of water at 30°C . what is the final temperature?
- (A) 50°C
- (B) 60°C
- (C)* 70°C
- (D) 80°C

- Hot water is added to three times the mass of water at 10°C and the resulting temperature is 20°C . what is the initial temperature of the hot water?
- (A) 100°C
- (B) 80°C
- (C)* 50°C
- (D) 40°C

- The thermometric property of a thermocouple is the change in
- (A) Equivalent resistance
- (B) Electromotive force
- (C)* Current
- (D) Pressure

- From the statement below, the qualities of a good thermometer are
- High thermal capacity
- High sensitivity
- Easy readability
- IV. Accuracy over a wide range of temperature
- (A) I, III and IV
- (B) II, III, IV
- (C) I and II
- (D)* I, II, III and IV

- A metal of volume 40cm^3 is heated from 30°C to 90°C the increase in volume is ?
- (A) 1.20cm^3
- (B) 0.40cm^3
- (C) $* 0.14\text{cm}^3$
- (D) 4.0cm^3

- What is the amount of heat needed to raise the temperature of 75g of water from 16°C to 25°C
- (A)* 2835J
- (B) 3528J
- (C) 5285J
- (D) 8528J

- Calculate the thermal energy required to boil completely to steam 0.20kg of water at 100°C ($L_v = 2.3 \times 10^6 \text{ J kg}^{-1}$)
- (A)* $0.46 \times 10^6 \text{ J}$
- (B) $6.4 \times 10^6 \text{ J}$
- (C) $7.2 \times 10^6 \text{ J}$
- (D) $8.4 \times 10^6 \text{ J}$

- Which of the following most affects the rate of evaporation.
- (A)* Temperature, Pressure, Surface area
- (B) Pressure, nature of the liquid ,colour of the liquid
- (C) Area ,Viscosity and surface tension
- (D) Humidity, wind and impurities

- Which of the following forms the microscopic properties of a gas?
- (A) Mass, temperature, velocity
- (B) Volume, temperature, pressure
- (C) * Density ,mass, velocity
- (D) Number of mole, pressure, density

- The relationship between Volume and temperature is investigated when pressure and amount of gas (n) are kept constant is known as;
- (A) Avogadro's Law
- (B)* Charles's Law
- (C) Boyle's Law
- (D) Pressure Law

- Suppose 100cm³ of a given mass of oxygen in a cylinder is warmed from 27°C to 100°C while its pressure remained constant. What is the new volume?
- (A)* 1243.3cm³
- (B) 1423.6cm³
- (C) 1544.4 cm³
- (D) 1678.6cm³

- A piece of copper of mass 0.75kg cools from 40°C to 15°C . How much heat is given out?
- (A)* $400\text{J Kg}^{-1}\text{C}^{-1}$
- (B) $500\text{J Kg}^{-1}\text{C}^{-1}$
- (C) $600\text{kg}^{-1}\text{C}^{-1}$
- (D) $800\text{Kg}^{-1}\text{C}^{-1}$

- The equation $P^x V^y T^z = \text{Constant}$ is Boyle's Law. What the values of x,y,z?
- (A) $X=0, Y=0, Z=1$
- (B) $X=1, Y=1, Z=1$
- (C) * $X=1, Y=1, Z=0$
- (D) $X=1, Y=1, Z=-1$

- Before starting a journey from Bosso campus the tyre pressure of a car was $3.0 \times 10^5 \text{ Nm}^{-2}$ at 300K. At the end of the journey at Gidan Gwanu campus the pressure rose to $4 \times 10^5 \text{ Nm}^{-2}$. Calculate the temperature of the tyre after the journey, assuming the volume is constant.
- (A)* 127°C
- (B) 130°C
- (C) 147°C
- (D) 176°C

- When a fixed mass of an ideal gas expands at constant temperature ,which of the following properties of the gas molecules increase?
- (A)* average separation
- (B) average kinetic energy
- (C) average speed
- (D) average number per unit volume

- The pressure of a gas when cooled at constant volume will decrease because the molecules,
 - (A) decreases in number
 - (B) break up into small into small molecules
 - (C)* collides less frequently with the walls of the container
 - (D) have the same kinetic energy

- Which of the following gas Laws is equivalent to workdone.
- (A)* Van der waals
- (B) Boyle's
- (C) Graham's
- (D) Charles

- In a gas experiment, the pressure of the gas is plotted against the reciprocal of the volume of the gas at constant temperature. The slope of the graph represents ?
- (A)* work
- (B) Force
- (C) Momentum
- (D) Power

- The most probable speed of the gas molecules is given as?
- (A) $\sqrt{3p/\rho}$
- (B) $\sqrt{3RT/M}$
- (C)* $\sqrt{2RT/M}$
- (D) $\sqrt{c^2}$

- When the process is adiabatic ,no energy is transferred as heat, then the energy required for the work can only come from....?
- (A) intermolecular force between gas molecules
- (B) internal pressure exerted by the gas molecules
- (C)* internal energy of the gas
- (D) collisions of gas molecules with the wall of the container

- If the internal energy of the gas decreases in adiabatic process, which of the following is likely to decrease proportionately ?
- (A) Pressure
- (B) Volume
- (C)* Temperature
- (D) Density

- The Pressure exerted by n moles of an ideal gas, in terms of the speed of its molecules, is?
- (A) $PV = nRT$
- (B) * $P = nMV_{rms}^2/3V$
- (C) $PV = nMV_{rms}^2/3P$
- (D) $P = \sqrt{3RT}/M$

- Air in the cylinder of diesel engine at 20°C is compressed from an initial pressure of 1 atm and volume of 200 cm^3 to a volume of 15 cm^3 . Assuming that air behaves as an ideal gas ($\gamma = 1.40$) and the compression is adiabatic, find the final pressure.
- (A) 34.2 atm
- (B) 36.4 atm
- (C)* 37.6 atm
- (D) 39.8 atm