

University of Salahaddin
College of Science
Department of Physics
General Physics



Question Bank

Second General

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Q1 / Chose the correct answer:

1. A container filled with a sample of an ideal gas at the pressure of 1.5 atm. The gas is compressed isothermally to one-fourth of its original volume. What is the new pressure of the gas?

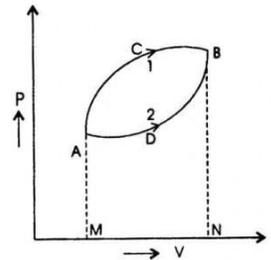
- a) 2 atm b) 3 atm c) 4 atm d) 5 atm e) 6 atm

2. One mole of an ideal gas expands slowly and isothermally at temperature T until its volume is doubled. The change of entropy of this gas for this process is:

- a. $(\ln 2)/T$ $\left[\frac{J}{SEK}\right]$ b. $2R$ c. Zero d. $R \ln 2$ $\left[\frac{J}{SEK}\right]$ e. $RT \ln 2$ $\left[\frac{J}{SEK}\right]$

3. A given mass of gas is taken from state A to B by two paths ACB and ADB successively denoted by 1 and 2. If the work done are W_1 and W_2 along path, then

- (1) $W_1 = W_2$ (2) $W_1 > W_2$
 (3) $W_1 < W_2$ (4) W_1 and W_2 cannot be compared

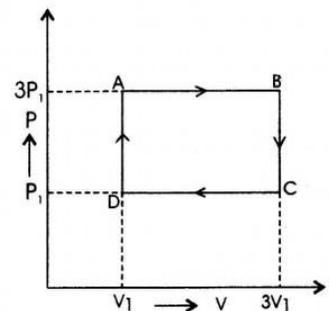


4. Three containers filled with 1 kg of each: water, ice, and water vapor at the same temperature $T = 0^\circ C$. Which of the following is true about the internal energy of the substances?

- a) $U_{\text{water}} > U_{\text{ice}} > U_{\text{vapor}}$ b) $U_{\text{water}} < U_{\text{ice}} > U_{\text{vapor}}$
 c) $U_{\text{water}} = U_{\text{ice}} = U_{\text{vapor}}$ d) $U_{\text{water}} < U_{\text{ice}} < U_{\text{vapor}}$
 e) $U_{\text{ice}} < U_{\text{water}} < U_{\text{vapor}}$

5. An ideal gas is taken around the cycle ABDCA; the change in internal energy of the gas will be

- (1) $2P_1 V_1$ (2) $-2P_1 V_1$
 (3) $4P_1 V_1$ (4) Zero



6. Which of the following is a form of kinetic energy that occurs within a molecule when the bonds are stretched or bent?

- a) Translational b) Vibrational c) Rotational d) Internal

Q2 / Fill following blanks:

- 1) Measure the temp. of point by thermometer.
- 2) The rate of heat flow by the two spheres is equal to
- 3) Triple point of water is equal to or
- 4) The of the thermal conductivity means flow of heat from high to lower temp.
- 5) The rate at which objects emit radiation energy depends,
....., and

Q3 / Briefly explain the following with draw if us necessary:

1. The Solar Radiation Spectrum.
2. The Unusual Behavior of Water.
3. Isothermal produced using the Van Der Waals Equation.
4. he relation between the pressure, specific volume, and temperature, because have a substance that contracts and expands.
5. The relation between (T, P, V) in saturation vapour pressure, and how to change between them?

Q4 / Draw the following diagrams with all necessary indications:

1. Atomic Bonding in Solids.
2. Sea Breezes and Land Breezes Arise from Uneven Surface Heating.
3. Behavior of gases at high pressure

Q 5 / Prove that:

1. The reduced of Van der Walls equation of state.
2. Entropy of an Ideal gas.
3. The Coefficient of Cubical Expansion.
4. The Change of heat flow is proportional to the temperature and two the surface of wall.

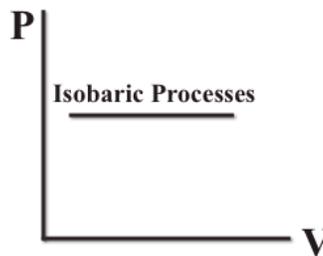
Q 6 / a) A small plastic container, called the coolant reservoir, catches the radiator fluid that overflows when an automobile engine becomes hot. The radiator is made of copper and the coolant has an expansion coefficient of $4.0 \times 10^{-4} (\text{°C})^{-1}$. If the radiator is filled to its 15-quart capacity when the engine is cold (6 °C) and expansion coefficient of $51 \times 10^{-6} (\text{°C})^{-1}$, how much overflow will spill into the reservoir when the coolant reaches its operating temperature (92 °C)?

Q7 / One wall of a house consists of 0.019-m-thick plywood backed by 0.076-m-thick insulation. The temperature at the inside surface is 25.0 °C , while the temperature at the outside surface is 4.0 °C , both being constant. The thermal conductivities of the insulation and the plywood are, respectively, 0.030 and $0.080 \text{ J}/(\text{s} \cdot \text{m} \cdot \text{°C})$, and the area of the wall is 35 m^2 . Find the heat conducted through the wall in one hour (a) with the insulation and (b) without the insulation.

Q8 / A particular mass of N_2 occupies a volume of 1.00 L at -50 °C and 800 bar. Determine the volume occupied by the same mass of N_2 at 100 °C and 200 bar using the compressibility factor for N_2 . At -50 °C and 800 bar it is 1.95; at 100 °C and 200 bar it is 1.10. Compare this value to that obtained from the ideal gas law.

Q9 / From the figure: -

- 1- Is the final temperature higher than, lower than, or equal to the initial temperature?
- 2- Is the work done of gas positive, negative, explain.
- 3- Show on the figure how you would determine the amount of work done.
- 4- Is any heat energy added to or removed from the system in this process explained.



Q10 / Show the difference between the following:

1. Ideal gas and Real gas.
2. Thermal Expansion and Thermal conductivity.