CBSE

THERMAL PROPERTIES OF MATTER WS 3

Class 11 - Physics

Section A

1. An ideal gas occupies a volume of 100 cm^3 at 20° C and 100 Pa. Find the number of moles of gas in the container. **[1]**

   a) 4.30×10^{-6} b) 4.10×10^{-6} mol

   c) 4.60×10^{-6} d) 4.80×10^{-6}

2. A spray can contain a propellant gas at twice atmospheric pressure (202 kPa) and having a volume of 125 cm^3 is at 22^oC. It is then tossed into an open fire. When the temperature of the gas in the can reaches 195^oC, what is the pressure inside the can? Assume any change in the volume of the can is negligible. **[1]**

   a) 260 kPa b) 300 kPa

   c) 290 kPa d) 320 kPa

3. The average kinetic energy of the molecules in a substance is most closely associated with: **[1]**

   a) Contraction b) expansion

   c) temperature d) heat

4. Two containers A and B are partly filled with water and closed. The volume of A is twice that of B and it contains half the amount of water in B. If both are at the same temperature, the water vapour in the containers will have pressure in the ratio of **[1]**

   a) 1 : 2 b) 4 : 1

   c) 1 : 1 d) 2 : 1

5. **Assertion (A):** Air pressure in a car tyre increases during driving. **[1]**
   Reason (R): Absolute zero degree temperature is not zero energy temperature.

   a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.

   c) A is true but R is false. d) A is false but R is true.

6. **Assertion (A):** Liquids usually expand more than solids. **[1]**
   Reason (R): The intermolecular forces in liquids are weaker than in solids.

   a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.

   c) A is true but R is false. d) A is false but R is true.

7. **State True or False:** **[1]**

   (a) Translatory motion is the motion in a straight line which is common in gases. **[1]**

8. **Fill in the blanks:** **[1]**

(a) _____ motion is the motion of molecules about their axis. **[1]**

9. What is the temperature above which steam will not condense to water even if it is compressed (isothermally) to very large pressure? **[1]**

Section B

10. A big size balloon of mass M is held stationary in the air with the help of a small block of mass $\frac{M}{2}$ tied to it by a light string such that both float in mid-air. Describe the motion of the balloon and the block when the string is cut. **[2]**

Section C

11. Define the terms **[3]**

i. absorptive power,

ii. emissive power and

iii. emissivity.

Write their SI units, if any.

Section D

12. Two ideal gas thermometers A and B use oxygen and hydrogen respectively. The following observations are made: **[5]**

Temperature	Pressure thermometer A	Pressure thermometer B
Triple-point of water	$1.250 \times 10^5 \mathrm{Pa}$	$0.200 \times 10^5 \mathrm{Pa}$
Normal melting point of Sulphur	$1.797 \times 10^5 \mathrm{Pa}$	$0.287 \times 10^5 \mathrm{Pa}$

a. What is the absolute temperature of normal melting point of sulphur as read by thermometers A and B*?*

b. What do you think is the reason behind the slight difference in answers of thermometers A and B*?* (The thermometers are not faulty). What further procedure is needed in the experiment to reduce the discrepancy between the two readings?