

## Topic 3 – Thermal physics

### PROBLEM SET

*THIS IS A PRACTICE ASSESSMENT. Show formulas, substitutions, answers, and units!*

#### Topic 3.2 – KMT and The Mole PROBLEM SET#1

20. A 16-pound bowling ball having a mass of 7.27 kg is placed on a dime having a diameter of 1.80 cm. The ball-dime combo is then placed on the floor. What is the pressure in  $\text{N m}^{-2}$  exerted on the floor? Why is the dime even used?

*The following questions are about the kinetic model of an ideal gas.*

24. List the four assumptions of the kinetic model of an ideal gas.
25. Using the assumptions of the kinetic model of an ideal gas: Explain why 1 mol of an ideal gas in a fixed container has a higher pressure at a higher temperature.

26. Using the assumptions of the kinetic model of an ideal gas: Explain why 1 mol of an ideal gas in a fixed container has a lower pressure than 2 mol in the same container at the same temperature.

*The internal volume of a gas cylinder is  $2.75 \times 10^{-3} \text{ m}^3$ . The cylinder head has a diameter of 12.5 cm. An ideal gas is pumped into the cylinder until the pressure becomes 350. kPa. The temperature of the gas is  $58.6^\circ\text{C}$ .*

27. What force does the gas exert on the cylinder head?

28. Determine how many moles of the gas are there in the cylinder.

29. Determine the number of gas atoms in the cylinder.