

AP2 FIZZIX PREX #2 – CH 13-15 2015 - SOLUTIONS

24. 0<sup>th</sup> Law: Being in thermal equilibrium means the objects are at the same temperature. Mass is irrelevant. Stupid Law.... C
25. Changes in internal energy are path independent on a PV diagram as it depends on the change in temperature, which is based on the beginning and end points of the path and not the path taken. Different paths, with different areas under them will do different amounts of work and hence, different amounts of heat exchanged. A
26. In linear expansion, every linear dimension of an object changes by the same fraction when heated or cooled. D
33. 
$$e_c = \frac{T_H - T_C}{T_H} = 1 - \frac{T_C}{T_H}$$
 (use absolute temperatures) D
34.  $\Delta U$  for each process is equal so  $Q_{AC} + W_{AC} = Q_{ABC} + W_{ABC}$ , or  $+30 \text{ J} + (-20 \text{ J}) = +25 \text{ J} + W_{ABC}$  C
37.  $\Delta U \propto \Delta T$  A
38. 
$$v_{rms} = \sqrt{\frac{3RT}{M}}$$
, if T is tripled, v is multiplied by  $\sqrt{3}$  D
40. 
$$e = \frac{W}{Q_H} = \frac{Q_H - Q_C}{Q_H}$$
 C
50. In a Carnot cycle  $\frac{Q_H}{Q_C} = \frac{T_H}{T_C}$  and in process AB,  $\Delta U = 0$  and since  $W_{AB} = -400 \text{ J}$ ,  $Q_{AB} = +400 \text{ J}$  and this is  $Q_H$ . So, 
$$\frac{Q_H}{Q_C} = \frac{T_H}{T_C} \Rightarrow \frac{400}{Q_C} = \frac{1000}{250}$$
 E