16.2 This problem asks for the maximum and minimum thermal conductivity values for a TiC-Ni cermet. Using a modified form of Equation 16.1 the maximum thermal conductivity k_{max} is calculated as

$$k_{max} \; = \; k_m V_m \; + \; k_p V_p \; = \; k_{Ni} V_{Ni} \; + \; k_{TiC} V_{TiC}$$

$$= \; (67 \text{ W/m-K})(0.10) \; + \; (27 \text{ W/m-K})(0.90) \; = \; 31.0 \text{ W/m-K}$$

Using a modified form of Equation 16.2, the minimum thermal conductivity k_{min} will be

$$k_{min} \; = \; \frac{k_{Ni} k_{TiC}}{V_{Ni} k_{TiC} \; + \; V_{TiC} k_{Ni}}$$

$$= \; \frac{(67 \text{ W/m-K})(27 \text{ W/m-K})}{(0.10)(27 \text{ W/m-K}) \; + \; (0.90)(67 \text{ W/m-K})}$$

$$= 28.7 \text{ W/m-K}$$