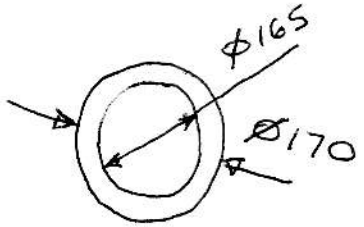

FREE EXPANSION OF BOTH MATERIALS AT 250°C

$165 \times 19.9 \times 10^{-6} \times (250-20) = 0.755205\,mm$

$170 \times 13.9 \times 10^{-6} \times (250-20) = 0.53176\,mm$

$\therefore$ DIAMETRAL INTERFERENCE $= 0.755205 - 0.53176$

$= 0.223445\,mm$

BOTH MATERIALS HAVE ALMOST THE SAME MODULUS OF ELASTICITY. ie:- $200 \times 10^3 \frac{N}{mm^2}$

PRESSURE BETWEEN SURFACES :-

$$P = \frac{DC}{2r_b} \times \frac{E^2}{E(K_2 + \nu)}$$

DC = DIAMETRAL INTERFERENCE

$E = 200 \times 10^3$

$\nu = 0.3$ POISSEN'S RATIO

$$K_2 = \frac{(r_o/r_b)^2 + 1}{(r_o/r_b)^2 - 1} = 33.507$$

$P = 8.011\ N/mm^2$

$r_o = \frac{170}{2} = 85$

$r_b = \frac{165}{2} = 82.5$

CHANGE IN OUTER RADIUS $= \frac{P r_o}{E} \times \left(\frac{2 \times r_b^2}{r_o^2 - r_b^2} \right) = 0.11068\,mm$

$\therefore$ CHANGE IN OUTER DIA OF SHAFT $= 2 \times 0.11068 = 0.221\,mm$ @ 250°C