

Ques-4 (iii)

If the tube and chamber are essentially the same in diameter then $d_1 = d_2$

$$\therefore \dot{Q}' = \frac{\sigma A_1 (T_1^4 - T_2^4)}{\frac{1}{\epsilon_1} + \frac{1}{1} \left(\frac{1}{\epsilon_2} - 1 \right)}$$

$$= \frac{5.67 \times 10^{-8} \times \pi \times 0.1 (700^4 - 1255^4)}{\frac{1}{0.5} + \frac{1}{1} \left(\frac{1}{0.8} - 1 \right)}$$

$$= -17,738 \text{ W/m}$$

∴ 17.74 kW/m received