Module 3: Short questions

1. Is the heat flow through a fin truly one-dimensional? Justify the one-dimensional assumption made in the analysis of fins.

2. Insulated tip condition is often used in fin analysis because (choose one answer)
   A. Fins are usually deliberately insulated at their tips
   B. There is no heat loss from the tip
   C. The heat loss from the tip is usually insignificant compared to the rest of the fin, and the insulated tip condition makes the problem mathematically simple

3. What is the difference between fin effectiveness and fin efficiency?

4. The fins attached to a surface are determined to have an effectiveness of 0.9. Do you think the rate of heat transfer from the surface has increased or decreased as a result of addition of fins?

5. Fins are normally meant to enhance heat transfer. Under what circumstances the addition of fins may actually decrease heat transfer?

6. Hot water is to be cooled as it flows through the tubes exposed to atmospheric air. Fins are to be attached in order to enhance heat transfer. Would you recommend adding fins to the inside or outside the tubes? Why?

7. Hot air is to be cooled as it is forced through the tubes exposed to atmospheric air. Fins are to be attached in order to enhance heat transfer. Would you recommend adding fins to the inside or outside the tubes? Why? When would you recommend adding fins both inside and outside the tubes?

8. Consider two finned surface which are identical except that the fins on the fist surface are formed by casting or extrusion, whereas they are attached to the second surface afterwards by welding or tight fitting. For which case do you think the fins will provide greater enhancement in heat transfer? Explain.

9. Does the (a) efficiency and (b) effectiveness of a fin increase or decrease as the fin length is increased?

10. Two pin fins are identical, except that the diameter of one of them is twice the diameter of the other? For which fin will the a) efficiency and (b) effectiveness be higher? Explain.

11. Two plate fins of constant rectangular cross section are identical, except that the thickness of one of them is twice the thickness of the other? For which fin will the a) efficiency and (b) effectiveness be higher? Explain.

12. Two finned surface are identical, except that the convection heat transfer coefficient of one of them is twice that of the other? For which fin will the a) efficiency and (b) effectiveness be higher? Explain.