MAE 423 HEAT AND MASS TRANSFER
EXAM 1 Practice Questions

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Name: _____ You are allowed one sheet of notes.

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1. A planar wall has a temperature of 800° C on one side and 50° C on the other side. If the wall is 10 cm thick, and has a thermal conductance of 0.5 W/(mK), how much heat is transmitted through the wall per unit area (per m^2)?

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2. A planar wall has a temperature of 800° C on one side and is exposed to air at 20° on the other side. If the wall is 10 cm thick, and has a thermal conductance of 0.5 W/(mK), and the convection coefficient for the exposed side is 15 W/(m^2K), (i) how much heat is transmitted through the wall per unit area (per m^2), and (ii) what is the temperature of the exposed side of the wall?

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3. A planar wall has a temperature of 800° C on one side and is exposed to air and room surfaces at 20° on the other side. If the wall is 10 cm thick and has a thermal conductance of 0.5 W/(mK), and the exposed surface has an emissivity of 0.8 and convection coefficient of 15 W/(m^2K), (i) how much heat is transmitted through the wall per unit area (per m^2), and (ii) what is the temperature of the exposed side of the wall?

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4. A cylindrical wall has a temperature of 800° C on the inside and is exposed to air and room surfaces at 20° on the outside. If the wall has an inside radius of 0.25 m, thickness of 10 cm, height of 0.5 m, and thermal conductance of 0.5 W/(mK), and the exposed outside surface has an emissivity of 0.8 and convection coefficient of 15 W/(m^2K), (i) how much heat is transmitted through the wall, and (ii) what is the temperature of the exposed outside of the wall?

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