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Roll No

CM-505 (GS)
B.E. V Semester Examination, June 2020
Grading System (GS)
Heat Transfer
Time : Three Hours

Maximum Marks : 70

- Note:** i) Attempt any five questions.
ii) All questions carry equal marks.

1. Using the thermal-resistance concept for multiple-layer cylindrical system develop the one-dimensional heat flow conduction equation.
2. Explain the scenario below? On a summer' morning, John walks barefoot across his paved driveway with no problem. However, later that afternoon he steps barefoot onto the same driveway and must quickly run off because the bottoms of his feet feel like they are burning.
3. a) Show that absorptivity of a radiating body is equal to its emissivity.
b) Discuss the main laws of black body radiations.
4. A long hollow cylinder has inner and outer radii as 10cm and 20cm respectively. The rate of heat generation is 1 kW/m³, the thermal conductivity of cylinder material is 0.2 W/mk. If the maximum temperature occurs at radius of 15cm and temperature of Outer surface is 607 deg.C, find temperature at the inner surface of the cylinder.
5. What is critical insulation thickness and how it differs from optimum insulation thickness? Explain for a pipe.
6. a) Distinguish between nucleate and film boiling.
b) Define film condensation on vertical plate.
7. Calculate the rate of condensation on a 1.5 by 1.5m vertical plate maintained at 40°F and exposed to saturated water vapor at 55°F; $h_{fg} = 2376$ kJ/kg at 55°F.

OR

Explain why the temperature boundary layer grows much more rapidly than the velocity boundary layer in liquid metals.

8. Answer any two of the following:
 - a) What is the Dittus-Boelter equation?
 - b) What is Beer's law?
 - c) Explain the method of Feeding of Multiple Effect Evaporators.
 - d) Define counter flow exchanger and then a parallel-flow exchanger with neat sketch?