SNS COLLEGE OF TECHNOLOGY

(An autonomous Institution)
Accredited by NBA & NAAC with "A^{++}" grade
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19MEB302 – Heat & Mass transfer

PUZZLES

1. True or False Quiz

1. In free convection, the movement of fluid is caused by external devices like fans or pumps.
   Answer: False (It's caused by temperature differences.)
2. The boundary layer is the region of fluid where velocity increases gradually from the surface to the free stream.
   Answer: True
3. Turbulent flow is smooth and predictable, while laminar flow is chaotic.
   Answer: False (It's the opposite.)
4. Forced convection is commonly used in cooling systems for electronic equipment.
   Answer: True
5. Flow over a cylinder is an example of internal flow.
   Answer: False (It's external flow.)

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2. Multiple Choice Questions

1. **What is the primary factor that drives free convection?**
   a) Fans
   b) Temperature gradients
   c) Pumps
   d) High pressure
   Answer: b) Temperature gradients
2. **Which flow regime is characterized by chaotic and irregular motion?**
   a) Laminar
   b) Turbulent
   c) Boundary layer
   d) Viscous
   Answer: b) Turbulent
3. **What is the flow type inside a pipe called?**
   a) Internal flow
   b) External flow
   c) Free convection
   d) Mixed convection
   Answer: a) Internal flow

4. **What type of convection occurs over a bank of tubes?**
   a) Free convection
   b) Forced convection
   c) Combined laminar and turbulent flow
   d) External flow
   Answer: d) External flow

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3. Concept Identification

Scenario:
A vertical plate in an electronic cabinet is heated, causing air near it to rise. Simultaneously, a cooling fan blows air across the cabinet to assist cooling.

Questions:

1. Which type of convection is caused by the rising air?
   Answer: Free Convection
2. Which type of convection is caused by the cooling fan?
   Answer: Forced Convection
3. If the air near the vertical plate transitions from laminar to turbulent flow, what phenomenon is being observed?
   Answer: Combined Laminar and Turbulent Flow
4. What is the name of the layer where fluid velocity changes from zero at the plate to free-stream velocity?
   Answer: Boundary Layer

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4. Fill in the Concept Chart

Instructions: Fill in the blank with the correct concept.

Flow/Convection Type	Definition/Example
Free Convection	Movement of fluid caused by _____ gradients. (*Answer*: Temperature)
Forced Convection	Flow caused by external devices such as _____. (*Answer*: Fans or Pumps)
Laminar Flow	Smooth and _____ flow. (*Answer*: Orderly)
Turbulent Flow	Flow that is _____ and irregular. (*Answer*: Chaotic)
Flow over Vertical Plate	Common in _____ cooling applications. (*Answer*: Electronic Equipment)
Internal Flow	Flow inside _____. (*Answer*: Pipes)

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5. Word Jumble

Unscramble the following words related to convective heat transfer:

1. RIAFOTLCNO WOLF (**Answer**: Internal Flow)
2. EERTNAXL WOLF (**Answer**: External Flow)
3. DOURBANY YALER (**Answer**: Boundary Layer)
4. ARMINAL FLOW (**Answer**: Laminar Flow)
5. NEESTRCTVOINV DORECF (**Answer**: Forced Convection)