For fully developed turbulent flow in smooth tubes, the local convective heat coefficient is constant in which of the following boundary conditions?

Selected Answer: either a or b

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uestion 2

In a fully developed internal pipe flow, the local convective heat coefficient is the highest at the entrance region.

Selected Answer: False

Response Feedback: The local convective heat coefficient is the highest at the entrance region where the velocity profile is uniform and not fully developed.

uestion 3

In internal forced convection, boundary layers are confined by the inner surfaces of the tube.

Selected Answer: True

uestion 4

For a fully developed pipe flow with constant surface temperature, the temperature differences between the fluid and surface decay exponentially in the flow direction.

Selected Answer: True

uestion 5

In a fully developed internal pipe flow, the local friction factor and local convective heat coefficient are constant.

Selected Answer: True

Question 1

The pressure drop in pipe flow is entirely due to viscous effects (friction loss) at the inner surface.

Selected Answer: True

Question 2

For fully developed turbulent flow in smooth tubes, the local convective heat coefficient is constant in which of the following boundary conditions?

Selected Answer: constant surface flux only

Response Feedback: For fully developed turbulent flow in smooth tubes, the local convective heat coefficient is constant (due to constant velocity and thermal profiles), and is regardless of boundary conditions.

Question 3

In fully developed circular pipe flow, fluid velocity is maximum at the pipe centre.

Selected Answer: True

Question 4

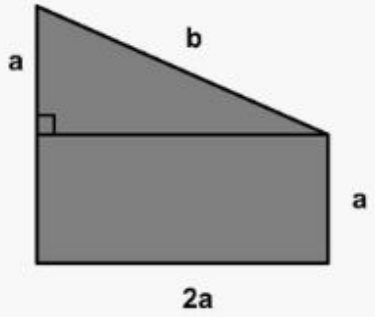
Which of the following statement(s) is/are correct for a fully developed pipe flow with constant surface heat flux?
a. The mean fluid temperature increases linearly in a tube of constant diameter.
b. The temperature difference between surface temperature and mean fluid temperature is constant in a tube of constant diameter.

Selected Answer: a only

Response Feedback: For fully developed pipe flow with constant surface heat flux, the mean fluid temperature and surface temperature will increase linearly, hence their temperature difference will remain constant along the pipe distance.

Question 5

What is the hydraulic diameter for the following non-circular tube (gray area is channel cross section)?



Selected Answer: None of the options

Response Feedback: Hydraulic diameter = (4 * flow area) / wetted perimeter

Question 1

For fully developed turbulent flow in smooth tubes, the local convective heat coefficient is constant in which of the following boundary conditions?

Selected Answer: either a or b

Question 2

In a fully developed internal pipe flow, the local friction factor and local convective heat coefficient are constant.

Selected Answer: True

Question 3

Which of the following statement(s) is/are correct for a fully developed pipe flow with constant surface heat flux?
a. The mean fluid temperature increases linearly in a tube of constant diameter.
b. The temperature difference between surface temperature and mean fluid temperature is constant in a tube of constant diameter.

Selected Answer: a and b

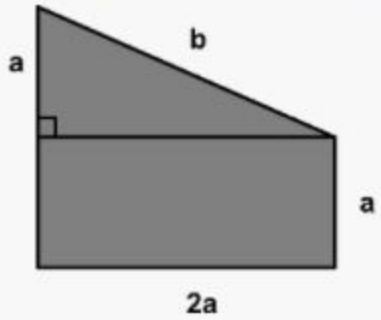
Question 4

For a fully developed pipe flow with constant surface temperature, the temperature differences between the fluid and surface decay exponentially in the flow direction.

Selected Answer: True

Question 5

What is the hydraulic diameter for the following non-circular tube (gray area is channel cross section)?



Selected Answer: $12a^2/(5a+b)$

Question 1

In a fully developed internal pipe flow, the local friction factor and local convective heat coefficient are constant.

Selected Answer: True

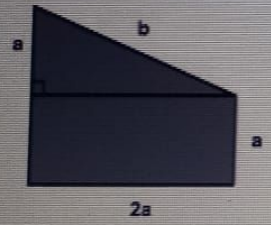
Question 2

In a turbulent pipe flow with a fixed flow rate and pipe diameter, the thermal entrance length will be the same between liquid A (Pr >1) and liquid B (Pr <1).

Selected Answer: True

Question 3

What is the hydraulic diameter for the following non-circular tube (gray area is channel cross section)?



Selected Answer: $12a^2/(5a+b)$

Question 4

For a fully developed pipe flow with constant surface temperature, the temperature differences between the fluid and surface decay exponentially in the flow direction.

Selected Answer: True

Question 5

For fully developed turbulent flow in smooth tubes, the local convective heat coefficient is constant in which of the following boundary conditions?

Selected Answer: either a or b

Friday, November 5, 2021 9:52:31 PM SGT

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Attempt Score	4 out of 5 points
Time Elapsed	4 minutes out of 15 minutes
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Question 1

For pipe flow, the critical Reynolds number at which flow transitions into turbulent region is

Selected Answer: 2300

Question 2

For fully developed turbulent flow in smooth tubes, the local convective heat coefficient is constant in which of the following bounda

Selected Answer: either a or b

Question 3

Which of the following statement(s) is/are correct for a fully developed pipe flow with constant surface heat flux?
a. The mean fluid temperature increases linearly in a tube of constant diameter.
b. The temperature difference between surface temperature and mean fluid temperature is constant in a tube of constant diamete

Selected Answer: a and b

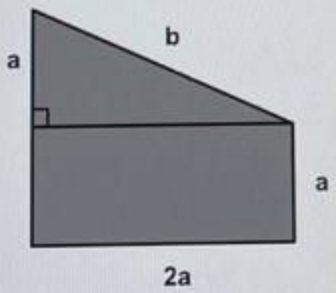
Question 4

In internal forced convection, boundary layers are confined by the inner surfaces of the tube.

Selected Answer: True

Question 5

What is the hydraulic diameter for the following non-circular tube (gray area is channel cross section)?



Selected Answer: $3a^2/(5a+b)$

Response Feedback: Hydraulic diameter = (4 * flow area) / wetted perimeter

Friday, November 5, 2021 8:19:43 PM SGT

Question 3

In a turbulent pipe flow with a fixed flow rate and pipe diameter, the thermal entrance length will be the same between liquid A (Pr >1) and liquid B (Pr <1).

Selected Answer:
True

Question 4

Which of the following statement(s) is/are correct for a fully developed pipe flow with constant surface heat flux?
a. The mean fluid temperature increases linearly in a tube of constant diameter.
b. The temperature difference between surface temperature and mean fluid temperature is constant in a tube of constant diameter.

Selected Answer:
a and b

Question 5

In internal forced convection, boundary layers are confined by the inner surfaces of the tube.

Selected Answer:
False

Response Feedback: The maximum boundary layer is the radius of the tube.

Friday, November 5, 2021 7:18:35 PM SGT

← OK

Results Displayed Submitted Answers, Feedback

Question 1

The pressure drop in pipe flow is entirely due to viscous effects (friction loss) at the inner surface.

Selected Answer:
True

Question 2

In fully developed circular pipe flow, fluid velocity is maximum at the pipe centre.

Selected Answer:
True

Question 3

In a turbulent pipe flow with a fixed flow rate and pipe diameter, the thermal entrance length will be the same between liquid A (Pr >1) and liquid B (Pr <1).

Selected Answer:
True

Question 4

Which of the following statement(s) is/are correct for a fully developed pipe flow with constant surface heat flux?
a. The mean fluid temperature increases linearly in a tube of constant diameter.
b. The temperature difference between surface temperature and mean fluid temperature is constant in a tube of constant diameter.

Selected Answer:
a and b

Question 1

In a fully developed internal pipe flow, the local convective heat coefficient is the highest at the entrance region.

Selected Answer: False

Response Feedback: The local convective heat coefficient is the highest at the entrance region where the velocity profile is uniform and not fully developed.

Question 2

In internal forced convection at a fixed flow speed, the fluid flow will change from laminar to turbulent along the flow direction.

Selected Answer: False

Question 3

For a fully developed pipe flow with constant surface temperature, the temperature differences between the fluid and surface decay exponentially in the flow direction.

Selected Answer: True

Question 4

Which of the following statement(s) is/are correct for a fully developed pipe flow with constant surface heat flux?
a. The mean fluid temperature increases linearly in a tube of constant diameter.
b. The temperature difference between surface temperature and mean fluid temperature is constant in a tube of constant diameter.

Selected Answer: a and b

Question 5

In a fully developed internal pipe flow, the local friction factor and local convective heat coefficient are constant.

Selected Answer: True