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NPTEL

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Unit 4 - Week 3

Register for Certification exam

Course outline

Assignment 3

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-02-20, 23:59 IST

1) Consider a cubical enclosure of side 1.0 cm.The radiative space resistance between parallel faces of the cube is *1 point*

- 1 cm^{-2}
- 5 cm^{-2}
- 3 cm^{-2}
- 10 cm^{-2}

No, the answer is incorrect.
Score: 0

Accepted Answers:
5 cm^{-2}

2) Consider an infinitely long pipe with cross-section in the form of an equilateral triangle of side 1 cm. The radiative space resistance between any two surfaces of the pipe per unit area is: *1 point*

- 1 cm^{-2}
- 2 cm^{-2}
- 3 cm^{-2}
- 4 cm^{-2}

No, the answer is incorrect.
Score: 0

Accepted Answers:
2 cm^{-2}

3) If a plane surface (ϵ = 0.9, T = 300 K) exposed to convective heat transfer from air (T = 290 K) is losing , 100 W/m^2 amount of heat, then the approximate value of convective heat transfer coefficient between the surface and air is *1 point*

- 4.75 W/m^{-2}-K

Week 8

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Accepted Answers:
4.75 W/m^{-2}-K

4) Which of the following statements is not correct for real specularly reflecting surfaces? ***1 point***

- View factor between two reflecting surfaces may be greater than one
- The reflectivity depends on incoming direction
- The reflectivity depends on outgoing direction
- The reflectivity does not depend on incoming direction

No, the answer is incorrect.
Score: 0

Accepted Answers:
The reflectivity does not depend on incoming direction

5) Two infinitely long parallel plates of width **w** are spaced **h=2w** apart. If both the plates are specular and ϵ_1=0.2 and ϵ_2=0.5, the view factor F^s_{1-1} is ***1 point***

- 0.79
- 0.079
- 0.21
- 0.021

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.079

6) Two infinitely long parallel plates of width **w** are spaced **h=2w** apart. If both the plates are specular and ϵ_1=0.2 and ϵ_2=0.5, the view factor F^s_{1-2} is ***1 point***

- 0.739
- 0.321
- 0.281
- 0.279

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.281

7) If the plates in the above problem have temperature T_1 =1000 K and T_2=2000 K, respectively, calculate the heat transfer on the cold plate is: ***1 point***

- 14,330 W/m^2
- -14,330 W/m^2
- -7,165 W/m^2
- 7,165 W/m^2

No, the answer is incorrect.
Score: 0

Accepted Answers:
-14,330 W/m^2

8) A cubical enclosure has five of its surfaces maintained at 300 K, while the sixth is isothermal at 1200 K. The entire enclosure is coated with a material that emits and reflects diffusely with ***1 point***

$$\begin{cases} 0.2, & 0 \le \lambda < 4\mu m. \end{cases}$$

$\epsilon_\lambda = \begin{cases} \\ 0.8, & 4\mu m < \lambda < \infty \end{cases}$

The radiative heat flux on the cold surface with **semi-gray** approximation is

- 8,543 W/m^2
- 9,272 W/m^2
- -9,272 W/m^2
- -8,543 W/m^2

No, the answer is incorrect.
Score: 0

Accepted Answers:
-9,272 W/m^2

9) In the above problem the raidative heat flux on the cold surface with **band approximation** ***1 point***
is

- -8,437 W/m^2
- 8,437 W/m^2
- 9,492 W/m^2
- -9,492 W/m^2

No, the answer is incorrect.
Score: 0

Accepted Answers:
-9,492 W/m^2

10) A thermocouple with a 0.5 mm diameter spherical bead is used to measure the local ***1 point***
temperature of a hot, radiatively nonparticipating gas flowing through an isothermal, gray-diffuse tube (T_w = 800 K, ϵ_w = 1). The thermocouple is a diffuse emitter and reflector with ϵ_b = 0.5, and the heat transfer coefficient between bead and gas is 30 W/m^2 K. If the real temperature of the gas is 1000 K, the actual temperature measured by the thermocouple would be

- 753 K
- 863 K
- 950 K
- 647 K

No, the answer is incorrect.
Score: 0

Accepted Answers:
863 K

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