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NPTEL

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Unit 7 - Week 6

Register for Certification exam

Course outline

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Week 6

- Exchange Areas
- Monte Carlo Method for Thermal Radiation-I
- Monte Carlo Method for Thermal Radiation-II
- Radiative Properties of Gases
- Atomic and Molecular Spectra
- Quiz : Assignment 6

Assignment 6

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

Due on 2019-03-13, 23:59 IST

1) Consider two isolated spectral lines of the absorption spectrum of high temperature gas CO_2 (T = 2000 K) located at wave numbers of 2500 cm^{-1} and 2501 cm^{-1}, respectively. If both the lines have same integrated line strength S = 0.1 , the absorption coefficient at a wave number of 2500 cm^{-1} is ***1 point***

- 0.432 cm^{-1}
- 0.0432 cm^{-1}
- 0.534 cm^{-1}
- 0.0534 cm^{-1}

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.0432 cm^{-1}

2) The Surface-to-surface direct exchange areas between plane parallel infinite plates separated by a distance of 1 m with a gray medium of absorption coefficient 0.25 m^{-1} is ***1 point***

- 0.0544
- 0.6492
- 0.3264
- 0.1638

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.6492

3) The Surface-to-gas direct exchange areas between plane parallel infinite plates separated by a distance of 1 m with a gray medium of absorption coefficient 0.25 m^{-1} is ***1 point***

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Score: 0

Accepted Answers:
0.35

4) The gas-to-gas direct exchange areas between plane parallel infinite plates separated by a distance of 1 m with a gray medium of absorption coefficient 0.25 m^{-1} is ***1 point***

- 0.2984
- 0.3723
- 0.7824
- 0.3508

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.2984

5) In a ro-vibrational molecular spectral band the condition for obtaining equally spaced lines is ***1 po***

- $B_{v+1} = B_v$
- $B_{v+1} < B_v$
- Band with a head
- Not possible

No, the answer is incorrect.
Score: 0

Accepted Answers:
$B_{v+1} = B_v$

6) A photon is emitted from one of the vertices of a cube of side s = 1 cm along the diagonal passing through the same vertex. If the cube is filled with a gray gas of $\kappa S = 1$ the range of random numbers for which the photon will be absorbed between center and the opposite vertex of the cube is ***1 point***

- (0.1458, 0.8734)
- (0.2431, 0.4930)
- (0.005, 0.1294)
- (0.8721, 0.9847)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(0.2431, 0.4930)

7) Consider a circular disc of radius R with uniform temperature T. The location of point of emission on the disc can be selected randomly with the following relation in terms of a uniformly distributed random number R_r ***1 point***

- $r = rR_r$
- $r = R\,(R_r)^{0.5}$
- $r = R\,(R_r)^2$
- $r = R/R_r$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$r = R\,(R_r)^{0.5}$

8) In above problem the angular location **φ** of point of emission can be determined with **1 point**

- $\varphi = 2\pi R_\varphi$
- $\varphi = \pi R_\varphi$
- $\varphi = 2\pi(R_\varphi)^{0.5}$
- $\varphi = 2\pi R^2_\varphi$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\varphi = 2\pi R_\varphi$

9) The absorption spectrum of a certain gas becomes smoother with increase in total pressure because of **1 point**

- More number of spectral lines at higher pressure
- Larger broadening at high pressure
- Less number of spectral lines at higher pressure
- Smaller broadening at high pressure

No, the answer is incorrect.
Score: 0

Accepted Answers:
Larger broadening at high pressure

10) The wavelength of a spectral line of a rotational band of CO for the rotational quantum number j = 0 is (Assume moment of inertia of CO to be 1.46×10^{-46} kg-m^2) **1 point**

- 660 μm
- 1070 μm
- 1220 μm
- 2610 μm

No, the answer is incorrect.
Score: 0

Accepted Answers:
2610 μm

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