8.2 Thermal Energy Transfer

Question Paper

Course	DP IB Physics
Section	8. Energy Production
Topic	8.2 Thermal Energy Transfer
Difficulty	Easy

Time allowed: 20

Score: /10

Percentage: /100

Question 1

In which type of material is conduction the main type of thermal transfer?

A. Gas

B. Liquid

C. Fluid

D. Solid

[1 mark]

Question 2

Which of the following statements about convection is correct?

A.	Convection is the main way heat is transferred through liquids and gases
B.	Convection mainly occurs in metals
C.	Cool fluid rises and warm fluid moves in to take its place
D.	Heated molecules gain energy, become denser and sink

[1 mark]

Question 3

Which region of the electromagnetic spectrum is responsible for thermal radiation?

A. Ultraviolet

B. Microwaves

C. Infrared

D. Visible Light

[1 mark]

Question 4

What is the correct definition for a perfect black body?

A. An object that transmits all of the radiation incident on it and does not reflect any radiation

B. An object that absorbs all of the radiation incident on it and does not reflect or transmit any radiation

C. An object that does not absorb any of the radiation incident on it

D. An object that transmits all of the radiation incident on it

[1 mark]

Question 5

A black body radiation curve shows the intensity and wavelength distribution of any waves emitted from a black body.

Which statement correctly describes the position of the peak intensity?

A. The lower the wavelength the higher the peak intensity

B. The higher the wavelength the higher the peak intensity

C. The wider the wavelength range, the lower the peak intensity

D. The narrower the wavelength range, the higher the peak intensity

[1 mark]

Question 6

Which relationship represents Wien's Displacement Law?

A. $\lambda_{max} = \frac{1}{T}$

B. $\lambda_{min} \propto \frac{1}{T}$

C. $\lambda_{max} \leq \frac{1}{T}$

D. $\lambda_{max} \propto \frac{1}{T}$

[1 mark]

Question 7

Which two factors does the power output of a black body depend on?

A. Mass and volume

B. Surface temperature and radius

C. Density and luminosity

D. Wavelength of radiation and spectral analysis

[1 mark]

Question 8

Which two assumptions are made when calculating the solar constant?

A. 1. The Earth is in an elliptical orbit around the Sun
   2. The Sun's output varies during its 11-year sunspot cycle

B. 1. Radiation from the Sun is incident on the Earth for one second
   2. Radiation from the Sun is incident on one square meter of the Earth

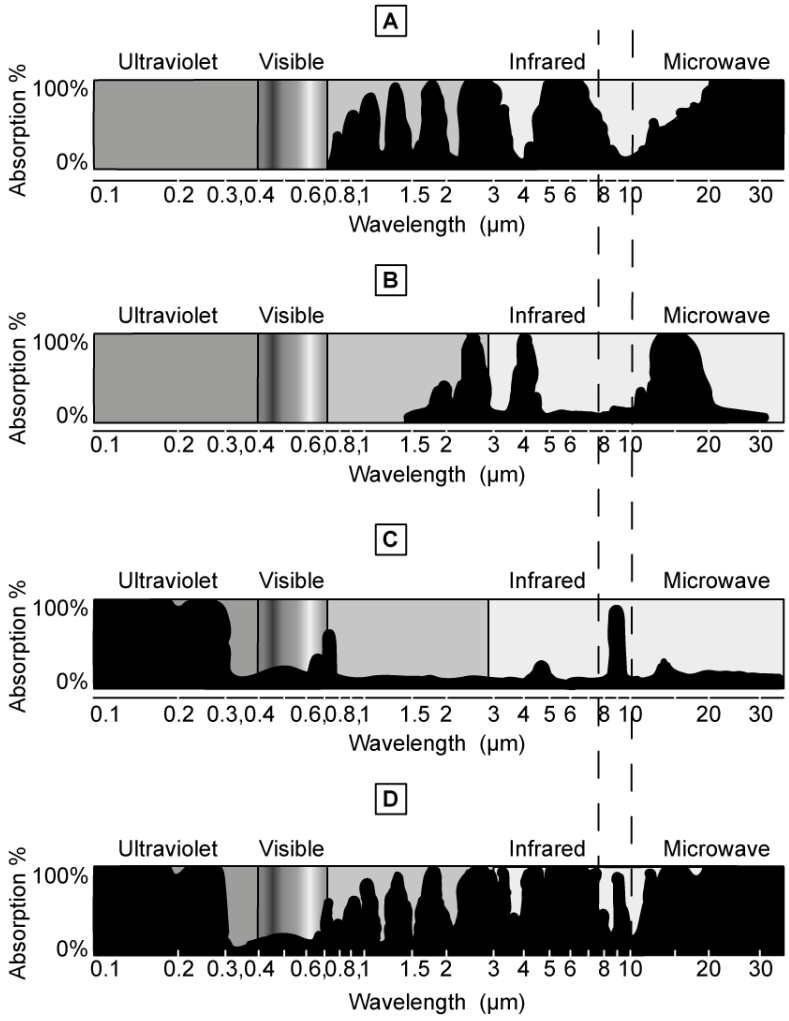
C. 1. Radiation is incident on the Earth, parallel to its surface
   2. The Earth is at its maximum distance from the Sun

D. 1. Radiation is incident perpendicular to the Earth's surface
   2. The Earth is at its mean distance from the Sun

[1 mark]

Question 9

Which diagram shows the absorption spectra for ozone?



[1 mark]

Question 10

Which equation is used to calculate emissivity?

A. $\frac{\textit{power radiated by an object}}{\textit{power emitted by a black body}}$

B. $\frac{\textit{power emitted by an object}}{\textit{power emitted by a black body}}$

C. $\frac{\textit{total scattered power from an object}}{\textit{total incident power from a black body}}$

D. $\frac{\textit{power absorbed by an object}}{\textit{power absorbed by a black body}}$

[1 mark]