

# 8.2 Thermal Energy Transfer

## Question Paper

Course	DPIB 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?

<b>A.</b>	Convection is the main way heat is transferred through liquids and gases
<b>B.</b>	Convection mainly occurs in metals
<b>C.</b>	Cool fluid rises and warm fluid moves in to take its place
<b>D.</b>	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

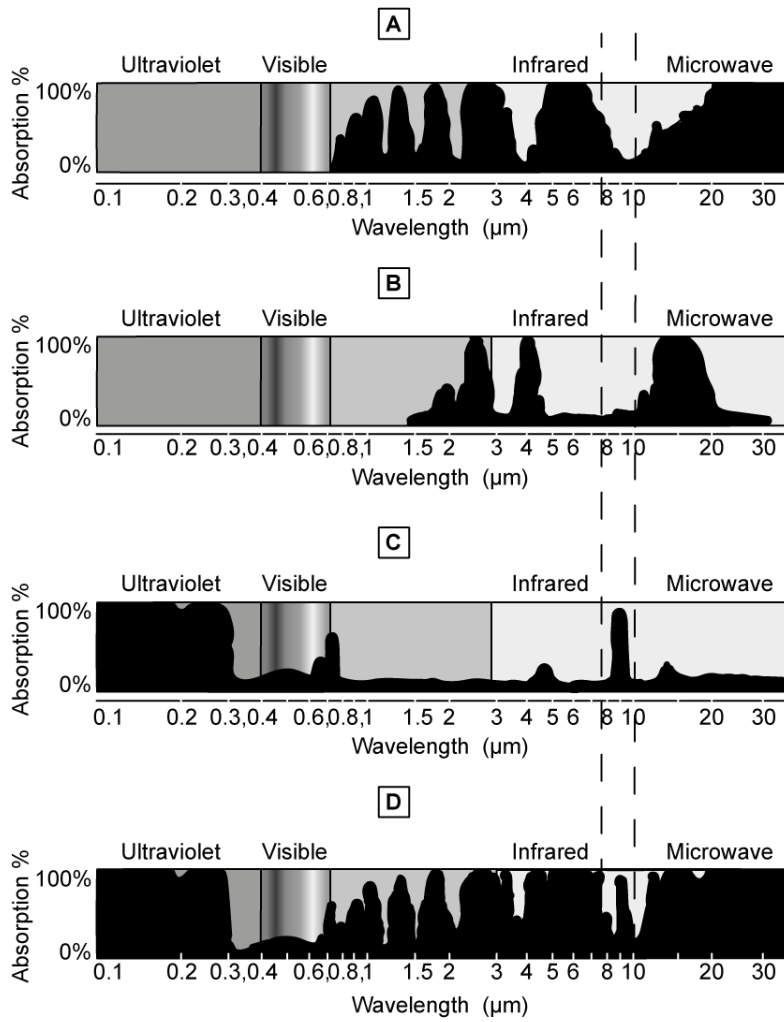
Which two assumptions are made when calculating the solar constant?

- 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.  $\frac{\text{power radiated by an object}}{\text{power emitted by a black body}}$
- B.  $\frac{\text{power emitted by an object}}{\text{power emitted by a black body}}$
- C.  $\frac{\text{total scattered power from an object}}{\text{total incident power from a black body}}$
- D.  $\frac{\text{power absorbed by an object}}{\text{power absorbed by a black body}}$

[1 mark]