

Exercise walk-through

9.3

Thermal Energy Transfer and Equilibrium

AP Physics 2

Heat transfer and equilibrium

Heat Q is energy in transit from hot to cold. Flow stops at **thermal equilibrium** (equal temperatures).

Zeroth law :
 $A=B$ and $B=C \Rightarrow A=C$ –
how a thermometer works.

Isolated: $Q_{\text{lost}} = Q_{\text{gained}}$.



Heat flows until temperatures equalise

Exercises 2.1-2.3

2.1 Name the three methods of thermal energy transfer. [2]

2.2 State the direction heat flows between a hot object and a cold object in contact. [1]

2.3 Two objects have reached thermal equilibrium. State what is true about their temperatures. [1]

Exercises 2.1-2.3

2.1 Name the three methods of thermal energy transfer. [2]

2.1

- conduction, convection, radiation
-

2.2 State the direction heat flows between a hot object and a cold object in contact. [1]

2.2

- from the hot object to the cold object
-

2.3 Two objects have reached thermal equilibrium. State what is true about their temperatures. [1]

2.3

- their temperatures are equal

Exercises 3.1-3.2

3.1 The method of heat transfer that needs no medium is

[1]

☐

A conduction

B convection

C radiation

D none of these

3.2 When two objects reach thermal equilibrium, the net heat flow between them is [1]

☐

A from hot to cold

B from cold to hot

C zero

D at its maximum

Exercises 3.1-3.2

3.1 The method of heat transfer that needs no medium is

[1]

☐

A conduction

B convection

C radiation

D none of these

3.1 C

- radiation.

3.2 When two objects reach thermal equilibrium, the net heat flow between them is [1]

☐

A from hot to cold

B from cold to hot

C zero

D at its maximum

3.2 C

- zero.

Exercise 3.3 (a)

3.3 A hot metal spoon is placed in a cup of cold water.

(a) State the direction of the heat flow.

[1]

Exercise 3.3 (a)

3.3 A hot metal spoon is placed in a cup of cold water.

(a) State the direction of the heat flow.

[1]

(a)

- from the spoon to the water

Exercise 3.3 (b)

3.3 A hot metal spoon is placed in a cup of cold water.

(b) Name the main method of transfer within the metal spoon.

[1]

Exercise 3.3 (b)

3.3 A hot metal spoon is placed in a cup of cold water.

(b) Name the main method of transfer within the metal spoon.

[1]

(b)

- conduction

Exercise 3.3 (c)

3.3 A hot metal spoon is placed in a cup of cold water.

(c) Describe the final state of the spoon and water.

[1]

Exercise 3.3 (c)

3.3 A hot metal spoon is placed in a cup of cold water.

(c) Describe the final state of the spoon and water.

[1]

(c)

- both reach the same temperature (thermal equilibrium)