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Crash Course Physics #24: Engines

Name: _____ Date: _____

You can access the video here → <https://youtu.be/p1woKh2mIVQ?si=YY0kGa0DhmQKPNa9>

- Heat engines convert _____ energy into mechanical work.
- A heat engine works in a repeating _____, starting at a high temperature and ending at a lower one.
- The heat taken in by a heat engine is labeled as _____.
- The heat released as exhaust by a heat engine is labeled as _____.
- The efficiency of a heat engine is equal to the work divided by the _____ heat.
- An engine that produces no exhaust heat would be perfectly _____—but that's not possible in real life.
- A _____ engine is a hypothetical, ideal engine with maximum possible efficiency.
- The Carnot engine works using two _____ processes and two _____ processes.
- An _____ process involves no change in heat.
- An _____ process allows heat transfer while the temperature remains constant.
- The ideal efficiency of an engine can be calculated as 1 minus the _____ temperature divided by the _____ temperature.
- During isothermal expansion in the Carnot cycle, heat is slowly added, causing the gas to _____ in volume.
- Refrigerators and air conditioners use _____ to make heat flow from a cooler area to a warmer one.
- The _____ of performance (COP) for a refrigerator is the heat removed from the low-temperature zone divided by the work.
- The ideal COP for a refrigerator can be calculated as T_L divided by _____ minus _____.

Crash Course Physics #24: Engines KEY

- Heat engines convert **thermal** energy into mechanical work.
- A heat engine works in a repeating **cycle**, starting at a high temperature and ending at a lower one.
- The heat taken in by a heat engine is labeled as **QH**.
- The heat released as exhaust by a heat engine is labeled as **QL**.
- The efficiency of a heat engine is equal to the work divided by the **input** heat.
- An engine that produces no exhaust heat would be perfectly **efficient**—but that's not possible in real life.
- A **Carnot** engine is a hypothetical, ideal engine with maximum possible efficiency.
- The Carnot engine works using two **adiabatic** processes and two **isothermal** processes.
- An **adiabatic** process involves no change in heat.
- An **isothermal** process allows heat transfer while the temperature remains constant.
- The ideal efficiency of an engine can be calculated as 1 minus the **low** temperature divided by the **high** temperature.
- During isothermal expansion in the Carnot cycle, heat is slowly added, causing the gas to **expand** in volume.
- Refrigerators and air conditioners use **work** to make heat flow from a cooler area to a warmer one.
- The **coefficient of performance (COP)** for a refrigerator is the heat removed from the low-temperature zone divided by the work.
- The ideal COP for a refrigerator can be calculated as T_L divided by T_H minus T_L .

15 Questions

Answer Key Included

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