

Air Breathing Propulsion Literacy Questions

These are just some things for you to think about. Some are technical; others are economic, historical or social. The instructor doesn't necessarily know the answers to all of these either. You ought to be able to answer many of them by the end of the course. You may occasionally find one of them on a quiz (trivia or real). You are encouraged to thrash out these subjects with your peers in the Collab discussion group or wherever you tend to thrash things out.

Why are there a lot more compressor stages than there are turbine stages in a gas turbine engine?

How is a Diesel Cycle different from an Otto cycle?

How are the Diesel and Otto cycles different from the Rankine and Brayton cycles?

How does the Rankine cycle differ from the Brayton cycle?

Why was the Rankine cycle implemented in practice about a third of a century earlier than the Brayton cycle?

What two countries pioneered in the development of the gas turbine engine? Who are considered the inventors of the gas turbine engine from those countries?

Why did the U.S. choose not to develop a jet engine during WW II?

What was the most immediate (and unexpected) payoff to the airlines when they switched from reciprocating (piston) engines to gas turbines in the 1950's?

How much does an engine, e.g., those on the Boeing 777 cost?

How much fuel does a Boeing 777 burn each hour?

What is the MTBO for a typical aircraft engine? (What does MTBO mean?)

What does ETOPS mean?

What does MRO mean?

What is the advantage of turboprops for regional and commuter airlines? What is their disadvantage?

What is the advantage of turboprops for fire fighting?

What was the first commercial aircraft powered by a turbojet engine?

Where and how often is the Paris Airshow held?

What are the big gas turbine manufacturers in the U.S.? In the world?

What is the most critical temperature in the design of a gas turbine engine?

Could you burn jet fuel in a piston (internal combustion) engine and vice-versa?

You're at the airport and notice a yellow fuel truck. What is the fuel specified in big yellow letters on the side?

How is a gas turbine used in a combined cycle power plant? What two thermodynamic cycles are used?

What was the first commercial jet aircraft built in the U.S.? What were the two similarly looking aircraft marketed by other manufacturers shortly thereafter?

How do you start up an aircraft gas turbine engine?

What is an APU?

What was the only commercial aircraft ever to employ afterburners?

On a particular flight you've gotten a seat forward of the wing. After touchdown you notice that a section of the engine cowling translates aft and exposes a grid-like structure. What is going on?

How much fuel per passenger was burned in crossing the Atlantic Ocean by Concorde?

How much fuel is burned per passenger crossing the Atlantic (e.g., from IAD to CDG) on a Boeing 777?

How many GE turboshaft engines were to power the now-cancelled "Marine One" helicopter?

What percentage of annual worldwide CO₂ emissions is attributed to commercial aviation?

How do "carbon credits" work?

What percentage reduction in fuel burn (and CO₂ emissions) is the 787 Dreamliner expected to have relative to existing commercial airliners?

Suppose there were a bridge across the Atlantic Ocean. Which mode of travel to Europe would use less fuel: (a) flying in a 787 Dreamliner, (b) driving a hybrid auto?

What is meant by a “4D” aircraft trajectory?

What is a continuous descent arrival?

When the pilot changes the power setting in the cockpit, what actually happens in the engine?

What does FADEC mean?

The same day Rolls-Royce announced the construction of a new assembly plant for engines in the 12,000 lb thrust range (the range of regional and large corporate jets) in Virginia last year, they announced another new plant in another country for their biggest engines. Which country was it?

What materials are used for the turbine blades in the HPT?

What is the only company that builds three-spool engines?

What is a blisk? What is a bling?

What is a typical bypass ratio in a current technology turbofan engine?

What is FOD?

Are turbojets used in any applications now?

What is an open rotor system?

How do engine manufacturers ensure that a catastrophic fan blade failure will be contained?

What engine has powered all new Boeing 737's for the last 25 years?

How are turbine blades cooled?