1. Write the Reynolds Transport Theorem and explain why it is useful (in case it is).

2. Write the expression of the thrust for a jet engine.

3. Define combustion.

4. Define equivalence ratio?

5. Which are the two parameters that define Brayton cycle?

6. How does the thrust and the thrust specific fuel consumption of a turboprop engine vary with altitude? Justify your answer.
   
   Hint: consider that inlet diffuser efficiency, compressor efficiency, turbine efficiency do not vary with altitude.

7. Draw the real cycle for a jet engine with afterburning. Explain how thrust augmentation is done using an afterburner.

8. What are the means of generating thrust with a turbofan engine?

9. Draw the turbine maps. Explain the features of the turbine maps.

10. Define solidity, \( \sigma \).

11. Define flow coefficient, \( \phi \).

12. Derive the rocket equation.

13. What is the type of the jet engine shown in the figure? Mark on the figure the name and location of as many components as possible. Briefly describe the role of each component.

Figure 1: Jet engine.