

Aircraft Constructions Complex exam questions

(Figures of the lecture material can be used in the exam!)

1. Characterize the main fuselage constructions. What are the functions of formers, stringers, longerons, bulkheads, doublers, and crossbeams?
2. What is the difference between the reversible and irreversible flying control?
3. Review the main types of trailing edges and characterize them.
4. Explain the operation of the leading edge devices (leading edge flaps and slats) in conjunction with the trailing edge flaps.
5. Review the types of speed brakes and their operation.
6. Flight controls, moments around the axes.
7. Methods of control balancing. What is the aim of the control balancing?
8. What is the artificial feel unit and why is it necessary?
9. What conditions are provided by the aircraft pressurization. Describe the pressurization profile of the aircraft.
10. Operation of the oleo-pneumatic strut (landing gear).
11. The hydraulic layout of a typical nose wheel steering system and its operation.
12. The hydraulic layout of a gear retraction system and its operation.
13. What are the effects of ice formation on the aircraft structures? List the de-icing and the anti-icing systems.
14. What are the main differences between the DC generator and the alternator?
15. Define the indicated power; the specific fuel consumption; the mechanical efficiency; thermal efficiency and the volumetric efficiency of the ICE.
16. What is the operation principle of the dual magneto ignition system?
17. What is the correlation between the fuel mixture strength and the required engine power?
18. Fuel system of a simple piston engine aircraft; carburettor systems, fuel injection? What is the reason for mixture control?
19. Define the ground boosted and the altitude boosted superchargers.
20. What are the advantages, disadvantages of the internal supercharger over the turbocharger?
21. Define the propeller efficiency. What are the advantages of the constant speed propeller over the fixed pitch one?
22. Control of a simple constant speed unit.
23. What is the correlation between the power take off of the constant speed propeller and its angle of attack?
24. Define the propulsive efficiency of the gas turbine engines.
25. What is the difference between the turboprop engine, the turboshaft engine, the low ratio bypass turbojet engine and the high bypass ratio (turbofan) engine?