

**Licence without type rating**  
**Category "C" unpressurized aeroplanes**  
**less than 5700 kg with piston engines**

**I- Piston Engines**

1- Principles, Terminology, definitions and laws:

- Normally aspirated and supercharged operation
- Four stroke cycles
- Ignition timing, mixture, fuel grade, detonation
- Power
- Overhaul periods / continuation in service beyond overhaul recommendation
- Ground running - principles and problems
- Effect of altitude, humidity, temperature, and icing
- Standard atmosphere, pressure altitude
- Fixed and variable pitch propeller effects (not rotorcraft)
- Vibration characteristics
- Type certification

3- Constructional arrangement:

- General arrangement - internal
- General arrangement - external
- Crankcase breathing
- Propeller shaft sealing
- Materials
- Fixed pitch propeller provision (not rotorcraft)
- Cooling
- Cylinders , pistons and valve gear
- Hydraulic tappets
- Camshaft
- Castings , mountings and accessories , drive

5- Carburation and Induction:

- Air intake - Normal /Alternate - filtering
- Manifolds
- Anti-icing provision
- Float type and injection systems
- Engine driven fuel pumps
- Priming systems
- Mixture / idle cut - off / throttle control

7- Ignition:

- Magnetos
- Ignition harness
- Spark plugs - reach variations
- Operating temperatures - long life
- Switch control
- Timing (internal / external)
- Advancing and retarding mechanisms
- Screening
- Starting aids - impulse couplings and ignition boosting

9- Starting:

- Starter motors - manual, bendix, solenoid, pre-engaged -engagement methods
- Non-engagement indication and effects

- Starter relays
- Earth straps
- Cooling
- Effects of battery

11- Fire protection and indication:

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- Extinguishant, bottles, cartridges, life control
  - Detection systems and warnings
  - Two shot provision

13- Lubrication:

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- Wet and dry sump systems
  - System arrangement
  - Pressure control
  - Effects of hot and cold weather
  - Filtering
  - Straight, detergent, ash dispersant oils
  - Engine condition assessment using oil system analysis
  - Propeller feathering systems (not rotorcraft or airships)
  - Oil coolers - temperature control valves
  - Hoses, rigid pipes, internal passages, splash- oil jet
  - Cooling functions of the oil system

15- Supercharging / Turbocharging:

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- Directly driven and exhaust driven superchargers
  - Manual and automatic control
  - Lubrication and hydraulic power
  - Controls and indication
  - Automatic control systems

17- Aircraft fuel:

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- Tanks, cells and integral systems
  - Venting
  - Fuel pumps - electrical
  - Fuel grades and quantity
  - Water contamination - drains
  - Filtering
  - Controls and indications

19- Engine control:

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- Throttle
  - Mixture
  - Propeller (not rotorcraft)
  - Alternate air
  - Manual controls for turbocharger
  - Carburetor heat

23- Engine instruments:

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- Manifold pressure
  - Rotational speed
  - Pressure and temperature
  - Cylinder head temperature
  - Exhaust gas temperature

25- Fixed Pitch propellers (not rotorcraft)

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- Materials
  - Diameter - minimum / maximum
  - Protective finishes
  - Damage areas
  - Balance control
  - Attachment
  - Spinners
  - Alternative types - different manufacturer / pitch

## II- Variable pitch propellers

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### 1- Principles, Terminology, definitions and laws:

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- Constant speeding
- Pitch variation
- Ground and flight functioning characteristics
- Power conversion
- Blade forces: aerodynamic and centrifugal
- Aerofoil aerodynamic principles
- Pitch coarse / fine, high / low, reverse
- Feathering
- Vibration characteristics

### 3- Constructional Arrangements:

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- Pitch change mechanism single / double acting
- CSUs / governors
- Balance control
- Materials
- Diameter - minimum and maximum
- Pitch stops - fixed, centrifugal, manual and electrical
- Protective finishes - contour control
- Damage acceptance areas
- Attachment and assembly methods
- Oil transfer - governor / propeller / sump
- Safety visibility

### 5- Automatic and Manual pitch control systems:

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- Pilot control and governor sensing
- Feathering

### 7- Ice Protection:

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- Liquid and electrical system