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Revised Examination Syllabi, Effective April 2010

(Test Pilot, Instructor & Aerobatic Ratings effective immediately)

Remember: You can use an AIP New Zealand Volume IV at any SAC examination to assist answering any question. Where an applicant is required to interpret an AIP Aerodrome Page for Law or FRT0, this will be provided with the exam, as will A3 sized, accurately scaled map extracts. The map extracts in the sample exams are for those exams, and not representative of the maps applicants will receive in their examination packs.

1. Aviation Law & Publications

Sport Aviation Corp Part 149 Exposition

- Flight Crew Certificate Classifications (Section 6.0 and 6.1)
- Requirements to act as Pilot in Command
 - a. Biennial Flight Review
 - b. Medical Certificate
 - c. Annual Subscription
- Ninety-Day Currency Rules for carriage of passengers
- Type and Group Rating system
- Authorised operations (Section 5.0, Chapter 2)
 - a. Additional meteorological limitations
 - b. Flights over water
- Aircraft Modification rules (Section 7.0, Chapter 4)

Aircraft Requirements

- Required Documents & Equipment
 - a. Flight Permit
 - b. Annual Condition Inspection

- c. Carriage of a portable/personal emergency locator beacon
- Rules for aircraft operation after Annual Condition Inspection expiry

Publications: Miscellaneous

- Contents of NOTAMS
- Contents of AIP Supplements

Publications: AIP New Zealand Volume IV

- Interpret Aerodrome Pages
 - a. Radio frequency to use
 - b. Local circuit joining procedures
 - c. Local circuit directions and operating procedures
 - d. Local activities
- Air Traffic Control Light Signals
- Air-Ground Signals at Aerodromes
- Transponder Codes
- VFR Metrological minima
- Aerodrome and Visual Navigation Chart Legends and Symbols

Publications: New Zealand Visual Navigation Charts (1:250 000 scale)

- Identify Controlled Airspace
 - a. Lateral limits
 - b. Vertical limits
 - c. Radio frequency and unit
 - d. VFR Transit Lanes
- Identify Special Use Airspace (and Prescribed Usage Conditions) within Class G Airspace
 - a. Mandatory Broadcast Zones (radio reporting and transponder requirements)
 - b. Common Frequency Zones (radio reporting requirements)
 - c. Danger Zones
 - d. Restricted Airspace
 - e. Military Airspace
- Identify and interpret Legend Symbols (NOT GIVEN ON MAP EXTRACTS)
 - a. Visual Reporting Points
 - b. Instrument Approach Tracks
 - c. Hazards and Obstacles
 - d. Cultural Features
 - e. Aeronautical Information
 - f. Special Messages (not examined)

Civil Aviation Rules: Rule Part 71 Airspace Designation

- Subparts B-E only
- 71.53 Control areas
- 71.55 Control zones
- 71.57 VFR transit lanes
- 71.105 Class C airspace
- 71.107 Class D airspace
- 71.113 Class G airspace
- 71.153 Restricted areas
- 71.155 Military operating areas
- 71.157 Mandatory broadcast zones
- 71.161 Danger areas
- 71.163 Low flying zones
- 71.201 Transponder mandatory airspace within controlled airspace
- 71.203 Transponder mandatory airspace within special use airspace
- 71.251 Visual reporting points

Civil Aviation Rules: Rule Part 91 General Operating Rules

- Subparts B-D only
- 91.129 Restricted and Danger Zones
- 91.131 Low Flying Zones
- 91.133 Military operating areas
- 91.135 Mandatory Broadcast Zones
- 91.201 Safety of Aircraft
- 91.217 Preflight Actions
- 91.221 Flying Equipment and Operating Information
- 91.223 Operating on and in the vicinity of an aerodrome
- 91.225 Operations at aerodromes with air traffic services
- 91.227 Operating near other aircraft
- 91.229 Right-of-way rules
- 91.243 ATC light signals
- 91.245 Operations in controlled airspace
- 91.247 Use of SSR transponder and altitude reporting equipment
- 91.301 VFR meteorological minima
- 91.309 Position reports
- 91.311 Minimum heights for VFR flights
- 91.313 VFR cruising altitude and flight level
- 91.315 Operating in snow and ice conditions

Civil Aviation Rules: Rule Part 103 Microlight Operating Rules

- Subparts A, E, F, G only
- 103.005 Pilot requirements
- 103.105 Documents to be carried
- 103.153 Minimum heights
- 103.155 Flight criteria (Meteorological minima, night operations, operations over congested areas)
- 103.207 Issue of flight permit
- 103.209 Modification
- 103.217 Maintenance and inspection requirements

2. Air Navigation & Flight Planning

This exam is now only 20 questions, and 1 hour and 15 minutes in length. Applicants will need to complete a flight plan sheet prior to answering questions. Half of the questions will be set from the flight plan (practical aspects of flight planning below). The other half will be on in-flight techniques and map interpretation as described below. Candidates will need to supply their own protractor, ruler, and calculator. A non-electronic E6B computer is recommended but not essential.

Practical Aspects of Flight Planning

- Measure true track
- Measure distance
- Calculate true heading from true track given wind
- Calculate magnetic heading from true heading given variation
- Calculate compass heading from magnetic heading given deviation
- Calculate groundspeed given wind & TAS
- Calculate estimated elapsed time from groundspeed and measured distance
- Calculate fuel required for a flight from estimated elapsed time, given allowances and rate of consumption
- Calculate aircraft weight problems (such as conversions between weight and volume of fuel, or maximum baggage)
- Calculate latest or earliest time of departure given information about MCT & ECT (be familiar with daylight tables in AIP NZ Vol IV)
- Flights need only be planned from point to point, there is no expectation to plan for climb or descent
- Select an altitude
 - a. Legal minimum heights for VFR flight
 - b. VFR cruising altitudes
 - c. Airspace restrictions (MBZ & CTA)
 - d. Local terrain elevation

- e. Standard overhead joining altitudes
- Safety equipment to be carried on cross country flights

In-flight Navigation Techniques

- 1:60 rule to revise compass headings
- Reciprocal heading (“double drift rule”)
- 60° diversion turns
- Compass turns (Over steer north by 30 degrees, under-steer south by 30 degrees... etc)
- Revised ETA
- Diversions: estimate EET and compass heading
- Mountain flying: positioning of aircraft in valleys

New Zealand Visual Navigation Charts (1:250 000 scale)

- Identify Controlled and Uncontrolled Airspace
 - e. Lateral limits
 - f. Vertical limits
 - g. Radio frequencies and ATS units
 - h. VFR Transit Lanes
- Identify Special Use Airspace (and Prescribed Usage Conditions) within Class G Airspace
 - f. Mandatory Broadcast Zones
 - g. Common Frequency Zones
 - h. Danger Zones
 - i. Restricted Airspace
 - j. Military Airspace
- Identify and interpret Legend Symbols
 - g. Visual Reporting Points
 - h. Hazards and Obstacles
 - i. Cultural Features
 - j. Aeronautical Information
 - k. Terrain features, elevations
- For the purposes of SAC examinations, students will not be required to interpret or apply contents of special messages on charts

3. Aviation Meteorology

Sport Aviation Corp Part 149 Exposition

- Additional meteorological limitations (Section 5.0, Chapter 4)

Civil Aviation Rules: Rule Part 91 General Flight Rules

- 91.301 VFR meteorological minima

Civil Aviation Rules: Rule Part 103 Microlight Operating Rules

- 103.155 Flight criteria (Meteorological minima, night operations, operations over congested areas)

New Zealand Weather Systems

- Prevailing conditions and flow
- Warm and cold fronts
- Anti cyclones and cyclones
- Ridges, troughs, depressions
- Isobars

Specific Phenomena

- Fog
- Sea breezes
- Mountain winds – foehn winds, anabatic, katabatic, turbulence in valleys
- Mechanical turbulence
- Orographic cloud and turbulence
- Isotherms
- Inversions
- Wind shear
- Wind gradient
- Cloud types and associated phenomena

Atmosphere

- Composition
- ISA Standard Day
 - a. Variations and effects on performance

- Temperature and pressure lapse rates
 - a. Human factors: hypoxia, sinus trouble, hypothermia

METAR and TAF reports

- Official source of these reports (websites)
- AUTO METAR format
- Amended TAFs
- Issue time
- Validity periods
 - a. Dates and times (NZDT, NZST, UTC)
 - b. Distance(s) from aerodrome
- Visibility and NDV
- Wind strength and direction
 - a. Predict runway in use at destination
- Cloud
 - a. Heights and ceilings (AGL, AMSL)
 - b. Cloud types and '///' indicator
 - c. Okta system
- Phenomena
 - a. E.g. -RA, SHRA, GS, FG, '/' indicator
- QNH
- Temperature and Dewpoint and their relationship
- BECMG and TEMPO times
- Reasons for variation from ARFOR
- Interpret for prevailing conditions (i.e. approaching cold front or warm front)
- Determine suitable departure and arrival times
 - a. Forecast conditions
 - b. Observe VFR minima

ARFOR

- Cloud
 - a. Heights and ceilings (AGL, AMSL etc)
 - b. Okta system
- Visibility
- Wind
- General conditions

4. Aeroplane Technical Knowledge

Sport Aviation Corp Part 149 Exposition

- Aircraft Modification rules (Section 7.0, Chapter 4)

Civil Aviation Rules: Rule Part 103 Microlight Operating Rules

- 103.207 Issue of flight permit
- 103.209 Modification
- 103.217 Maintenance and inspection requirements

Instruments

- Radio
 - a. Principles of operation
 - b. Squelch
 - c. Volume
 - d. Improving reception quality
 - e. Improving transmission quality
- Transponder
 - a. Principles of operation (Standby, Mode A, Mode C)
- Magnetic Compass
 - a. Turning errors and acceleration errors
 - b. Variation and deviation
- Pitot-Static System
 - a. Altimeter
 - b. Vertical speed indicator
 - c. Airspeed indicator
 - Effects of head and tailwind on readings
 - Effects of altitude and air pressure on TAS
- Carbon Monoxide Detectors and Carbon Monoxide (human factors)

Electrical Systems

- Magneto Ignition systems
- Generators
- High and low voltage conditions

Engines and Propellers

- Four stroke engine principles of operation
- Fuel and contamination
- Carburettor heat and carburettor icing
- Oil pressure, oil temperature, cylinder head temperature, radiator/coolant temperature
- Lubrication and cooling
- Gearboxes
- Fixed and variable pitch (constant speed) Propellers
- Causes of engine failures

Aircraft Performance

- ISA Conditions, Pressure Altitude, Density altitude effects on take off and climb performance
- Take off and landing performance
 - a. Weight
 - b. Runway surface and condition
 - c. Wind, temperature, pressure
 - d. Wing flap settings
- Centre of gravity and effects on handling
- Weight and balance calculations
- Mechanical and wake turbulence
- V speeds: V_x , V_y , V_a , V_{ne} , V_{s1} , V_{s0} , V_{fe}

Principles of Flight

- Techniques to transition between climb, descent and level flight
- Primary forces (thrust, weight, lift, drag)
 - a. Straight and level,
 - b. Climb and descent
 - c. Turns
- Turning
 - a. Adverse yaw, skid and slip
 - b. Load factor
 - c. Centripetal force
 - d. Spiral dive recovery
- Aerodynamic Theory and Wing Design
 - a. Stalls (onset symptoms, wing drop and spin, recovery techniques)
 - b. Angle of attack
 - c. Wing chord
 - d. Relative air flow
 - e. Induced and parasite drag
 - f. Torque

- g. Effect of lowering flaps on wing
- Crosswind landing techniques

5. Flight Radio Telephone Operator Certificate

Radio

- Principles of operation
 - a. Squelch
 - b. Volume
 - c. Improving reception quality
 - d. Improving transmission quality

Transponder

- b. Principles of operation (Standby, Mode A, Mode C)
- c. Codes to use for general use and emergencies
- d. Use of IDENT function
- e. Responding to Squawk instructions from ATS

Unattended Airfields and Class G Airspace

- Call(s) prior to taxi
- Call(s) prior to taking off
- Call(s) for operating in circuit
- Call(s) for joining an unattended airfield via a standard overhead procedure
- Call(s) for position reporting in MBZs
- FISCOM units
- Position reporting for integration with TCAS/Fast/IFR traffic
- Emergency procedures (PAN, Mayday etc)

Controlled Aerodromes and Class C & D Airspace

- Use of ATIS facilities
- Establishing communication with ATS
- Initial call – for entry/joining
- Initial call – for taxi/departure
- Entry to circuit
- Downwind
- Continue approach

- Landing clearances
- Standby and holding instructions
- “Number 2”
- Taxi clearances
- Departure clearances
- Take off clearances
- Given a clearance that you cannot comply with
- Incorrect information passed
- Conditional clearances
- Traffic information
- ATC Light Signals
- Transponder Codes
- Radio checks and readability scales
- Standard phraseology

Publications: AIP New Zealand Volume IV

- Interpret Aerodrome Pages
 - e. Radio frequency to use
- Air Traffic Control Light Signals
- Aerodrome and Visual Navigation Chart Legends and Symbols
- Transponder Codes

Publications: New Zealand Visual Navigation Charts (1:250 000 scale)

- Identify Controlled Airspace
 - i. Lateral limits
 - j. Vertical limits
 - k. Radio frequency and unit
- Identify Special Use Airspace (and Prescribed Usage Conditions) within Class G Airspace
 - k. Mandatory Broadcast Zones (radio reporting and transponder requirements)
 - l. Common Frequency Zones (radio reporting requirements)
- Identify and interpret Legend Symbols (NOT GIVEN ON MAP EXTRACTS)
 - l. Visual Reporting Points

Civil Aviation Rules Part 71: Airspace

- 71.201 Transponder mandatory airspace within controlled airspace
- 71.203 Transponder mandatory airspace within special use airspace
- 71.251 Visual reporting points
- 71.157 Mandatory broadcast zones

Civil Aviation Rules Part 91: General Operating Rules

- 91.135 Mandatory Broadcast Zones
- 91.243 ATC light signals
- 91.245 Operations in controlled airspace
- 91.247 Use of SSR transponder and altitude reporting equipment
- 91.309 Position reports

Other Publications (Recommended reading)

- 'An introduction to radio for the VFR pilot' by Errol Simmons (in SAC Training Manual)
- Civil Aviation Authority Advisory Circular 172-1 or 91-9

6. Test Pilot Written Examination Syllabus

This exam is 25 questions in length and has a sitting time of 90 minutes. Candidates should supply their own AIP Volume IV, calculator, and ruler for graphs and weight and balance problems

Sport Aviation Corp Part 149 Exposition

- Section 6.0 Chapter 5, Test Pilots
 - a. Group and Type Ratings
 - b. Currency Requirements
 - c. Privileges and Limitations
- Section 6.1 Intermediate Pilot Aircraft Technical Knowledge Examination Syllabus
- Additional Principles of Flight and Aircraft Technical Knowledge Syllabus from SAC Test Pilot Ground School Course
 - a. Flutter: causes, testing techniques, symptoms, recovery
 - b. Centre of Gravity calculations
 - c. Airspeed Indicator Calibration
 - d. Rate of Climb and Angle of Climb Tests
 - e. Pressure and Density Altitudes
 - f. Stall testing
 - g. Stability (positive, neutral and static about each axis of movement)
 - h. Basic aircraft structures and design
- Section 7.0 Chapter 4, Aircraft Modification

Aircraft Requirements

- Required Documents & Equipment
 - d. Flight Permit & Temporary Flight Permit
 - e. Annual Condition Inspection
 - f. Carriage of a portable/personal emergency locator beacon

Civil Aviation Rules Part 19 Transitional Rules

- 19.405 Test Pilots
- 19.413 Microlight Personnel

Civil Aviation Rules Part 103 Microlight Operating Rules

- 103.5
- 103.7
- 103.159
- Subpart G (rules 103.203 – 103.221)

Other Publications

- FAA Advisory Circular 90-89A
- SAA NZ Inc. Ground and Flight Test Report for Amateur Built, Microlight Aircraft

7. Microlight Flying Instructor Certificate

This examination is 30 questions in length, and has a sitting time of 90 minutes. Candidates will need to provide their own AIP Volume IV and Navigation equipment (protractor, ruler, calculator, optional non-electronic E6B navigation computer)

SAC may require this exam to be sat, at its discretion, by instructors seeking upgrade of the Provisional Classification or upgrade from Instructor to ATO as the requirement to pass an exam has been in our exposition for some time now but we have not actioned it previously

Sport Aviation Corp Part 149 Exposition

- Section 5.0 Chapter 2 Authorised Operations
- Section 6.0 Chapters 2, 3, 4, 6: BFRs, Pilots with other experience, Type ratings, FRTO
- Section 6.1
 - a. Knowledge of training requirements for novice solo authorisation, advanced, intermediate, passenger ratings, upgrade from provisional to full instructor ratings (e.g. required hours, ground training)
- Section 7.0 Chapter 4 Modifications

Other Examination Material

- All examination material for intermediate/advanced pilot and FRTO rating exams is assessable, and in addition to this, the rules below:

Civil Aviation Rule Part 91

- Special Operations relevant to Flight Instruction
 - a. 91.123 Flight instruction
 - b. 91.131 Low flying zones
 - c. 91.311 Minimum heights for VFR flights

Civil Aviation Rule Part 103

- 103.7 Flight instruction
- 103.209 Modification

Other Publications

- CAA GAP Booklet: Flight Instructor Guide (Chapters 1-8 on learning and instructing theories only)

8. Aerobatic Rating Certificate Written Examination Syllabus

This examination is 25 questions in length and has a sitting time of one hour. Applicants should provide their own AIP Volume IV, and a calculator for weight and balance calculations

Sport Aviation Corp Part 149 Exposition

- Section 6.0, Chapter 7: Aerobatic Rating
 - a. Privileges & Limitations
 - b. Currency Requirements
- Section 6.1 Intermediate Pilot Aircraft Technical Knowledge Examination Syllabus
- Additional Syllabus from SAC Aerobatic Ground School Course
 - a. Use of General Aviation Areas
 - b. Centre of Gravity Calculations
 - c. Human Factors: G-loc
 - d. Wake & mechanical turbulence
 - e. V speeds
 - f. Energy Management
 - g. Advanced PoF: Lift and Drag
 - h. Pressure and Density Altitude
 - i. Torque
 - j. Knowledge of four basic manoeuvres

Civil Aviation Rule Part 61

- 61.551 Eligibility requirements
- 61.555 Privileges and limitations

Civil Aviation Rule Part 91

- 91.701 Aerobatic flight
- 91.703 Aviation events