



**Safety Regulation Group  
Personnel Licensing Department**

## **Joint Aviation Requirements Flight Crew Licensing**

### **Standards Document 10 (Aeroplanes), Version 05**

#### **Guidance for:**

- **Instructors**
- **Authorised Flight Instructor Course Providers (FIC)**
- **Authorised Flight Instructor Examiners (FIE)**

#### **Instructor Rating Skill Tests and Proficiency Checks**

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## 1. FOREWORD

- 1.1 Standards Document 10 (Aeroplanes) has been compiled for use by instructors, flight instructor course providers (FIC) and flight instructor examiners (FIE). It contains information on the format, content, assessment and administration of skill tests and proficiency checks for the issue, revalidation, renewal and, where applicable, variation of flight instructor ratings (FI, FI(R) and AFI), class rating instructor ratings (CRI (SE &ME)) and instrument rating instructor ratings (IRI).
- 1.2 The purpose of this document is to provide guidance on the manner in which tests and checks are to be conducted and the criteria against which instructor competence is assessed, thereby enabling applicants to prepare fully. Additionally, by providing a standard reference document for examiners it should ensure that tests and checks and conducted in a uniform manner, standards are applied consistently and assessments of instructor competence are reliable.
- 1.3 This Standards Document should be used in conjunction with the following documents:
- JAR-FCL 1 Subpart H and the associated Acceptable Means of Compliance (AMC);
  - LASORS;
  - CAA Forms SRG\1131, 1133, 1135 and 1169 (instructor Forms 1, 2 and 3 and the Instructor Test/Check Schedule and Examiner's Record respectively);
  - The JAA Flight Examiners' Manual, specifically Module 3, available at [www.jaa.nl/licensing/flight\\_examiners\\_manual.html](http://www.jaa.nl/licensing/flight_examiners_manual.html)
  - (For examiners) The CAA Flight Examiners Handbook (FEH).
- 1.4 Nothing in the document is intended to conflict with the UK Air Navigation Order or other legislation, which remains the primary authority. Whilst every effort is made to ensure that all information is correct the CAA reserves the right to amend this document, as required, to reflect changes in practice required for the effectiveness of the tests and checks.
- 1.5 All CAA Forms and documents referred to in this document are available on the CAA website [www.caa.co.uk](http://www.caa.co.uk) by entering the form or document reference number or name into the search function, or alternatively by following the links at Appendix 3.
- 1.6 In the following text the terms, "Applicant" and "Instructor" both refer to the person undergoing test/check. The term, "Student" refers either to a student pilot or to the examiner acting as a student pilot.
- 1.7 If you require further guidance, or wish to comment on the content of this document, please contact one of the CAA Staff Flight Examiners at your nearest Regional Flight Test Centre.

### 1.8 Regional Flight Test Centres

Bournemouth	01202 576621	Leeds	0113 250 6625
Bristol	01275 475226	Oxford	01865 841199
Cranfield	01234 750111 Ext. 5586		

Civil Aviation Authority  
Personnel Licensing Department  
Approvals Support  
Aviation House  
Gatwick Airport South  
West Sussex  
RH6 0YR

Tel No. 01293 573700  
Fax No. 01293 573996  
E-mail - [fclweb@srq.caa.co.uk](mailto:fclweb@srq.caa.co.uk)

## 2. GENERAL REQUIREMENTS

### Examiners

- 2.1 All examiners are authorised in writing, giving the extent of their privileges and the validity period of the authorisation. Examiners are responsible for observing the conditions of their authorisation. Further guidance on examiner roles and responsibilities is in CAA Standards Document 21 and the Flight Examiner's Handbook.
- 2.2 Examiners must ensure that they are fully prepared, appropriately qualified and current for any skill tests or proficiency checks they conduct, including having the privilege to instruct for the rating for which the applicant is being assessed and to act as pilot in command of the aeroplane during such tests and checks.
- 2.3 Examiners shall not conduct skill tests for applicants whom they have trained for that particular rating, except with express permission in writing from the CAA.
- 2.4 If an applicant is unsuccessful in three consecutive test attempts with any one examiner, then that examiner should not conduct the fourth attempt without the express permission of the Chief Flight Examiner. In any event, no examiner should conduct more than 3 sequential tests of any kind with one applicant whether successful or not.
- 2.5 Examiners should use the opportunity of flight tests to emphasise points of standardisation notified through examiner and instructor seminars. Additionally and where appropriate, reference should be made to flight safety information and publications such as CAA Safety Sense Leaflets (incorporated in LASORS), Pink AICs, GASIL, CAA Standards documents and TrainingComm.

### Aerodrome

- 2.6 Appendix 1 to JAR-FCL 1.055 lists the requirements for facilities at the base aerodrome, and any alternate aerodromes at which flying training for instructor ratings is being conducted. Additional requirements for the approval of aerodrome facilities by the CAA are listed in Standards Document 37 paragraph 11. It is assumed that these facilities will be used for instructor skill tests upon completion of an approved course of training.
- 2.7 Where tests and checks are conducted away from an approved instructor training organisation, for example for the revalidation or renewal of instructor ratings, there are no specific requirements for aerodrome facilities. Therefore the examiner must exercise judgement and be satisfied that the aerodrome and the facilities are suitable for the proposed test or check.

### Provision of Aeroplanes

- 2.8 The aeroplanes used for flight training for instructor ratings must meet the requirements of Appendix 1 to JAR-FCL 1.055 and, for approval by the CAA, Standards Document 37 paragraph 9. It is assumed that these aeroplanes will be used for instructor skill tests upon completion of an approved course of training.
- 2.9 Where tests and checks are conducted away from an approved instructor training organisation, for example for the revalidation or renewal of instructor ratings, the examiner must be satisfied that the aeroplane is appropriately certified, insured, suitably equipped and has been correctly maintained and is airworthy. All equipment required for that particular test or check must be serviceable and the aircraft must be capable of safely performing all manoeuvres required of the flight test.
- 2.10 Where the flight test or check requires manoeuvres such as spinning and aerobatics, the pilot's operating handbook or aircraft flight manual must indicate that such manoeuvres are permitted. Any published limitations such as CofG location, fuel quantity and distribution etc must be observed.
- 2.11 For multi engine instructor training and testing the aeroplane must be capable of having the propellers feathered and un-feathered. The aircraft performance must enable a positive climb gradient from take-off safety speed at normal training weights, with all necessary drag removed and the critical engine set for zero thrust in ISA conditions.

### Administrative Arrangements

- 2.12 Booking arrangements for instructor skill tests are normally made directly between the FTO and examiner, and for proficiency checks between applicant and examiner. When arranging the test the examiner should clarify items such as:
  - a. Date, time and place of test;
  - b. Provision of a suitably equipped and serviceable aeroplane with appropriate insurance cover;
  - c. Agreement on a suitable subject for the long brief (to be advised at least 2 days before the test);
  - d. Availability of training records, course completion certificates, test forms and aircraft documents;
  - e. Flight test fees and expenses including arrangements in case of cancellation.
- 2.13 Applicants for initial issue of an instructor rating or FIC authorisation must have completed all of the requirements for issue of the rating or authorisation before attempting the skill test. Training records shall be made available to the examiner. In addition, the training organisation must confirm the applicant's readiness for test by completing the Approved Course Certificate at Section 10 of Instructor Form 1 (SRG\1131).
- 2.14 As a concession, and in recognition of the delays that may otherwise be incurred awaiting suitable weather to complete all mandatory FI(R) skill test items, the spinning element of the test may be flown during the course, and assessed by an FIE as a standalone test item. In this case a F685 must be completed by the FIE indicating satisfactory completion of item 4a and the relevant flight entry in the applicant's logbook annotated accordingly by the FIE. These documents must then be presented to the FIE who conducts the remainder of FI(R) skill test. Applicants and examiners are reminded that the spinning element requires some degree of instruction in spinning, see paragraph 5.12 for further.

- 2.15 It is recommended that the subject of flight test fees and expenses be addressed with the applicant prior to commencing the test. The CAA Scheme of Charges sets the fees to be charged for tests conducted by Staff Flight Examiners; authorised examiners may determine an appropriate fee for their services.

### 3. THE EXAMINER'S BRIEFING

- 3.1 The examiner will give the applicant an initial briefing. An example briefing is at Appendix 6 in the FEH. The following items should be covered:
- a. An assessment of the weather;
  - b. Establishing the test requirements;
  - c. Documents and forms;
  - d. Order of events;
  - e. Definition of terms;
  - f. Roles and responsibilities;
  - g. Exercise for the main lesson;
  - h. Additional or secondary exercises;
  - i. Conduct of the post flight debrief;
  - j. Ground oral examination and long briefing.
- 3.2 The main flight exercise will be chosen from a representative syllabus, for example from the JAR-FCL PPL syllabus for an initial FI(R) skill test or FI/FI(R)/AFI revalidation proficiency check; from the MEP class rating syllabus for the CRI ME or for the addition of ME instructional privileges; and from the Instrument rating or IMC syllabus for the IRI or for removal of the "No Applied IF" restriction.
- 3.3 The examiner should be imaginative and flexible and select air exercises from across the syllabus, whilst ensuring that those exercises selected may be taught without undue difficulty in the prevailing weather conditions. Normally, before flight, the examiner will also give the applicant an indication of the secondary exercises likely to be included in the test/check.
- 3.4 Instructors must be prepared to teach any exercise from the full scope of the appropriate syllabi, and should avoid limiting their preparation to a few, favoured exercises.
- 3.5 Detailed briefing of the format and conduct of the ground oral examination and long briefing may be left until after the flight exercise.
- 3.6 During the initial briefing the examiner should make every effort to put the applicant at ease and ensure that the content and format of the test and the various roles and responsibilities are fully understood.
- 3.7 Examiners should explain which sections of the test will be required, if necessary by referring to the Flight Test Report form (FCL 685) as guidance.
- 3.8 Examiners and applicants must expect that a complete test may take 4 to 6 hours, therefore examiners should plan to test just one applicant per day. There must be no attempt to pressure the applicant into hurried actions, nor for the examiner to omit items or otherwise devalue the test/check by cutting short the duration.
- 3.9 The following documentation must be available for checking by the examiner:
- a. The applicant's licence, logbook, course report (where applicable), Instructor Form 1 completed up to and including Section 10 'Approved Course Certificate' plus Section 13 (for initial issue of FI, CRI, IRI or addition of privileges) or Instructor Form 3 with all but Section 5 completed (for renewal or revalidation);
  - b. Aeroplane documents and technical log;
  - c. Aeroplane pilot's operating handbook or flight manual and checklist.
- 3.10 If a seminar has been attended for rating renewal or revalidation, Section 5c of the applicant's Instructor Form 3 (SRG\1135) must be signed as evidence of attendance.
- 3.11 The examiner shall explain that throughout the flight he should be considered as a student pilot and be treated accordingly.
- 3.12 The examiner shall explain that the applicant will be assessed throughout the day's activities and in the following general areas:
- a. Ability as an instructor to impart knowledge and skill, both on the ground and in the air;
  - b. Personal flying ability, general airmanship and safety;
  - c. Positioning and efficient use of time and airspace;
  - d. Knowledge and understanding of the training syllabus and teaching exercises;
  - e. Theoretical knowledge and understanding of subjects allied to the syllabus;
  - f. Ability to recognise, analyse and correct typical student faults;
  - g. Ability to conduct an effective debriefing.
- 3.13 The applicant should understand that the final assessment will be reserved for the end of the test and that, as well as individual exercises, the overall performance will be considered. Therefore, applicants should not attempt to judge their own performance or dwell on any errors or mistakes.
- 3.14 The examiner must clarify responsibilities throughout the flight including responsibility for pre-flight planning and preparation, booking out, ATC liaison, navigation etc. Additionally, the examiner should brief roles and responsibilities in the event of emergencies or unexpected events during the flight. If the examiner intends to introduce simulated emergency procedures, he should brief whether or not the applicant is expected to continue in role and deal with these as instructional exercises.

- 3.15 Throughout the test it will be necessary for the examiner to make notes to facilitate an accurate, effective and thorough debriefing. Examiners should do this as unobtrusively as possible, explaining that this is normal practice and that it should not give rise to concern.

#### 4. THE INSTRUCTOR'S PRE-FLIGHT BRIEFING

- 4.1 Having indicated to the instructor the main exercise to be taught, the examiner will allow the instructor 15 to 20 minutes to prepare.
- 4.2 It shall be assumed that the student has completed all exercises and received any required long briefings that normally precede the exercise to be taught.
- 4.3 Applicants may refer to any pre-prepared notes or material but must demonstrate sound knowledge of the content and sequence of the exercises, rather than read directly from the notes.
- 4.4 The normal media for this briefing are whiteboard, OHP, flipchart or computer generated presentations (e.g. PowerPoint). It is recommended that applicants check beforehand that appropriate facilities are available at the test/check venue and be prepared, where necessary, to adapt their briefing to make best use of the available equipment.
- 4.5 The examiner may wish to take notes during the briefing.
- 4.6 The completed presentation should be retained for reference and to facilitate de-briefing later in the day.

#### **Assessment Criteria are at Appendix 1**

#### 5. THE AIR EXERCISE

**Note:** for the purposes of this document, the terms "air exercise" and "flight test" are used for the assessment of practical exercises taught in an aeroplane (or synthetic flight training device), as opposed to theoretical discussion in a classroom environment.

- 5.1 All FI skill tests and proficiency checks must include Section 3, the main air exercise and at least three additional flight test items from Section 4, the mandatory exercises. At the examiner's discretion, the remaining mandatory items in Section 4 may be assessed by theoretical discussion on the ground. A typical example might be for the instructor to demonstrate how to calculate take off and landing performance from the POH or AFM, apply appropriate correction factors for short, wet grass, compare this with the declared distances in the AIP and then teach a short field take-off as a practical exercise followed by a climb at  $V_x$  to 1000ft. This would satisfy two of the mandatory items (c and f below), Section 4 item c as a practical demonstration of instructional skill in the air and item f as theoretical discussion on the ground.
- 5.2 The following are considered to be mandatory exercises:
- a. Spin Avoidance (SE aeroplane)
  - b. Safety module comprising
    - i. Weather appreciation;
    - ii. Flight in poor visibility;
    - iii. Calculation and appreciation of safety altitude;
    - iv. Stall/spin awareness;
    - v. Navigation techniques;
  - c. Take-off and climb, engine failure after take-off (SE aeroplane)
  - d. Approach, landing, missed approach
  - e. Forced landing without power
  - f. CFE Nominated exercise\*
- 5.3\* At the annual Flight Instructor Examiner standardisation meeting the CFE nominates an exercise or topic for inclusion in all instructor skill tests and proficiency checks and instructor seminars. The purpose is to increase awareness amongst the instructor community of a particular area of flight operations and to improve the overall standard to which these areas are taught. For 2008 and until further notice the subject is "Pre-Flight Planning", specifically:
- o Aircraft Performance planning
  - o Mass and Balance calculations
  - o Pilots Operating Handbook/AFM
  - o Fuel planning
  - o NOTAM (obtaining and interpreting the relevant information)
  - o Use of the UK AIP
- 5.4 Prior to walking to the aeroplane, the examiner should ensure that additional equipment, which might be needed during the flight, is available e.g. protractor for airborne navigation planning, or view limiting devices for exercises involving simulated instrument flight.
- 5.5 The examiner will indicate whether the inspection and completion of the aircraft documents and pre-flight inspection of the aeroplane should be conducted as a teaching exercise or demonstration.
- 5.6 The departure may either be flown by the instructor or, where appropriate for the syllabus exercise, by the examiner acting as a student. In either case, the instructor should take the opportunity to build on the student's knowledge, skill, orientation, lookout and general airmanship.

- 5.7 Once established in a suitable training area the instructor should complete the main air exercise as previously briefed. The examiner will act according to the instruction given and simulate the responses and actions of a typical student, occasionally making errors. It is important that the examiner is consistent, so that the instructor has a reasonable chance of identifying errors and correcting them. Once the "student" has mastered any skill, or partial skill, the examiner should refrain from making the same mistake again.
- 5.8 In order to condense the flight and enable all exercises to be assessed in a reasonable time, the examiner may occasionally elect not to complete the briefed exercise as a student when handed control by the instructor. This is normally accomplished by taking control and stating, "I have just completed that exercise to your satisfaction." When doing this, examiners must be careful not to rush the instructor or disrupt the flow or development of the lesson. Instructors should not attempt to abbreviate the lesson.
- 5.9 After completion of the main exercise, the examiner will direct the flight to cover a selection of other exercises including the mandatory items. These items may either be assessed as teaching exercises or as demonstrations. For the former, the examiner will act as a student who has received all appropriate ground briefings and preceding air exercises; the aim is to teach a new skill which the examiner may subsequently practise as a student. For the latter, the instructor will be briefed to either fly the manoeuvre as a pure demonstration of skill, or talk through ('patter') the exercise whilst flying it. For a "pattered" exercise, the aim is to condense a complex lesson into a relatively short demonstration whilst highlighting the teaching salient points.
- 5.10 If the flight test requires advanced manoeuvres such as spinning and aerobatics, but the weather or aircraft performance/limitations prevent such exercises from being completed, it will be necessary to assess these on a separate flight.
- 5.11 It is expected that the flight test part of an instructor test or check will last between 1½ and 2 hours.

### **Spinning**

- 5.12 On initial FI(R) skill tests a full spin must be included unless already certified by an FIE during the FI course and as allowed in paragraph 2.14 above. This is a teaching exercise; it is not sufficient for the applicant simply to demonstrate entry to and recovery from a spin. Therefore, an element of instruction must be given which includes some or all of the following, as specified by the examiner: precautions to be taken prior to deliberately spinning an aircraft, spin entry technique (deliberate) or (inadvertent) spin entry from mishandled manoeuvres, signs of the incipient spin and symptoms of a developed spin, spin recovery techniques at the incipient and developed stage, post spinning checks.
- 5.13 On FI/FI(R) and AFI proficiency checks in SE aircraft, a full spin should be taught or demonstrated provided weather permits and the aeroplane is so cleared, otherwise the minimum requirement is to teach or demonstrate the signs of an incipient spin and the recovery action at the incipient stage. The incipient stage must show signs of impending departure including a stalled condition with yaw and roll. On FI tests and checks in ME aeroplanes, spinning symptoms and recovery techniques must be refreshed by discussion.
- 5.14 For FIC and FIE initial authorisation, at least one full spin must be included as an exercise in how to teach and/or assess spinning safely.
- 5.15 Spinning is not required for CRI and IRI skill tests and proficiency checks.

### **Assessment Criteria are at Appendix 1**

## **6. THE INSTRUCTOR'S POST-FLIGHT DEBRIEFING**

- 6.1 After the flight the applicant will be required to debrief the examiner's performance in role as a student. The examiner must not omit, gloss over or hurry the instructor through this section as it often reveals useful information regarding the instructor's perception of the flight and of the "student's" performance. The instructor is expected to have kept notes and a basic log of the flight as a permanent record of the lesson.

### **Assessment Criteria are at Appendix 1**

## **7. THE THEORETICAL KNOWLEDGE ORAL**

- 7.1 The purpose of the ground theoretical knowledge oral examination is to determine the instructor's breadth and depth of knowledge, the ability to discuss with confidence a variety of subjects related to the training syllabus and privileges of the licence/rating, and to impart such knowledge and understanding to student pilots.
- 7.2 Generally the oral examination of associated ground subjects takes between 1½ and 2 hours. The exact duration will depend on the nature of the test and the applicant's performance. The oral examination for class rating and instrument rating instructors should focus on those subject areas relevant to the appropriate rating.
- 7.3 The oral examination will cover the subject areas listed in section 1 of the instructor test/check schedule. A theoretical knowledge oral question bank is provided as a supplement to this Standards Document. It is strongly recommended that all applicants refer to this supplement when preparing for the theoretical knowledge oral.

- 7.4 The following documents and equipment should be accessible to the applicant (documents may be made available in electronic format):
- a. United Kingdom Aeronautical Information Publication;
  - b. Aeronautical Information Circulars;
  - c. CAP 393 Air Navigation: The Order and Regulations;
  - d. CAP 413 Radio Telephony Manual;
  - e. JAR-FCL1 - Flight Crew Licensing (Aeroplane);
  - f. LASORS;
  - g. Aeronautical Charts;
  - h. Training Syllabus;
  - i. Aircraft Flight Manual or Pilot's Operating Handbook and checklist;
  - j. The FTO, Flying Club or Registered Facility Operations Manual and/or Flying Order Book (as applicable);
  - k. Training aids including aeroplane models, sectioned flight instruments etc;
  - l. Training reference books, diagrams and notes as applicable to the syllabus;
  - m. CAA Standards Document 10 and other Standards Documents as appropriate to the syllabus.
- 7.5 Before starting the theoretical knowledge oral examination, the applicant should be reminded that some questions may require in-depth explanations but others might be answered with a simple statement of fact. There will be no trick questions. If the applicant does not understand the question or know the answer, then he should either seek clarification or say so.
- 7.6 Questions may be answered using whatever notes, training aids, equipment and reference documents are available.
- 7.7 The examiner should keep notes during the oral examination to facilitate debriefing.
- 7.8 Where an instructor holds both SE and ME instructional privileges and revalidates the rating in a SE aircraft, the oral examination must include questions relevant to ME operations and instruction. Likewise, where the rating is revalidated in a SE aeroplane, the oral examination must include questions relevant to ME operations and instruction.

### ***Assessment Criteria are at Appendix 1***

## **8. THE LECTURE or LONG BRIEFING**

- 8.1 All applicants will be expected to give a long briefing or short lecture lasting for about 30 to 40 minutes.
- 8.2 The subject will be determined by the examiner and should be made known to the applicant not less than 2 days before the date of the test. Subject matter should be relevant and related to the appropriate rating and training syllabus. Examiners must vary the subject matter so that it becomes a useful and challenging exercise for the applicant to research, prepare and present the lesson. The subject may be chosen in order to satisfy one of the mandatory exercise requirements.
- 8.3 Applicants should expect to give the brief or lecture to a small audience consisting of the examiner and other student pilots or instructors who may be available and interested at the time.
- 8.4 Applicants will be expected to demonstrate effective use of training aids and equipment. Therefore, prior preparation of equipment and rehearsal is strongly advised.
- 8.5 A reasonable time should be allowed at the end of the briefing or lecture for any audience questions. The examiner must ensure that this does not become a lengthy question session exposing the applicant to unfair questioning or ridicule.

### ***Assessment Criteria are at Appendix 1***

## **9. CLASS RATING INSTRUCTOR RATING (Multi-engine) and FI ADDITION of ME INSTRUCTIONAL PRIVILEGES**

- 9.1 General requirements for examiners, provision of aircraft and the use of airfields are as described at paragraph 2 above.
- 9.2 Applicants for the issue of a CRI rating multi-engine aeroplanes or applicants wishing to add ME instructional privileges to their FI Rating shall have:
- a. Met the requirements detailed in JAR-FCL 1.380(a) for CRI (SPA) ME;
  - b. Completed the relevant course of approved training in Appendix 1 to JAR-FCL 1.380 and AMC-FCL 1.380;
  - c. Passed a Skill Test with an FIE in accordance with Appendices 1 and 2 to JAR-FCL 1.330 & 1.345.
- 9.3 JAR-FCL 1.380(c) states that, before the privileges of a CRI rating are extended to another type or class of aeroplane, the holder shall, within the last 12 months, have completed at least 10 hours flight time on aeroplanes of the applicable class or type or similar type as agreed with the CAA.
- 9.4 JAR-FCL 1.310 requires that all instructors shall have at least 15 hours experience as a pilot on the type or class of aeroplane on which instruction is given.

**Note:** Where the FI (ME) or CRI (ME) training and skill test is conducted on a single lever power control (SLPC) aeroplane, such as the DA 42, the examiner should remind the instructor that differences training with an FI or CRI is required before operating a different type of ME aeroplane within the class. It is also strongly recommended that the instructor receive further guidance from an appropriately qualified FIC instructor before attempting to teach on a ME aeroplane with "conventional" engine controls.

## Content and Conduct of the Skill Test

- 9.5 The format of the skill test is similar to the FI test described above with the content modified to be compatible with the privileges of the CRI ME. Additional information is in the guidance notes accompanying the FI Test Check Schedule-Examiner's Record Form 685.
- 9.6 Section 1 – Theoretical Knowledge. The theoretical knowledge oral will still cover the main subject areas listed in the instructor test/check schedule, but focus on single-pilot ME aeroplane instruction and operation. The applicant must demonstrate a sound understanding of and the ability to teach subjects related to the operation of ME aeroplanes, including the differences and familiarisation training required for operating different types and variants within the class. A full theoretical syllabus is listed in the AMC to JAR-FCL 1.380. The topic for the long briefing or lecture shall be taken from this ME class rating training syllabus.
- 9.7 Sections 2 and 3 – Pre-Flight Briefing and Main Flight exercise. The exercise chosen by the examiner must be from the ME class rating syllabus for initial award of the CRI rating. Subsequent proficiency checks for CRI may include instruction for the addition, revalidation or renewal of a single pilot ME type rating. Assessment criteria are the same as for the FI rating.
- 9.8 Section 4 – Mandatory Exercises. These items are still required where appropriate for ME aeroplanes, including the CFE nominated exercises.
- 9.9 Section 5 – Multi-Engine Exercises. This section should be used to cover any aspect of ME operation not embraced by the other test sections, including symmetric and asymmetric flight.
- 9.10 Section 6 – Instrument Exercises. Where the instructor holds or seeks ME instrument instruction privileges (IRI or No Applied IF restriction removed), an asymmetric instrument approach must be included as a teaching exercise.
- 9.11 Section 7 – Post-Flight Debriefing. The instructor must always debrief the examiner's performance as a "student."

### **Assessment Criteria are at Appendix 1**

## **10. CLASS RATING INSTRUCTOR RATING (Single-engine)**

- 10.1 General requirements for examiners, provision of aircraft and the use of airfields are as described at paragraph 2 above.
- 10.2 Applicants for the issue of a CRI rating single-engine aeroplanes shall have:
  - Met the requirements detailed in JAR-FCL 1.380(b) for CRI (SPA) SE;
  - Completed the relevant course of approved training in Appendix 2 to JAR-FCL 1.380 and AMC-FCL 1.380;
  - Passed a Skill Test with an FIE in accordance with Appendices 1 and 2 to JAR-FCL 1.330 & 1.345.
- 10.3 JAR-FCL 1.380(c) states that, before the privileges of a CRI rating are extended to another type or class of aeroplane, the holder shall, within the last 12 months, have completed at least 10 hours flight time on aeroplanes of the applicable class or type or similar type as agreed with the CAA.
- 10.4 JAR-FCL 1.310 requires that all instructors shall have at least 15 hours experience as a pilot on the type or class of aeroplane on which instruction is given.

## Content and Conduct of the Skill Test

- 10.5 The format of the skill test is similar to the FI test described above with the content modified to be compatible with the privileges of the CRI SE. Further information is in the guidance notes accompanying the FI Test Check Schedule-Examiner's Record Form 685.
- 10.6 Section 1 – Theoretical Knowledge. The theoretical knowledge oral will still cover the main subject areas listed in the instructor test/check schedule, but focus on single-pilot SE aeroplane instruction and operation. The applicant must demonstrate a sound understanding of the operation of SE aeroplanes, including the differences and familiarisation training required for operating different variants within the class. The topic for the long briefing or lecture shall be relevant to the SE class rating training syllabus.
- 10.7 Sections 2 and 3 – Pre-Flight Briefing and Main Flight exercise. The exercise chosen by the examiner must be from the SE class rating syllabus. Typical scenarios include:
  - Training for the addition of a new SE SP type rating to a licence;
  - A tail-wheel conversion;
  - Refresher training for a licence holder with a lapsed SEP class rating;
  - Remedial training for a pilot who had failed a class rating skill test.

The assessment criteria are the same as for the FI rating.
- 10.8 Section 4 – Mandatory Exercises. The mandatory exercises are still required, including the CFE nominated exercise, except for the full spin.
- 10.9 Section 5 – Multi-Engine Exercises are not applicable.
- 10.10 Section 6 – Instrument Exercises. Where the instructor holds or seeks instrument instruction privileges (IRI), an item or items of applied instrument flight must be included as a teaching exercise.
- 10.11 Section 7 – Post-Flight Debriefing. The instructor must always debrief the examiner's performance as a "student."

## **Assessment Criteria are at Appendix 1**

### **11. INSTRUMENT RATING INSTRUCTOR RATING and REMOVAL of the “NO APPLIED IF” RESTRICTION**

- 11.1 General requirements for examiners, provision of aircraft and the use of airfields are as described at paragraph 2 above.
- 11.2 Applicants for the issue of an Instrument Rating Instructor (IRI) rating or to have the 'No Applied IF' restriction removed from their FI rating shall have:
- Met the requirements detailed in JAR-FCL 1.395 if applying for IRI Rating;
  - Met the requirements detailed in JAR-FCL 1.330(d) if applying to remove 'No Applied IF' restriction;
  - Completed the relevant course of approved training in Appendix 1 to JAR-FCL 1.395 and AMC-FCL 1.395;
  - Passed a Skill Test with a FIE in accordance with Appendices 1 and 2 to JAR-FCL 1.330 & 1.345.
- Note:** If the test is to remove the “no applied IF” restriction for an applicant to instruct solely for the UK IMC Rating, a reduced experience level of 10 hours flight time by sole reference to instrument is acceptable.
- Note:** The test may be conducted in a single-engine, or a multi-engine aeroplane. For the latter, the applicant must also hold ME instructional privileges as an FI or CRI ME.

### **Content and Conduct of the Skill Test**

- 11.3 The format of the skill test is similar to the FI test described above with the content modified to be compatible with the privileges of the IRI. If the test is to remove the 'No Applied IF' restriction from an FI rating, and FI privileges are to be revalidated on the same flight, then all the relevant revalidation test items must be included in the schedule and Instructor Form 3 is to be completed in addition to Instructor Form 1.
- 11.4 Additional information is in the guidance notes accompanying the FI Test Check Schedule- Examiner's Record Form 685.
- 11.5 Section 1 – Theoretical Knowledge. The theoretical knowledge oral and long briefing should focus on instrument flight instruction and IFR operations. The applicant must demonstrate sound knowledge, understanding of and the ability to teach subjects including instruments and avionics, instrument procedures, radio navigation and navigation aids, meteorology, flight planning and human factors. A theoretical syllabus is listed in the AMC to JAR-FCL 1.395. The long briefing or lecture subject must be related to an aspect of instrument flying and IFR operation.
- 11.6 Sections 2 and 3 – Pre-Flight Briefing and Main Flight exercise. The main exercise chosen by the examiner must come from the IMC rating or Instrument Rating syllabus. Additional exercises may cover any aspect of basic or applied instrument flying. For applied exercises such as instrument procedures, the applicant must manage all aspects of navigation and communication. The applicant must demonstrate that he/she is 'at home' in the controlled, IFR environment while teaching an exercise. Should the weather dictate that exercises are flown in IMC, the applicant must demonstrate smooth and accurate instrument flying and situational awareness whilst presenting the lesson.
- 11.7 Section 4 – Mandatory Exercises. Within this section, only those items applicable to instrument flight and IFR operations are required. For example, this will include the current CFE nominated exercise - Pre-flight planning and preparation.
- 11.8 Section 5 – Multi-Engine Exercises. Where the instructor holds or seeks ME instrument instruction privileges and a ME aeroplane is provided for the test flight, an asymmetric instrument approach must be included as an instructional exercise.
- 11.9 Section 6 – Instrument Exercises. This section should be used to cover any aspect of basic or applied IF, not embraced by the other test sections. The flight profile should include flight by reference to full, partial and limited instruments (or for glass panel – display failures and reversionary modes). The examiner must ensure to cover both precision and non-precision approaches, either as air exercises or during the ground oral.
- 11.10 Section 7 – Post-Flight Debriefing. The instructor must always debrief the examiner's performance as a “student.”

## **Assessment Criteria are at Appendix 1**

### **12. THE EXAMINER'S FINAL ASSESSMENT and DEBRIEFING**

#### **Pass/Fail Criteria**

- 12.1 The Examiner shall consider the instructor's overall performance as well as individual items and sections.
- 12.2 When assessing the result, (Pass, Partial Pass, Fail) the examiner will group the test sections under 3 main headings:
- Theoretical Knowledge Oral and Long Briefing/Lecture (section 1);
  - The Pre-Flight Briefing (section 2);
  - The Airborne Exercises and Debrief (sections 3 to 7).
- 12.3 A Pass will be achieved when all sections of the test/check are assessed as satisfactory.
- 12.4 If section 1 is failed and all other sections passed, the result will be a Partial Pass. The re-test shall comprise section 1 only.

- 12.5 If section 2 is failed and all other sections passed, the result will be a Partial Pass; the re-test shall comprise section 2 only.
- 12.6 If only one of the sections comprising the airborne exercises is failed, and all other sections passed, the result will be a Partial Pass. The re-test shall comprise a pre-flight briefing (section 2) plus the failed section.
- 12.7 If two or more sections of the test/check are failed, the result shall be a Fail, the re-test shall comprise all 7 sections.
- 12.8 Each attempt at the test must be recorded on a separate report form (F685).
- 12.9 Following a partial pass, ideally the same examiner will complete the re-test. Where this is not possible, the case should be referred to the CFE who will appoint another examiner.
- 12.10 Retraining may be recommended following a partial pass; applicants are strongly advised to comply with any recommended retraining. Retraining prescribed by the examiner following a Fail is mandatory. Where an applicant fails an instructor rating test/check on two consecutive occasions, the examiner must inform the CFE using a Form112; the CFE will then decide on retraining requirements and appoint the next examiner.

## Debriefing

- 12.11 Normally the applicant should be debriefed when all sections of the test have been completed, including section 7. However, the examiner may terminate the test at any stage if it is considered that the applicant's demonstration of flying or instructional skills requires a complete re-test.
- 12.12 The preferred method for conducting the debriefing is for the examiner to state the overall test result at the beginning. If the result is a Partial Pass or Fail, the examiner must explain succinctly which section or sections were unsuccessful, the reasons for failure, any remedial action required and the re-test requirements, before moving on to any more general debrief topics.
- 12.13 Subsequently the examiner should facilitate a discussion of the test or check and be prepared to clarify any misunderstandings, highlight and reinforce examples of effective instructional technique, and guide the applicant towards alternative techniques and strategies where instructional competence could be improved. Applicants must understand however, that they are not being asked to criticise their own performance and that this discussion will not affect the result.

## 13. ADMINISTRATION

### Skill Tests for Initial Issue of Instructor ratings (FI, CRI, IRI)

- 13.1 The examiner shall complete Section 11 of Instructor Form 1. This form should be forwarded to PLD as soon as possible. Additionally, the examiner shall complete the Flight Instructor Test/Check Schedule – Examiner's Record form FCL685 (SRG\1169) and retain a copy for 3 years.
- 13.2 Applicants for the initial issue of an instructor rating may not exercise the privileges of the rating until it has been issued by PLD. Examiners are not to make any entry in the applicant's licence.

### FI and IRI Rating Revalidation and Renewal

- 13.3 The requirements for revalidating and renewing FI and IRI ratings are at JAR-FCL 1.355 and 1.400 and in LASORS Section H.
- 13.4 Where a proficiency check is successful and the applicant has completed the other requirements, the examiner shall complete Section 5 of the Instructor Form 3 and complete the Certificate of Revalidation in the applicant's licence.
- 13.5 If the applicant has not completed the additional requirements, Section 5A shall be completed but no licence entry may be made. Applicants must be advised of the date by which the remaining requirements should be met in order to revalidate the rating and be given the Instructor Form 3 with the successful progress check certified.
- 13.6 Where an instructor rating has lapsed and the applicant meets the requirements for renewal (FI seminar and proficiency check), examiners should enter details in the applicant's licence renewing the rating for 3 years from the date of the check or seminar (whichever occurs later) provided both events have been completed within the previous 12 months, and the rating has expired for no more than 5 years. If the rating has expired by more than 5 years, the matter should be referred to CAA PLD.
- 13.7 When a FI (A) or FI (H) completes the revalidation or renewal requirements at a seminar, either a FIE (A) or FIE (H) may complete the administrative actions by certifying the examiner's certificate in the Instructor Form 3 and the certificate of revalidation in the applicant's licence.
- 13.8 Following an unsuccessful test, the applicant must be informed that the privileges of the rating may not be exercised, notwithstanding that there may be an unexpired period of that rating. Where privileges are withdrawn pending re-test, the applicant must be issued with a Notification of Failure form F252.

#### Notes:

Where an FI is qualified to:

- Instruct for the issue of an IMC rating but NOT for an IR, he does not require 10 hours IR/IMC training for revalidation by experience.
- Conduct IR training but does not meet the 10 hours IR training requirement, a proficiency check must be completed as one of the revalidation requirements with particular emphasis on Section 6, in order to retain the privilege to instruct for the IR.

- 13.9 FIC Instructors and FIE must always include a proficiency check as part of their revalidation process. In the case of FIE, this check must be flown with a CAA Staff Flight Examiner.

### CRI rating revalidation and Renewal

- 13.10 In common with all instructor ratings the CRI rating is valid for 3 years and may be revalidated within the 12 months preceding the expiry date. Unlike the FI and IRI ratings, the CRI rating may be revalidated solely by experience (JAR-FCL 1.385). Notwithstanding this, in order to exercise the privileges of the rating a CRI must have a valid Certificate of Revalidation in the licence. Any appropriately authorised FIE may complete the CofR provided the CRI presents evidence of satisfactory experience. An Instructor Form 3 (SRG\1135), completed by the applicant and certified by the examiner, must be submitted to PLD.
- 13.11 Where a CRI rating has lapsed, the applicant will be required to undertake refresher training at the discretion of the Authority. Applicants and examiners should contact the CAA PLD or the nearest Regional Flight Test Centre for advice.

### Removal of Restrictions or Additional Instructional Privileges

- 13.11 A proficiency check for the revalidation or renewal of a rating may be combined with a skill test to remove a restriction (No Night, No Applied Instrument Instruction) or add instructional privileges (ME Instruction). Where this occurs, Instructor Forms 1 and 2 or 3 (as appropriate) will be required. The instructor must be reminded that any additional privileges may not be exercised until the CAA has issued the revised rating.

## 14. ASSESSMENT of an APPLICANT for AUTHORISATION to CONDUCT the FLIGHT INSTRUCTOR COURSE

- 14.1 For the instructor seeking or holding an authorisation to conduct the FI(R) course (FIC instructor), the assessment will assume a higher than average level of instructional competence, depth of knowledge and breadth of experience. For such authorisation, the applicant will be expected to answer the majority of theoretical knowledge questions confidently and correctly, present a blueprint pre-flight brief, give an example long brief and conduct an airborne lesson and debrief as a demonstration of best practice in effective instructional technique and standardisation in pilot training. In addition, the applicant must be able to provide comprehensive guidance on effective instructional techniques and methods to facilitate and enhance the teaching and learning process.
- 14.2 Applicants wishing to seek approval to run Flight Instructor Courses (FIC) shall:
- Meet the requirements detailed in JAR-FCL 1.330(f) and Standards Document 37;
  - Apply to CAA PLD Approvals Support;
  - Have successfully completed the FIC Initial Assessment;
  - Completed the recommended training course with an FIE;
  - Successfully carried out a ground and flight test with a CAA Staff FE or FIE nominated by the Authority.

### The FIC Initial Assessment

- 14.3 The FIC Initial Assessment will normally be held at one of the CAA Regional Flight Test Centres and will last for approximately 5 hours with a break for lunch. A panel comprising CAA Staff Examiner, CAA Training Standards Inspector and an independent FIE will conduct the assessment. The purpose of this assessment is to ascertain that the applicant has attained appropriate instructional experience, is competent and confident to instruct all aspects of the PPL syllabus and has the potential to conduct the FI(R) course.
- 14.4 The assessment takes the following format:
- o An informal introduction, during which the applicant's licence, logbook and instructional experience is reviewed;
  - o A debrief and discussion of a self-study questionnaire previously sent to the applicant;
  - o A presentation by the applicant of a pre-flight brief, selected from the PPL syllabus;
  - o A discussion of the structure and conduct of various airborne instructional exercises;
  - o A general assessment of the applicant's theoretical knowledge and ground instructional technique in the form of a question and answer session.
- 14.5 The assessment is normally conducted as a group session involving at least two applicants. Further information regarding the application and assessment process for FIC authorisation is available from PLD Approvals Support.

### The FIC Instructor Preparatory Course

- 14.6 The recommended course is not designed to improve personal instructional standards and competence. It aims to enlighten the applicant to the differences between teaching a student pilot for a licence or rating and teaching a qualified pilot how to teach (train the teacher). Additionally, it provides guidance on the content, design, conduct and administration of instructor training courses and reviews established and standard teaching methods. Although there will inevitably be some brushing up of existing instructional skills and knowledge, this should be a side effect of the course, not the main objective.

A copy of the course objectives and programme is at Appendix 2. Although the course is scheduled for up to 4 days, the applicant's previous experience and performance on the first day of the course may allow this to be reduced.

**Note:** Candidates are strongly advised to complete this course before submitting themselves for the FIC authorisation test.

## **Upgrade SE to ME FIC**

- 14.7 If an FIC instructor gained his authorisation while holding only an FI SE rating, in order to conduct ME FIC training he must:
- a. Gain an FI ME rating;
  - b. Have successfully trained at least 3 applicants for the ME Skills Test (i.e. 18 hours ME instruction);
  - c. Successfully carry out a ground and flight test with a nominated FIE.

## **Administration**

- 14.8 The FIE providing the FIC preparatory course must certify the course completion certificate in Instructor Form 1. Upon completion of the FIC authorisation skill test, the Staff FE or FIE conducting the test will complete the examiner's certificate and forward the form to PLD. The examiner must also retain a completed Form 685.

## APPENDIX 1

### ASSESSMENT CRITERIA – GENERAL

1. Criteria for the assessment of instructor competence are provided in the following documents:
  - PANS Training (Chapter 4 and the attachment)
  - JAR FCL (AMC FCL 1.310(d))
  - EASA Part FCL (draft)
  - CAP 737 Crew Resource Management Training
  
2. Assessment criteria usually comprise a unit of competence, an element or elements of observable performance and the associated demonstration of knowledge, skill and attitude. Although there are slight variations between the various documents listed above, generally the main competence units are as follows:
  - Prepare resources;
  - Create a climate conducive to learning;
  - Present knowledge;
  - Integrate threat & error management and crew resource management
  - Manage time to achieve training objectives
  - Facilitate learning
  - Assess trainee performance
  - Monitor and review progress
  - Evaluate training sessions
  - Report outcome
  
3. Currently, it is a requirement of PANS Training and JAR-FCL that all instructors delivering competence-based training (i.e. training for the Multi-crew Pilot Licence) are assessed against the above criteria. Additionally, those seeking accreditation as CRM instructors are assessed against similar criteria. The intent of EASA part FCL is that **all** instructors shall be assessed for competence against such criteria.
  
4. The assessment criteria presented in this appendix are compatible with and expand upon the general competence units listed above. For convenience, the criteria are presented in a manner that reflects the order of events of a typical instructor test or check. They are presented as word pictures that describe expected and acceptable behaviour markers and are provided to facilitate the objective, reliable and transparent assessment of instructor competence by examiners. The aim is to ensure that all instructors, and those who train instructors, have access to and understand the criteria against which their performance is assessed, enabling them to be appropriately trained and fully prepared.

### ASSESSMENT CRITERIA – PRE-FLIGHT BRIEFING

5. The purpose of the pre-flight briefing is to ensure that the student is prepared for the airborne instruction he/she is about to receive. This should not be the time to introduce new concepts to the student – all the theory underpinning the practical lesson should have been learnt previously from a long briefing and by directed self-study. The pre-flight briefing should take approximately 20 minutes and ideally be given shortly before the airborne lesson, so that it is fresh in the student's mind.
  
6. The instructor test/check schedule at Appendix 2 to JAR-FCL 1.330 & 1.345 (reproduced on CAA form FCL685 (SRG\1169)) lists the following items for assessment:
  - a. Visual presentation and content;
  - b. Technical accuracy;
  - c. Clarity of explanation;
  - d. Clarity of speech;
  - e. Instructional technique;
  - f. Use of model and aids;
  - g. Student participation.
  
7. Generally, examiners look at the pre-flight briefing as a whole and assess it for presentation, content and instructional technique. The following bullet points are indicators of sound instructor competence:

#### Presentation:

- The briefing is presented in a location conducive to learning, for example an enclosed briefing room or private area with low ambient noise level.
- The temperature and lighting are adjusted to make the environment comfortable.
- The instructor is fully prepared for the briefing and prepares the room and training aids before the arrival of the student.
- The instructor utilises training aids in an appropriate and effective manner to enhance the impact of verbal briefing.
- Where a whiteboard, flip sheet or OHP is used, the layout is logical and uncluttered, colour is used consistently and effectively (e.g. red to indicate importance or danger); handwriting and diagrams are neat and clear.
- Where an OHP or digital media is used, the instructor uses a "gradual reveal" technique to focus the student's attention on the part of the lesson being discussed.
- Where training aids such as model aircraft or sectioned instruments are used, the instructor indicates movement or operation in the correct sense and from the perspective of the student.

**Content:**

- The brief includes a clearly defined, relevant and achievable aim.
- The instructor refers to and puts into context the underpinning theoretical knowledge gleaned from long briefings and self-study.
- The instructor indicates, in a logical sequence, how the lesson will progress; which skills will be revised from previous lessons, which new skills will be learnt and how the aim will be achieved.
- It is assumed that the lesson is part of a structured syllabus, in which case the instructor briefs all items within the syllabus lesson plan without omission.
- Where the instructor refers to operating procedures, speeds, power settings, limitations, regulations etc, these are technically correct.
- In addition to briefing the main exercise, the instructor incorporates practical guidance and training in airmanship, resource management and threat and error management, and indicates to the student why this is relevant and how it will be achieved.
- The instructor is able to provide clear, concise and technically correct answers to student questions or concerns related to but not necessarily part of the briefed exercise.

**Instructional technique:**

- The instructor's manner and attitude set a good example and encourage a relaxed yet professional learning environment.
- The instructor arouses interest and motivates the student by establishing a "need to know".
- The instructor displays enthusiasm, patience, honesty, flexibility, confidence, and where appropriate, humour; overall giving the impression that he has a vested interest in the student pilot's progress.
- The instructor does not exhibit any distracting mannerisms or display any negative personality traits such as sarcasm, disinterest, overconfidence, impatience, or an overbearing or demeaning manner.
- The instructor uses appropriate question technique to establish the student's existing level of knowledge and personal preparation.
- The instructor recognises the trainee's needs, ability and progress and adapts his/her teaching style accordingly.
- Explanations given are clear, concise, and technically correct and illustrated with appropriate use of visual aids.
- Throughout the brief the instructor makes it quite clear who will be in control of the aeroplane by using phrases such as, "I will teach.....,You will practise....., " rather than the less specific, "We will have a look at...."
- The student is encouraged to participate fully in the brief and the instructor regularly checks understanding by posing appropriate and relevant questions.

**Assessment Criteria - Airborne Exercises**

8. For the airborne exercise instructors will be assessed on their personal flying ability, flight management skills and the ability to present a coherent and effective instructional lesson. They must also be able to monitor the student's progress and analyse and correct any poor techniques.
9. The flight lesson begins with pre-flight preparation. All instructors must be able to determine, without error, that they, their students and the aircraft they are about to fly are suitable prepared for flight. Pre-flight preparation includes (but is not limited to) the following items:
  - Personal preparation, for example by using the "I'M SAFE" (Illness, Medication, Stress, Alcohol, Fatigue, Eating) mnemonic.
  - The instructor calculates the aircraft performance for the prevailing conditions (or verifies the students calculations) and ascertains that the take off and landing distances available, after considering any additional factors, are sufficient for the flight to be conducted safely.
  - The instructor calculates the aircraft mass and balance (or verifies the students calculations) and confirms that it will be operated within limits throughout the flight.
  - The instructor demonstrates thorough familiarity with the POH/AFM & Checklist and is able to obtain information regarding aircraft specifications, limitations, normal and abnormal operation, performance, loading, handling and systems without error.
  - The instructor checks the aircraft technical records, certificates and associated documents and ensures that the aircraft is airworthy.
  - The instructor completes a fuel plan, checks the aircraft fuel and confirms that the intended flight may be conducted safely and completed with sufficient reserve and contingency fuel.
  - The instructor checks and correctly interprets NOTAM and weather information and ensures that the intended flight can be conducted safely and effectively with a high likelihood of achieving the aim.
  - The instructor has a working familiarity with the relevant parts of the AIP and associated AIC and is able to obtain information relevant to the airfields, airspace and aeronautical facilities likely to be used on the intended flight.
10. Although instructors must complete thorough pre-flight planning and preparation for all flights, for the sake of expediency examiners may select only one or two items to formally assess on a test or check. This may be conducted either as a teaching exercise or as a demonstration.

11. For the main airborne exercise, and any additional exercises, the test/check schedule lists the following items for assessment:
  - a. Arrangement of demonstration;
  - b. Synchronisation of speech/demo;
  - c. Correction of faults;
  - d. Aeroplane handling;
  - e. Instructional technique;
  - f. General airmanship/Safety;
  - g. Position and use of airspace.
  
12. As with the pre-flight brief, the examiner generally looks at the overall picture to assess whether the instructor gives an effective lesson and demonstrates satisfactory standards of aircraft handling and flight management. The following are reliable indicators of competence for an airborne instructional lesson:
  - The instructor selects an appropriate operating area and altitude band in which to present the exercise(s). For example, for early training exercises there should be a distinct horizon, minimal turbulence and satisfactory aircraft performance.
  - The instructor ensures that the student is comfortable and that communication is unhindered (radio and intercom volume and squelch are correctly set). Where possible, a “quiet” frequency is selected so that the lesson is not interrupted with background radio chatter.
  - The instructor uses clear, concise and unambiguous phrases with correct and appropriate aviation phraseology.
  - The instructor’s hand-over and take-over protocol is consistent and exemplary. There is never any doubt about who has control of the aircraft.
  - The instructor refrains from making control inputs (riding the controls) when the student is flying. If corrective action is necessary the instructor takes control and re-briefs the student.
  - When skills involving control inputs are being taught, the student is invited to “follow through” whilst the instructor manipulates the controls. Upon completion of the demonstration the student is instructed to “relax”.
  - The instructor briefs the student on the exercise to be flown, hands over control, then monitors in silence as the student practises the manoeuvre. Upon completion, the instructor takes back control before debriefing/re-briefing. Note: This is in contrast to the instructor handing over control *then* giving the brief, or debriefing whilst the student is still in control of the aeroplane. The latter is poor instructional technique because the student must concentrate both on controlling the aircraft and listening to the instructor.
  - Generally, it is poor practice to coach a student through a manoeuvre. Occasional words of encouragement are perfectly acceptable such as, “Good”, “That’s nice”, “Well done” etc. However, the instructor should avoid providing further guidance, for example: “Add more power”, “Raise the nose slightly”, “Select flap now” etc. An instructor who habitually does this should ask him/her self the question, “How will my student perform when I’m not here?”
  - When the instructor is flying he/she keeps the student mentally alert and engaged in the conduct of the flight, for example by inviting the student to conduct routine cruise checks, indicate the location of the airfield, calculate fuel endurance etc.
  - The instructor highlights where skills or procedures involve the practical application of previously acquired theoretical knowledge.
  - The student is never put in a position where he/she is attempting a manoeuvre or practising a skill that has not previously been taught or demonstrated.
  - Once a manoeuvre or skill has been taught, the student is given every opportunity to practise that manoeuvre or skill, for example by positioning or configuring the aircraft for the next event.
  - When flying, the instructor uses the same techniques as those taught to and expected of the student. For example, just as students are taught to lookout and clear the airspace into which they are about to manoeuvre, the instructor must set an example by always doing likewise. It is all too easy to give the impression that there are two ways of flying, one when learning and another when qualified and experienced.
  - All demonstrations are accurately flown and with smooth, co-ordinated control inputs. When quoting speed, altitude, heading, power settings and other parameters the instructor ensures that they correspond with the actual aircraft performance and configuration.
  - The instructor does not attempt to gloss over or bluster his/her way out of poor demonstrations. He/she admits the error and repeats the demonstration, where appropriate making a teaching point out of it.
  - Where appropriate, the instructor introduces “deliberate errors”. For example, when first teaching how to regain level flight the instructor deliberately selects an attitude that is slightly too high or too low. He/she then indicates that the attitude selected is incorrect because the altimeter indicates a gradual climb/descent and shows how an attitude adjustment is necessary to refine level flight.
  - The instructor’s “patter” is co-ordinated with the demonstration such that the aircraft can be seen to be responding in the manner described.
  - The lesson is developed in the same sequence and with the same content as the pre-flight brief.
  - The instructor is attuned to the student’s ability and progress and adjusts the pace of the lesson accordingly.
  - The instructor maintains a high level of situational awareness and uses the airspace efficiently such that the lesson is not prolonged unnecessarily with re-positioning.
  - The instructor continues to prosecute an effective lookout throughout the lesson and avoids becoming engrossed in events within the aircraft.
  - The instructor recognises and corrects significant student-handling errors in a sympathetic and efficient manner and at the earliest appropriate moment.
  - The instructor is not overly fussy about minor student handling errors to the detriment to the flow and continuity of the airborne exercise.
  - The instructor encourages critical self-analysis.

- The instructor provides appropriate positive comment and praise to reinforce correct technique, effective flight management and sound decision-making by the student.
- The instructor incorporates or highlights practical examples of “airmanship” in the lesson. This might include but is not limited to threat avoidance strategies, resource management, workload management, task prioritisation and aeronautical decision-making.

### Assessment Criteria – Post Flight Debriefing

13. The post-flight debriefing is an often overlooked but vital part of pilot training. It provides an opportunity for the student pilot to consolidate his/her thoughts whilst the preceding lesson is still fresh in the mind and for the instructor to reinforce important teaching points and clear up any misunderstandings. Additionally, the instructor can focus attention and direct any self-study for the next lesson or part of the syllabus.
14. The following are indicators of competent debriefing skills:
- The instructor correctly identifies and states whether or not the student achieved the aim of the lesson.
  - The instructor correctly identifies any critical handling errors and/or fundamental gaps in the student's knowledge, skills and understanding (for that part of the course) and specifies appropriate remedial training.
  - The instructor correctly identifies any minor handling errors and/or any minor gaps in the student's knowledge, skills and understanding (for that part of the course) and corrects these by de-briefing and directed self-study.
  - The instructor correctly identifies and praises examples of student progress and achievement and developing competence.
  - The instructor reinforces examples of good airmanship, including sound decision-making, effective resource and workload management and pro-active threat avoidance.
  - Where appropriate, the instructor makes reference to a suitable behavioural marker system (e.g. NOTECH) to reinforce the debriefing of non-technical skills.
  - The debrief focuses on significant aspects of the lesson, rather than simply following a chronological order of events.
  - The instructor encourages student participation and uses facilitative techniques where appropriate to elicit responses from the student, to check understanding and enhance the learning process.
  - The instructor provides clear, concise and technically correct answers in response to direct student questions.
  - The instructor provides directed self-study in anticipation of the next lesson or part of the syllabus.
  - The instructor completes the student's training record with clear, concise notes and objective assessment.
  - Inadequate student progress or critical errors and omissions are recorded and highlighted for attention and remedial action.

### Assessment Criteria – Theoretical Knowledge Oral and Long Briefing/Lecture

15. As for the pre-flight briefing, examiners generally look at the theoretical knowledge oral and long briefing as a whole and assess the presentation, technical content and instructional technique. Many of the indicators of instructor competence are the same as those listed for the pre-flight briefing and post-flight debriefing at paragraphs 5-7 and 13, 14 above. The following additional criteria apply:
- The instructor is able to locate and indicate the content of the relevant theoretical knowledge syllabus.
  - The instructor retains a working knowledge and understanding of the majority of topics from the relevant theoretical knowledge syllabus, and is able to discuss and answer questions related to the syllabus correctly and with confidence.
  - With sufficient time to prepare, the instructor demonstrates the ability to teach in depth and from basic principles any topic from within the appropriate theoretical knowledge syllabus.
  - The instructor motivates the student and arouses interest by establishing a “need to know.”
  - The instructor clearly states one or more objectives for the lesson. The objectives are specific, relevant and achievable.
  - The lesson follows a clear structure: an introduction, a development stage and a consolidation or summary.
  - The instructor builds upon existing knowledge and leads the student from known to unknown.
  - Where the instructor makes a statement or provides information, either during a prepared brief or when answering questions, the information is technically correct.
  - During a complex or lengthy lesson, the instructor occasionally recaps and ensures the student is keeping pace with the lesson.
  - The instructor regularly checks understanding of the key points by using appropriate question technique.
  - Where appropriate, the instructor provides handouts or summary notes at the end of the lesson.
  - The instructor is able to indicate where relevant information may be found in source documents, reference material and training manuals.

**APPENDIX 2****FIC INSTRUCTOR PREPARATORY COURSE****Objectives.**

The recommended course is designed to give the applicant adequate training in the instructor training techniques required when conducting the Flight Instructor Course (FIC). On completion of the course, the course tutor will recommend whether or not the applicant should proceed to the FIC authorisation acceptance test.

The tutor should also make quite clear to the applicant his/her strengths and weaknesses, suggesting any further training or experience that may be required prior to proceeding to test, for example:

- Gain more experience in the field;
- Further self study;
- Observation of one or more FI training courses;
- Undertake further training.

The FIC preparatory course is not considered as a pass or fail course; the purpose is to prepare suitably experienced and able applicants for a future role as instructor trainers. The examiner conducting the FIC authorisation flight test shall make the final assessment of competence.

**The Course.**

The course should stress the standardisation of teaching methods.

The applicant should already be fully familiar with the PPL syllabus, lesson plans and theoretical knowledge underpinning the lessons, thus the main thrust of the course is to enhance one's ability to "TEACH THE TEACHER".

The applicant will be expected not just to present example air exercises as if to a student pilot, but also provide advice and guidance on instructional technique to the would-be instructor. This requires a thorough understanding of the structure and content of the overall syllabus and every lesson within the syllabus, including knowing why particular lessons are taught in such a fashion or sequence. The applicant must also be able to give insight into typical student errors, strengths and weaknesses.

**Course Schedule.**

The course tutor should contact the applicant well in advance to establish the course requirements. The course will vary in length and content according to the qualifications and experience of the applicant. The course should be designed to cover aspects of each qualification held for example, PPL, Night, Applied IF, ME class rating and aerobatics. The course schedule should be planned well in advance and a copy sent to the applicant. An example course is attached below.

**Course Costs.**

The recommended cost of the course (daily rate) is discussed, and agreed, annually at the Examiners' Meeting. The applicant will meet the cost of aircraft hire or may, of course, provide his own aircraft as long as the airworthiness regulations regarding remunerated flight instruction are met.

**FIC INSTRUCTOR'S PREPARATORY COURSE****SCHEDULE OF SAMPLE COURSE****DAY ONE**

0900 – 0930	Course Outline and Aim
0930 – 1000	FIC Course Documentation and Instructor Privileges
1000 – 1100	Philosophy of Teaching
1100 – 1230	The Lesson Structure <ul style="list-style-type: none"> <li>○ Ground Preparation</li> <li>○ The Structure of the Air Exercise</li> <li>○ The "Give" and "Giveback"</li> <li>○ The Debrief</li> </ul>
1230 – 1330	Lunch
1330 – 1400	Performance and Type Techniques - AFM/POH and Engine Manual
1400 – 1500	Discussion of Training
1500 - 1530	Tea
1530 – 1700	Discussion of ANO, AIC, JAR-FCL1, AIP, LASORS

**DAY 2**

0900 – 1100	Navigation Techniques and MDR - Discussion
1100 – 1200	Spinning and Stalling - Discussion
1200 – 1300	Lunch
1300 – 1500	Air Exercise and Briefs – (Descending 2 Exercise 8)
1500 – 1530	Tea
1530 – 1700	Air Exercise and Briefs – (Forced Landings with and without power Ex 16 and 17)

**DAY 3**

0900 – 1000	<p>Discussion of Circuit Techniques</p> <ul style="list-style-type: none"> <li>○ Normal Power Approach – Performance</li> <li>○ Go Around</li> <li>○ Glide Approach and Landing</li> <li>○ Crosswind Landing</li> <li>○ Flapless Landing</li> <li>○ Bad weather circuit and Short field</li> </ul>
1000 – 1200	<p>Air Exercise and Briefs</p> <ul style="list-style-type: none"> <li>○ Steep Turns Ex 15.1, 15.2 and 15.3.1</li> <li>○ Airfield Joining and Circuits Ex 13.1-3 and 12</li> <li>○ Normal Power Approach Ex 13.2</li> <li>○ Go Around Ex 13.3</li> <li>○ Glide Approach Ex 13.4</li> <li>○ Crosswind Approach and Landing Ex 13.6</li> <li>○ Flapless Approach and Landing Ex 13.7</li> <li>○ Performance Landing Ex 13.9</li> </ul>
1200 - 1300	Lunch
1300 - 1400	Basic Instrument Technique Ex 19 1-5
1400 - 1500	Ex 19a.1-6 Discussion
1500 - 1530	Tea
1530 - 1700	Air Exercise and Briefs - Full Panel IF Ex 19a, Ex 19 b 1 and 2

**NOTE:** By the end of Day 3, the Course Tutor should be able to make an assessment of the applicant's progress and suitability to the authorisation flight test.  
Should the applicant be qualified to instruct Applied IF then it is recommended that the course continue to Day 4.

**DAY 4**

0900 - 0930	Discussion of Limited Panel techniques and recovery from Unusual Attitudes Ex 19b.1, 1-5, Ex 19b2. 1-5
0930 - 1000	Discussion of the Hold and Non-Precision Approach
1000 - 1200	<p>Air Exercise and Briefs</p> <ul style="list-style-type: none"> <li>○ Limited Panel, Ex 19b1-2</li> <li>○ Homing, Hold and Non-Precision, Ex 19d.1, 19d.3 and 19d.4</li> </ul>
1200 - 1300	Lunch
1300 - 1600	<p>Discussion of SRA, PAR and ILS teaching techniques, flight exercise and briefing - Instrument Approach, Ex 19d.4</p> <ul style="list-style-type: none"> <li>○ PAR/SRA</li> <li>○ ILS</li> </ul>
1600 - 1630	Tea
1630 - 1700	Discussion of Flight Planning and Log Keeping

## **APPENDIX 3**

### **ASSOCIATED FORMS and DOCUMENTS**

[SRG1131: Instructor Form 1: JAR-FCL \(Aeroplanes\), JAR-FCL 2 \(Helicopters\) \(FCL675\) | Publications | CAA](#)

[SRG1133: Instructor Form 2: JAR-FCL 1 \(Aeroplane\), JAR-FCL 2 \(Helicopter\) - Application \(FCL676\) | Publications | CAA](#)

[SRG1135: Instructor Form 3: Instructor Rating Revalidation/Renewal | Publications | CAA](#)

[SRG1169: Flight Instructor Test/Check Schedules - Examiner's Record | Publications | CAA](#)

[http://www.caa.co.uk/docs/33/Standards\\_Document\\_21\\_v5.pdf](http://www.caa.co.uk/docs/33/Standards_Document_21_v5.pdf)

[http://www.caa.co.uk/docs/33/Standards\\_Document\\_37\\_v2.pdf](http://www.caa.co.uk/docs/33/Standards_Document_37_v2.pdf)

## **APPENDIX 4**

### **FLIGHT EXERCISES WITH STANDARD EXERCISE NUMBERING**

#### **Introduction**

This Standard Exercise Numbering System, **which has been aligned with JAR-FCL Part 1**, should be used in all references to the flight exercises in syllabuses, student records, logbooks and instructor training records.

- 1 FAMILIARISATION WITH THE AEROPLANE**
  - 1.1 AEROPLANE GENERAL
    - 1.1.1 External features
    - 1.1.2 Internal features
    - 1.1.3 The cockpit and controls
    - 1.1.4 Introduction to Checklist
  - 1.2 AIRCRAFT SYSTEMS, NORMAL AND ABNORMAL OPERATION
    - 1.2.1 All systems, normal operation
    - 1.2.2 Systems failures, abnormal operation and procedures
    - 1.2.3 Re-starting the engine in flight, automatic starter and aerodynamic procedures
  - 1.3 FIRE DRILLS
    - 1.3.1 Engine fire on the ground
    - 1.3.2 Engine fire in the air
    - 1.3.3 Cabin fire
    - 1.3.4 Electrical fire
  - 1.4 EMERGENCY DRILLS
    - 1.4.1 Location and use of emergency equipment
    - 1.4.2 Emergency landing/ditching procedures
    - 1.4.3 Location and operation of escape hatches
    - 1.4.4 Evacuation, land/water
    - 1.4.5 Emergency communications
    - 1.4.6 Radio failure procedures (appropriate to stage of course)
      - (a) Local or FIR day
      - (b) Local or FIR night
      - (c) Controlled airspace
- 2 PREPARATION FOR FLIGHT AND ACTION AFTER FLIGHT**
  - 2.1 PRE AND POST FLIGHT PROCEDURES
    - 2.1.1 Pre-departure procedures
    - 2.1.2 Pre-flight inspection
    - 2.1.3 Checks before starting
    - 2.1.4 Starting procedure
    - 2.1.5 Checks after starting
    - 2.1.6 Radio and instrument checks
    - 2.1.7 Power check
    - 2.1.8 Arrival procedure
- 3 AIR EXPERIENCE**
  - 3.1 FAMILIARISATION FLIGHT
    - 3.1.1 Seat, harness and control adjustment
    - 3.1.2 Headset and intercom
    - 3.1.3 Local flight
- 4 EFFECTS OF CONTROLS**
  - 4.1 THE FLYING CONTROLS
    - 4.1.1 Primary effects
    - 4.1.2 Secondary effects
    - 4.1.3 The effects of airflow and power
  - 4.2 THE TRIM, ENGINE AND ANCILLARY CONTROLS
    - 4.2.1 The trim controls
    - 4.2.2 The throttle and RPM control
    - 4.2.3 The flaps
    - 4.2.4 The landing gear
    - 4.2.5 Other engine and ancillary controls

**5 TAXYING****5.1 BASIC CONTROL TECHNIQUE, PRECAUTIONS AND TAXYING**

- 5.1.1 Preliminary checks and lookout
- 5.1.2 Starting-off, control of speed and stopping
- 5.1.3 Control of direction and turning
- 5.1.4 The effects of wind
- 5.1.5 The effects of ground surfaces
- 5.1.6 Special precautions and abnormal procedures
- 5.1.7 Taxying checks
- 5.1.8 Emergencies (brakes and steering failure)

**5.2 AIRFIELD PROCEDURES**

- 5.2.1 Clearances and ATC liaison
- 5.2.2 Airfield discipline
- 5.2.3 Airfield charts for ground movements

**6 STRAIGHT AND LEVEL****6.1 BASIC CONTROL TECHNIQUE**

- 6.1.1 Visual attitude for straight and level flight
- 6.1.2 Demonstration of inherent stability
- 6.1.3 Use of controls
- 6.1.4 Regaining datum heading and altitude

**6.2 PRECISION EXERCISES**

- 6.2.1 Straight and level at various power settings
- 6.2.2 Straight and level at selected airspeeds
- 6.2.3 Straight and level when changing configuration

**6.3 PERFORMANCE APPLICATIONS**

- 6.3.1 Cruising for maximum range
- 6.3.2 Cruising for maximum endurance

**7 CLIMBING****7.1 BASIC CONTROL TECHNIQUE**

- 7.1.1 Climbing at recommended power and IAS
- 7.1.2 Climbing with flaps down

**7.2 PERFORMANCE APPLICATIONS**

- 7.2.1 Prolonged climb
- 7.2.2 Climbing at maximum rate
- 7.2.3 Climbing maximum angle
- 7.2.4 Cruise climb

**8 DESCENDING****8.1 GLIDING**

- 8.1.1 Entering and maintaining the glide
- 8.1.2 Levelling off
- 8.1.3 Precision exercise

**8.2 DESCENDING AT SELECTED RATES OF DESCENT AND AIRSPEEDS**

- 8.2.1 Descending with flap
- 8.2.2 Descending with power
- 8.2.3 Descending at selected rates of descent and airspeeds

**8.3 PERFORMANCE APPLICATIONS**

- 8.3.1 Gliding, clean
- 8.3.2 Gliding, approach configuration
- 8.3.3 Side slipping
- 8.3.4 En-route descent

**8.4 EMERGENCY DESCENT**

- 8.4.1 Glide at maximum flap speed (V<sub>fe</sub>)
- 8.4.2 Descending at maximum permitted IAS (V<sub>ne</sub>)

**9 MEDIUM TURNS****9.1 BASIC CONTROL TECHNIQUE**

- 9.1.1 Orientation and lookout
- 9.1.2 Level turns

- 9.1.3 Climbing turns
- 9.1.4 Descending turns
- 9.1.5 Gliding turns
  
- 9.2 PRECISION EXERCISES
  - 9.2.1 Turns onto specified landmarks and headings
  - 9.2.2 Turns in the approach and landing configuration
  - 9.2.3 The relationship between IAS, bank and rate of turn
  
- 9.3 ABNORMAL (DI FAILURE) PROCEDURE
  - 9.3.1 Compass errors
  - 9.3.2 Compass/timed turns

## **10 SLOW FLIGHT AND STALLING**

- 10A SLOW FLIGHT
  - 10A.1 Controlled slow flight in clean configuration; recognition and avoidance of stall onset
    - 10A.1.1 Straight and level and level turns; flying for endurance and range
    - 10A.1.2 Climbing and descending with turns; climbing at  $V_x$ , gliding at best L/D ratio.
    - 10A.1.3 Descending unbalanced turns at low airspeed; gliding turns
    - 10A.1.4 Effect of pilot distractions on safety
  - 10A.2 Controlled slow flight with flap, recognition and avoidance of stall onset.
    - 10A.2.1 Straight and level and level turns; handling in low visibility
    - 10A.2.2 Climbing and descending with turns. Descending turns in approach configuration
    - 10A.2.3 The effect of going around in configurations where applications of engine power causes a strong nose-up trim change
  
- 10B STALLING
  - 10B.1 Basic stalling
    - 10B.1.1 Pre-stalling checks
    - 10B.1.2 Approach to the stall
    - 10B.1.3 Recovery from stalls when power is not available
    - 10B.1.4 Full stall, clean configuration, power off, standard recovery
    - 10B.1.5 Stall with wing drop and standard recovery
    - 10B.1.6 Standard recovery at stall warning
  - 10B.2 Advanced stalling
    - 10B.2.1 Full stall, flaps down, power off and standard recovery
    - 10B.2.2 Full stall, flaps down, approach power and standard recovery
    - 10B.2.3 Full stall, landing configuration, approach power and standard recovery
    - 10B.2.4 Approach to the stall warning in the landing configuration and standard recovery
    - 10B.2.5 Full stall and stall warning recovery from a banked attitude
    - 10B.2.6 Secondary stalls with increased wing loading
    - 10B.2.7 Stall from maximum power climbs (straight and turning)

## **11 SPINNING**

- 11A SPIN RECOVERY AT THE INCIPIENT STAGE
  - 11A.1 Pre-spinning checks
  - 11A.2 Symptoms of the incipient stage
  - 11A.3 Recovery after a level flight entry
  - 11A.4 Recovery after entry from other attitudes
  
- 11B SPIN RECOVERY AT THE DEVELOPED STAGE
  - 11B.1 Pre-spinning checks
  - 11B.2 Spin entry and recognition of spin direction
  - 11B.3 Recovery after a level flight entry
  - 11B.4 Recovery after entry from other attitudes
  - 11B.5 Effect of power and flaps (if not restricted)
- 11C EMERGENCY RECOVERY

## **12 TAKE-OFF AND CLIMB**

- 12.1 TAKE-OFF INTO WIND
  - 12.1.1 Pre take-off and runway checks
  - 12.1.2 Take-off and initial climb to circuit height
  - 12.1.3 Climb to downwind
  - 12.1.4 Take-off and circuit departure

- 12.2 ENGINE FAILURE AFTER TAKE-OFF
  - 12.2.1 Take-off Safety Speed considerations
  - 12.2.2 Control following engine failure on the ground
  - 12.2.3 Control following engine failure after take-off
  - 12.2.4 Emergency drills
- 12.3 TAKE OFF OUT OF WIND
  - 12.3.1 Calculation of crosswind component
  - 12.3.2 Take-off and initial climb
- 12.4 PERFORMANCE TAKE-OFF
  - 12.4.1 Short take-off, scheduled technique to 50'
  - 12.4.2 The effects of different types or contaminated surfaces on control and take-off distance
- 12.5 NOISE ABATEMENT PROCEDURES
  - 12.5.1 Effect on take-off roll and climb performance; routings
- 13 APPROACH AND LANDING**
- 13.1 AIRFIELD PROCEDURES
  - 13.1.1 Airfield Approach Checks
  - 13.1.2 Joining the circuit
  - 13.1.3 Circuit pattern and Landing Checks
- 13.2 ENGINE ASSISTED APPROACH AND LANDING
  - 13.2.1 The approach
  - 13.2.2 Round out and landing
  - 13.2.3 Control after landing
  - 13.2.4 Touch and go landing
- 13.3 MISSED APPROACH/MISSED LANDING PROCEDURES
  - 13.3.1 From a missed approach
  - 13.3.2 From a missed landing
- 13.4 GLIDE APPROACH AND LANDING
  - 13.4.1 The approach
  - 13.4.2 Round out and landing
- 13.5 APPROACH AND LANDING (TAILWHEEL AEROPLANE)
  - 13.5.1 The approach
  - 13.5.2 Round out and landing
  - 13.5.3 Control after landing
- 13.6 OUT OF WIND CIRCUIT AND LANDING
  - 13.6.1 Calculation of crosswind component
  - 13.6.2 Circuit adjustments
  - 13.6.3 The approach
  - 13.6.4 Round out and landing
  - 13.6.5 Control after landing
- 13.7 FLAPLESS LANDING
  - 13.7.1 Check of landing distance
  - 13.7.2 adjustments
  - 13.7.3 The approach
  - 13.7.4 Round out and landing
- 13.8 LANDING ON AN ALTERNATIVE SURFACE, GRASS OR RUNWAY
  - 13.8.1 The approach
  - 13.8.2 Round out and landing
  - 13.8.3 Control after landing
- 13.9 PERFORMANCE (MINIMUM LANDING DISTANCE) APPLICATION
  - 13.9.1 The approach to 50'
  - 13.9.2 Scheduled minimum field length technique from 50'
  - 13.9.3 Control after landing
  - 13.9.4 The effects of surface conditions on landing distance, control and braking techniques

**14 FIRST SOLO**

- 14.1 PRELIMINARY TRAINING
- 14.2 Flying ability final check
- 14.3 Timing a first solo
- 14.4 Briefing a first solo
- 14.5 Observing a first solo

**15 ADVANCED TURNING**

- 15.1 BASIC CONTROL TECHNIQUE
  - 15.1.1 Orientation and lookout
  - 15.1.2 Steep level turns
  - 15.1.3 Correction of faults
  - 15.1.4 Symptoms of the stall in the turn and recovery
- 15.2 PRECISION EXERCISES
  - 15.2.1 Steep descending turns
  - 15.2.2 Steep gliding turns
  - 15.2.3 Steep climbing turns
  - 15.2.4 Maximum rate turns
- 15.3 RELATED REVISION EXERCISES
  - 15.3.1 Unusual attitudes (including spiral dives)
  - 15.3.2 Spin recovery (from the turn)

**16 FORCED LANDING WITHOUT POWER**

- 16.1 Approach from 1000'
  - 16.1.1 Glide approach and landing on the airfield
  - 16.1.2 Glide approach to go-around over selected area
- 16.2 FULL FORCED LANDING PROCEDURE
  - 16.2.1 Full procedure to go-around, including selection of field and all drills
  - 16.2.2 Practice approaches from various heights and positions

**17 PRECAUTIONARY LANDING**

- 17.1 PROCEDURE
  - 17.1.1 Landing area selection
  - 17.1.2 Inspection of landing area
  - 17.1.3 Circuit, approach and landing

**18A PILOT NAVIGATION**

- 18A.1 FLIGHT PLANNING
  - 18A.1.1 Weather forecast and actuals
  - 18A.1.2 Map selection and preparation
  - 18A.1.3 Calculations (including MSA)
  - 18A.1.4 Flight information
  - 18A.1.5 Notification of the flight
- 18A.2 AERODROME DEPARTURE
  - 18A.2.1 Cockpit management
  - 18A.2.2 Departure procedure
- 18A.3 EN ROUTE
  - 18A.3.1 Navigation technique and hazard avoidance
  - 18A.3.2 Minimum weather conditions including navigation when VFR cannot be maintained
  - 18A.3.3 Diversion procedure
  - 18A.3.4 Operations in regulated/controlled airspace
- 18A.4 UNCERTAIN OF POSITION/LOST PROCEDURE
  - 18A.4.1 Uncertain of position
  - 18A.4.2 Lost procedure
- 18A.5 ARRIVAL PROCEDURE
  - 18A.5.1 Aerodrome joining procedures
  - 18A.5.2 Parking procedures

**18B NAVIGATION AT LOWER LEVELS**

- 18B.1 LOW LEVEL FAMILIARISATION
  - 18B.1.1 Entry/exit lanes
  - 18B.1.2 Actions before descending (MSA)
  - 18B.1.3 Visual impressions and height keeping
  - 18B.1.4 Effects of speed and inertia in turns
  - 18B.1.5 Effects of wind and turbulence

**18B.2 LOW LEVEL OPERATION/HAZARDS**

- 18B.2.1 Minimum level navigation
- 18B.2.2 Bad weather operations
- 18B.2.3 Airfield approach and joining
- 18B.2.4 Bad weather circuit/landing

**18C RADIO NAVIGATION UNDER VFR****18C.1 USE OF RADIO NAVIGATION AIDS**

- 18C.1.1 VOR
- 18C.1.2 ADF
- 18C.1.3 VDF
- 18C.1.4 Radar (en-route/terminal)
- 18C.1.5 DME
- 18C.1.6 RNAV and SATNAV

**19A INSTRUMENT FLYING, BASIC, FULL PANEL****19A.1 BASIC CONTROL TECHNIQUE**

- 19A.1.1 Pre-flight instrument checks, revision
- 19A.1.2 Disorientation
- 19A.1.3 Relaxation
- 19A.1.4 The control instruments, indications and interpretation
- 19A.1.5 The performance instruments, indications and interpretation
- 19A.1.6 Selective radial scanning
- 19A.1.7 Priority radial scanning
- 19A.1.8 Attitude flight, level, climbing, descending and turning
- 19A.1.9 Configuration changes
- 19A.1.10 Instrument errors

**19A.2 PRECISION EXERCISES**

- 19A.2.1 Level flight, climbing and descending with specified settings
- 19A.2.2 Level, climbing and descending turns at Rate 1 onto specified headings
- 19A.2.3 Level 30° banked turns onto specified headings
- 19A.2.4 Changing speed in level flight
- 19A.2.5 Changing configuration

**19B INSTRUMENT FLYING, ABNORMAL (LIMITED PANEL) OPERATION****19B.1 BASIC CONTROL TECHNIQUE**

- 19B.1.1 Attitude interpretation using the performance instruments
- 19B.1.2 Modified scanning technique
- 19B.1.3 Level flight, climbing and descending
- 19B.1.4 Compass/timed turns
- 19B.1.5 Changing speed and configuration

**19B.2 UNUSUAL ATTITUDE RECOVERIES**

- 19B.2.1 Recovery, sustained steep turns
- 19B.2.2 Recovery, approach to a stall
- 19B.2.3 Recovery, straight dives
- 19B.2.4 Recovery, spiral dives
- 19B.2.5 Recovery, steep climbing turns

**19C INSTRUMENT FLYING, ADVANCED, FULL PANEL****19C.1 PRECISION EXERCISES, PRE-NIGHT FLYING REQUIREMENTS**

- 19C.1.1 Instrument climb following a visual take-off
- 19C.1.2 Instrument circuit, approach and go-around, including checklist items

**19C.2 ABNORMAL (ASYMMETRIC) OPERATION**

- 19C.2.1 Asymmetric instrument flying, climbs, descents and turns including checklist items

- 19C.2.2 EFATO (after simulated take-off) and asymmetric climb including check-list items
- 19C.2.3 Asymmetric circuit, approach and go-around including check-list items

## **19D INSTRUMENT FLYING, APPLIED**

- 19D.1 INSTRUMENT/NAVAID TRACKING
  - 19D.1.1 Modified instrument scanning to include navigation aids
  - 19D.1.2 Intercepting and maintaining ADF tracks, to/from
  - 19D.1.3 Intercepting and maintaining VOR tracks, to/from
- 19D.2 ROUTE FLYING
  - 19D.2.1 Take-off, climb and procedural departure
  - 19D.2.2 Airways routes
  - 19D.2.3 Off airways routes
  - 19D.2.4 Combined airways and off airways routes
- 19D.3 HOLDING PROCEDURES
  - 19D.3.1 En-route holding
  - 19D.3.2 Terminal holding
- 19D.4 AIRFIELD/RUNWAY APPROACH/MISSED APPROACH PROCEDURES
  - 19D.4.1 Procedural approach
  - 19D.4.2 Radar vectored approach
  - 19D.4.3 Missed approach procedure
- 19D.5 ABNORMAL (ASYMMETRIC) PROCEDURES
  - 19D.5.1 Simulated engine failure following an actual take-off
  - 19D.5.2 Asymmetric approach and missed approach
  - 19D.5.3 Asymmetric approach and straight in landing
  - 19D.5.4 Asymmetric approach and circle to land

## **20 NIGHT FLYING**

- 20.1 BASIC TECHNIQUE
  - 20.1.1 Pre-flight checks
  - 20.1.2 ATC liaison
  - 20.1.3 Taxiing differences
  - 20.1.4 Airfield lighting familiarisation
  - 20.1.5 Take-off and climb
  - 20.1.6 Circuit, approach and landing and missed approach
- 20.2 EMERGENCY PROCEDURES
  - 20.2.1 Engine failure considerations for single engine aeroplanes
  - 20.2.2 Radio and electrical failures
  - 20.2.3 Emergency flare path landing
- 20.3 ABNORMAL (ASYMMETRIC) OPERATION
  - 20.3.1 Take-off briefing engine failure considerations
  - 20.3.2 Engine failure after take-off and asymmetric climb
  - 20.3.3 Asymmetric circuit and landing
  - 20.3.4 Asymmetric go-around from committal height
- 20.4 NIGHT NAVIGATION
  - 20.4.1 Map reading differences
  - 20.4.2 Combination of visual and radio-aids navigation

## **21 AEROBATICS**

- 21.1 BASIC CONTROL TECHNIQUE
  - 21.1.1 Pre-aerobatics checks
  - 21.1.2 Loop
  - 21.1.3 Barrel roll
  - 21.1.4 Slow roll
  - 21.1.5 Stall turn
  - 21.1.6 Roll off the top
  - 21.1.7 Half roll

- 22 ASYMMETRIC FLIGHT**
- 22.1 BASIC CONTROL TECHNIQUE
  - 22.1.1 Demonstration of asymmetric flight including engine shutdown and restart
  - 22.1.2 The effects of engine failure in straight flight
  - 22.1.3 Control and identification
    - 22.1. The effects of engine failure in turns
  - 22.1.5 The effects of airspeed variations at constant power
  - 22.1.6 The effects of power variations at constant IAS
- 22.2 CRITICAL AND SAFETY SPEEDS
  - 22.2.1 Critical speed and the factors affecting
  - 22.2.2 The effects of engine failure at speeds above and below Take-off Safety Speed ( $V_{toss}$  or appropriate  $V$  speed if defined for the type)
- 22.3 PERFORMANCE APPLICATIONS AND CONSIDERATIONS
  - 22.3.1 Engine limitations and handling considerations
  - 22.3.2 Scheduled techniques for level flight, climb, descent and turns
  - 22.3.3 The effects of configuration on performance
  - 22.3.4 The effects of an unfeathered (wind milling) propeller on performance
  - 22.3.5 The effects of weight, altitude and temperature on performance
- 22.4 TAKE OFF, CIRCUIT, LANDING AND MISSED APPROACH PROCEDURES
  - 22.4.1 Take-off briefing engine failure procedures
  - 22.4.2 Take-off, engine failure and asymmetric climb with checklist drills
  - 22.4.3 Asymmetric circuit, approach and landing with checklist drills
  - 22.4.4 Asymmetric missed approach procedure from committal height with Checklist drills

**Safety Regulation Group  
Personnel Licensing Department**



**Joint Aviation Requirements Flight Crew Licensing  
Supplement to Standards Document 10 (Aeroplanes), Version 01  
Theoretical Knowledge Oral – Question Bank**

## INTRODUCTION

The main body of text in CAA Standards Document 10 (Aeroplanes) outlines the administrative procedures for the conduct of instructor rating skill tests and proficiency checks. Section 1 of the test/check schedule (Appendix 2 to JAR-FCL 1.330 & 1.345) comprises a theoretical knowledge ground oral examination. The purpose of the oral examination is to determine the applicant's breadth and depth of knowledge, ability to discuss a variety of topics related to aviation, and the ability to impart such knowledge and understanding to a trainee pilot.

In preparing for this examination I am keen that the applicant's efforts are focussed and productive and that undue time and effort is not invested in learning information that one cannot reasonably be expected to retain for more than a few days, or which has little relevance or practical application for a working instructor. Additionally, this supplement provides flight instructor course providers (FIC instructors) with a reference document to complement the ground theoretical knowledge syllabus in the AMC to JAR-FCL 1 Subpart H. This document should be brought to the attention of prospective trainee instructors to facilitate personal preparation prior to commencing the course. It should be referred to throughout initial instructor training, and thereafter as required; to prepare for ongoing proficiency checks, for recurrent training, for the removal of instructor rating restrictions and to qualify for additional instructional privileges. This supplement also indicates to instructor examiners (FIE) the subjects for which the applicant has had the opportunity to prepare. Though not necessarily exhaustive, the questions contained within this document represent therefore, the likely scope and format of the theoretical knowledge oral examination.

For instructors seeking to conduct the FI(R) course (FIC instructor), the UK CAA assessment for authorisation will assume a higher level of competence, depth of knowledge and breadth of experience. For such authorisation, in addition to being able to answer these theoretical knowledge questions confidently and correctly, the applicant will be expected to present blueprint examples of **how** to answer such questions (as if had they been posed by trainee pilots) and provide guidance on effective instructional techniques and methods to facilitate the teaching and learning process.

If you require further guidance, or wish to comment on the content of this supplement, please contact one of the CAA Staff Flight Examiners at your nearest Regional Flight Test Centre.

P J Lander

CAA Chief Flight Examiner

## INSTRUCTOR THEORETICAL KNOWLEDGE ORAL and LONG BRIEF

The question topics listed below are in the order in which they appear in Appendix 2 to JAR-FCL 1.330 & 1.345, the FI (A) skill test and proficiency check schedule, Section 1 – Theoretical Knowledge Oral. The examiner, when considering which questions to ask, will take account of the nature of the test or check and use his or her discretion to select appropriate and relevant questions. For example, an applicant for the CRI (ME) rating, or for variation of an FI (A) rating to include ME instructional privileges, may expect a number of the questions to focus on the theory of asymmetric flight and aircraft control and performance with one engine inoperative. Such questions will not be asked however, during an initial FI(R) skill test on SEP.

### a. AIR LAW

1. With reference to the appropriate document(s), state the rules of the air with regard to:
  - o Collision avoidance
  - o Right of way in the air
  - o Right of way on the ground
  - o Flight in the vicinity of an aerodrome
  - o Landing and taking off
  - o Lights to be displayed
  - o Low flying
2. Define QFE, QNH, RPS and Standard Pressure Setting (1013) and explain the practical use of these various altimeter settings for a typical cross-country flight (VFR and/or IFR).
3. Define height, altitude, flight level, transition altitude and transition level. Explain when and where it is appropriate to be flying by reference to height, altitude and flight levels.
4. With reference to an appropriate chart or document, explain the classification and extent of controlled and uncontrolled airspace in the UK.
5. State the dimensions of an ATZ and MATZ and explain the practical considerations for piloting an aeroplane through or in the vicinity of, the airspace associated with an ATZ and/or a MATZ.
6. With reference to an appropriate chart or document, describe the lateral and vertical dimensions of a control zone (CTZ) and control area (CTA). Explain the practical considerations for piloting an aeroplane through or in the vicinity of a CTA and/or a CTZ.
7. State the visual and instrument flight rules (VFR), (IFR) as they apply outside of controlled airspace and explain the relevance of each for the typical private pilot.
8. With reference to a suitable document, explain the conditions required for flight in accordance with the visual flight rules (visual meteorological conditions) for a private pilot on a typical cross-country flight.
9. With reference to a suitable document, explain the requirements for a pilot to operate at night (with and without passengers).
10. Demonstrate the procedure for calculating the onset of official night time.
11. With reference to a suitable document, explain the circumstances in which a pilot (with or without IMC or instrument ratings) may operate in accordance with the instrument flight rules and when a pilot may operate in instrument meteorological conditions.
12. Explain the meaning of the terms “safety altitude” and “minimum safe altitude” (MSA). Explain the relevance of safety altitude and/or MSA for a VFR flight.
13. Explain the relevance of and how to calculate the minimum safe altitude for a flight conducted in accordance with the instrument flight rules.
14. With reference to a suitable document, explain the privileges and limitations of the private pilot licence (PPL) [or where applicable, the commercial pilot licence (CPL)]. Explain how those privileges and limitations are amended by the inclusion of:
  - o an IMC rating
  - o a Night Qualification
  - o an Instrument Rating
  - o an additional aircraft type or class rating
15. With reference to a suitable chart and appropriate document(s), explain the meaning of various airspace restrictions and other areas where activities hazardous to flight may occur including:
  - o Restricted, Prohibited and Danger areas
  - o Areas of Intense Air Activity
  - o High Intensity Radio Transmission Areas
  - o Glider, Hang Gliding and Parascending Sites
  - o Free-fall Parachuting Drop Zones
16. Demonstrate how to plan and conduct a flight to operate in the vicinity of, or through, the airspace of a designated danger area.

17. State the air traffic services provided to pilots by ATC or ATSU outside of controlled airspace. Explain the information provided by each level of service and the limitations of the service.
18. Explain the meaning, applicability and relevance of special VFR for the operations of a typical private pilot.
19. Explain how to record flight time in a pilot's logbook.

**b. AIRCRAFT GENERAL KNOWLEDGE**

**INSTRUMENTS**

20. Explain the basic principles of operation of the Air Speed Indicator (ASI). Describe the errors associated with the ASI and explain how they affect its use.
21. State whether a pressure (or position) error correction (PEC) is applicable for the ASI in your aircraft and if so, where to find information regarding the ASI PEC and the magnitude of the correction.
22. Explain the basic principles of operation of the Vertical Speed Indicator (VSI). Describe the errors associated with the VSI and explain how they affect its use.
23. Explain the basic principles of operation of the pressure altimeter. Describe the errors associated with the pressure altimeter and explain how they affect its use.
24. Demonstrate the checks performed and accuracy required in order for the altimeter in your aircraft to be confirmed as serviceable before flight. State whether a pressure (or position) error correction is applicable for the altimeter in your aircraft and if so, where to find information regarding the magnitude of the correction.
25. Demonstrate the location and operation of the alternate static source (if applicable). State whether a correction is applicable for the ASI, VSI and pressure altimeter in your aircraft following operation of the alternate static source.
26. Describe the properties of a gyroscope. Define real and apparent wander. Explain how the properties of a gyroscope relate to the principles of operation of one or the following:
  - o An Attitude Indicator
  - o A Direction Indicator
  - o A Turn Indicator
  - o A Turn Co-ordinator
27. With the aid of a model or diagram, explain the principles of operation and practical limitations of the attitude indicator(s) in your aircraft. State the indications and implications of power failure to the AI gyro.
28. With the aid of a model or diagram, explain the principles of operation and practical limitations of the gyroscopic heading reference system in your aircraft. State the indications and implications of power failure to the DI/HSI gyro.
29. With the aid of a model or diagram, explain the principles of operation of the turn indicator/turn co-ordinator in your aircraft. Explain how the TI/TC in your aircraft may be used to accomplish turns onto specific headings and to recover from unusual attitudes. State the indications and implications of power failure to the TI/TC gyro.
30. Explain the principles of operation of the direct indicating (wet) compass. Describe the errors associated with the compass when not in straight and level un-accelerated flight.

**AIRFRAME**

31. With the aid of a suitable diagram, explain the basic principle of operation of [one or more of] the following flight controls:
  - o elevator (or stabilator)
  - o ailerons
  - o rudder
  - o trim tab(s)
  - o flaps
  - o slats
32. Describe the likely causes and symptoms of a malfunction of one of the flight controls (for example jammed elevator trim or flap motor failure). State and explain the checklist items for abnormal/emergency operation of the system.
33. As a practical exercise (e.g. pre-flight check), indicate and state the function of the various aerials, vents, drains and access points on your aircraft.
34. Explain the form and function of [one or more of] the following control surfaces:
  - o trim tabs
  - o horn balances
  - o mass balances
  - o strakes
  - o spades

## POWERPLANT

35. With the aid of a suitable diagram, explain the basic principles of operation of the four-stroke internal combustion engine.
36. With the aid of a suitable diagram, explain the basic principles of operation of a diesel engine.
37. Define ignition advance and ignition retard. Explain why it might be appropriate to advance or retard the ignition and how (or indeed if) this is achieved in a typical aircraft internal combustion engine.
38. With the aid of a suitable diagram, explain the basic principles of operation of the aircraft ignition (magneto) system.
39. State the checks to be performed on the ignition (magneto) system before and after flight. Explain why the checks are performed and describe the symptoms and consequences of a faulty magneto or magneto switch.
40. Define detonation and pre-ignition and explain the likely causes, symptoms and possible remedies for each.
41. With the aid of a suitable diagram, explain the basic principles of operation of a typical float type carburetion system.
42. With the aid of a suitable diagram, explain the basic principles of operation of a typical fuel injection system.
43. Where applicable for aircraft type and with reference to the POH/AFM, demonstrate how to set the mixture control to operate fully rich, at best power mixture, best economy mixture and to select idle cut off.
44. Explain the principles of operation of the normal and alternate air induction system for your aircraft. Describe the causes and symptoms of induction and carburettor icing and likely remedies.
45. With the aid of a suitable diagram, explain the basic principles of operation of a typical engine lubrication system. Demonstrate the normal pre and post flight checks of the system and describe the likely symptoms of a system malfunction.

## SYSTEMS

46. With the aid of a suitable diagram, explain the basic principles of operation of the undercarriage retraction system. Describe the likely causes and symptoms of a malfunction of the system. State and explain the checklist items for abnormal/emergency operation of the system.
47. With the aid of a suitable diagram, explain the basic principles of operation of a typical light aeroplane fuel system. State the fuel capacity and useable fuel for your aircraft and describe the procedures for managing the fuel, including pre-flight checks for fuel quantity and contamination.
48. With the aid of a suitable diagram, explain the basic principles of operation of a variable pitch propeller. Describe the likely causes and symptoms of propeller over-speed/under-speed. State and explain the checklist items for abnormal/emergency operation of the system.
49. With the aid of a suitable diagram, explain the basic principles of operation of a typical light aeroplane electrical system. Describe the likely causes and symptoms of a malfunction of the system. State and explain the checklist items for abnormal/emergency operation of the system.
50. With the aid of a suitable diagram, explain the basic principles of operation of a typical vacuum system. Describe the likely causes and symptoms of a malfunction of the system. State and explain the checklist items for abnormal/emergency operation of the system.
51. With the aid of a suitable diagram, explain the basic principles of operation of a typical pitot-static system. Describe the likely causes and symptoms of a malfunction of the system. State and explain the checklist items for abnormal/emergency operation of the system.

### **c. FLIGHT PERFORMANCE AND PLANNING**

52. Draw the curves of Thrust Horsepower (THP) available against THP required for a typical single engine piston aeroplane. On the curve show:
  - o The minimum speed for level flight
  - o The maximum speed for level flight
  - o The speed for maximum rate of climb
  - o The minimum power speed
  - o The minimum drag speed
  - o The effect of increasing altitude
53. Define specific fuel consumption (SFC) and explain the factors affecting SFC.
54. State the general requirements for flying for maximum endurance. Demonstrate, with the use of the flight manual or pilot operating handbook for your aircraft, how to derive practical fuel consumption figures, including endurance information.
55. State the general requirements for flying for maximum range. Demonstrate, with the use of the flight manual or pilot operating handbook for your aircraft, how to derive practical fuel consumption figures, including range information.
56. Describe the forces acting in a steady state level turn. Explain the requirement to increase backpressure and power in order to maintain entry altitude and speed when flying a steep turn.
57. State the theoretical engine, airframe and environmental requirements for a turn with either minimum radius or maximum rate. Describe how to fly your aircraft to achieve the aforementioned turn.

58. Describe the forces acting in a steady state climb. State why the speeds for best angle of climb and best rate of climb are different. Describe how to fly your aircraft to achieve a climb at the best angle and best rate.
59. Describe the forces acting in a steady state descent. State why gliding speeds for maximum range and minimum rate of descent are different. Explain how to fly your aircraft to achieve optimum glide performance.
60. Explain the dangers associated with attempting to "stretch the glide".
61. With reference to the POH/AFM, demonstrate how to calculate the mass and balance for a representative flight. State the mass and CofG limitations for your aircraft and explain the consequences of attempting to operate outside of these limits.
62. With reference to the POH/AFM, demonstrate how to calculate the take off and landing performance for a representative flight. State whether any additional factors would be advisable/mandatory and explain the effect of the following on take-off and landing performance:
  - o Weight/altitude/temperature
  - o Grass
  - o Contaminated or wet runway
  - o Obstacles
  - o Use of flap
63. Demonstrate how to obtain an appropriate NOTAM bulletin for a representative flight. Explain how to interpret NOTAM information including:
  - o Date, time and duration
  - o Location and dimensions (radius/altitude)
  - o Relevance
  - o Operational limitations and effect

**d. HUMAN PERFORMANCE AND LIMITATIONS**

64. Describe the symptoms of hyperventilation and its association with anxiety. What precautions might be taken to alleviate student anxiety and how might an instructor aid a student to recover from hyperventilation?
65. Explain the likely causes and symptoms of motion sickness. State the precautions to be taken to avoid and actions that might be taken to alleviate motion sickness.
66. State the meaning of the terms, "Stress" and "Arousal" in relation to aviation human performance. Explain why an understanding of the effects of "Stress" and "Arousal" is important for the trainee pilot and instructor.
67. Describe the basic physiology of the inner ear and eustacean tube. Explain the hazards of flying with a cold and the problems that can be experienced during ascent and descent. (This question may also refer to the sinuses)
68. Describe the basic theory of human information processing and explain how limitations with short-term memory may affect a pilot's ability to correctly recall lengthy messages or instructions.
69. Describe the symptoms and dangers of carbon monoxide poisoning. State the precautions to be taken to avoid and actions that might be taken to aid recovery from CO poisoning.
70. With the aid of a suitable diagram, explain the basic physiology of vision. State the limitations of human vision with relation to the "see and avoid" principle and describe an optimal visual scan pattern for lookout.
71. With the aid of a suitable diagram, explain the basic physiology of balance. State the limitations of the human balance organs in relation to flight without external visual reference. Explain how knowledge and understanding of such human limitations is important for flight by sole reference to instruments.
72. State the responsibilities of the pilot in command of an aeroplane.
73. State and explain an example of an appropriate self-check mechanism for the private pilot to ensure he/she is mentally and physically prepared for flight.
74. Describe the basic theory of personality types and explain how student pilots may differ in the ways in which they learn new skills.

**e. METEOROLOGY**

75. Describe the heat processes (energy into and out of the atmosphere) that give rise to "weather".
76. Define troposphere, tropopause and stratosphere. List the characteristics of the troposphere in terms of gaseous composition, water vapour content, temperature and pressure. Explain why an understanding of the structure of the troposphere is of importance to pilots.
77. State the effect of changes in temperature and pressure on altimeter readings.
78. Explain when it might be appropriate to make a correction to the altimeter reading for temperature, and indicate the magnitude of such a correction.
79. Define dew point. Explain the significance of the dew point to pilots.

## THE ATMOSPHERE IN HORIZONTAL MOTION

80. Describe the global forces that give rise to horizontal motion of the atmosphere (wind).
81. Describe how information on wind velocity is provided for the pilot by the forecasting services and by ATC.
82. Explain the basic principles of "Buys Ballot's law".
83. Explain why the wind flows around high and low-pressure systems and not from high to low pressure, as might be anticipated by a layman.
84. Define the terms veer and back. Explain the difference between the surface wind velocity and upper winds.
85. Explain the difference between the surface wind over land and sea given the same pressure gradient.
86. Describe the effects of cloud cover on surface wind and give an example of when an understanding of this might be of relevance to a pilot.
87. Describe the normal diurnal variation of wind and give an example of when an understanding of this might be of relevance to a pilot.
88. Explain the development of sea breezes and give an example of when an understanding of this might be of relevance to the pilot.
89. Explain and give an example of how topography and other regional factors may generate or influence local winds (for example Föhn wind, anabatic or catabatic winds).
90. Explain why the wind speed associated with a low pressure system (cyclonic wind) is generally less than the wind speed associated with a high pressure system (anti-cyclonic wind) for the same pressure gradient.
91. Explain why the wind speed associated with a low pressure system at higher latitudes is generally less than that associated with a low pressure system at lower latitudes, for the same pressure gradient.

## THE ATMOSPHERE IN VERTICAL MOTION

92. Explain the meaning of the terms "stability" and "instability" in relationship to the vertical motion of the atmosphere.
93. Explain lapse rate and give typical numerical examples for the environmental (ELR), dry adiabatic (DALR) and saturated (SALR) adiabatic lapse rates. State why the SALR varies with altitude.
94. Describe how the relationship between ELR, DALR and SALR determines vertical motion and the development of cloud and precipitation in the atmosphere.
95. Explain and state the significance of mechanical turbulence, convection, orographic lifting processes and mass ascent/descent on the development of clouds and precipitation in the atmosphere.
96. Explain the Föhn effect. Give an example of when an understanding of this might be of relevance to the pilot.
97. Explain the development of and conditions associated with standing waves. Give an example of when an understanding of this might be of relevance to the pilot and state how to recognise standing wave activity.

## VISIBILITY

98. Define visibility. Explain the difference between met visibility, in-flight visibility and runway visual range.
99. Describe the factors influencing visibility and explain the difference between determining visibility in daylight and at night.
100. Describe the difference between air-to-ground visibility and reported visibility at ground level. Explain the hazards associated with descending through a haze layer, to make an approach at an airfield that can be seen from directly above.
101. List the main causes and favourable conditions for the formation, persistence and subsequent clearing of haze.
102. Define mist and fog. Explain the conditions associated with the formation, persistence and subsequent clearance of either radiation or advection fog.

## CLOUDS AND PRECIPITATION

103. List and describe the basic cloud types.
104. Explain the relationship between the main cloud types and the following processes:
  - o Frontal activity
  - o Orographic lift
  - o Atmospheric instability
  - o Mechanical turbulence
105. Describe the growth of cloud particles into precipitation.
106. Discuss the significant features of the main cloud types in relationship to aircraft operations.

## ICING

107. List the types of icing encountered in cloud, precipitation and clear air.
108. For each type of icing listed in the previous question, describe the associated hazards to aircraft in flight.
109. Explain the conditions associated with the formation of hoar frost on parked aircraft and appropriate precautions to be taken prior to flight.
110. State the significance of latent heat, water temperature and droplet size in determining the type and severity of icing experienced.
111. Explain the effect of aircraft speed, shape and cloud characteristics on the rate of ice accretion.
112. State the effect of kinetic heating and airframe temperature lag on the nature and severity of airframe icing.
113. State the atmospheric and engine operating conditions that pose a significant risk of carburettor icing.
114. Describe how to recognise the formation of engine icing (induction and/or carburettor) and the appropriate use of engine controls to prevent and/or clear engine icing.
115. Explain the principles of operation and limitations of the anti-icing/de-icing equipment on your aircraft.
116. Interpret icing forecast terminology from the Met Form 215.

## THUNDERSTORMS

117. State the requirements for and describe the stages of the growth of Cumulonimbus and the development of thunderstorms.
118. Describe favourable pressure patterns for thunderstorm development.
119. Differentiate between air mass/heat thunderstorms and frontal thunderstorms.
120. List the hazards associated with flight in the vicinity of thunderstorms.

## AIR MASSES, FRONTS AND PRESSURE SYSTEMS

121. Define the term air mass and list the main air masses that affect the UK.
122. Describe the properties of [one of] the air masses that affect the UK with respect to temperature, stability and humidity at source.
123. Describe the changes occurring within the air mass as it travels from the source regions to the UK and state the associated weather conditions (visibility, cloud and precipitation).
124. Define the term 'front'. Draw and illustrate a plan section and cross section of one of the following fronts:
  - o Warm front
  - o Cold front
  - o Occluded front
125. For any given front, indicate movement, slope, 0°C level, tropopause level, air mass disposition, basic cloud structure and rain belts as appropriate.
126. Explain the development of, and weather associated, with an occlusion. State the difference between a warm and cold occlusion.
127. Explain the changes in the following as either a warm or cold front passes overhead:
  - o Wind direction and strength
  - o Cloud structure
  - o Precipitation
128. Identify on a meteorological synoptic chart the following weather systems:
  - o Anticyclone
  - o Ridge
  - o Col
  - o Trough
  - o low

## HIGH ALTITUDE METEOROLOGY (high performance types only)

129. State the significance of contour charts in forecasting upper winds.
130. Define the term "jetstream." Describe the conditions associated with the development of jetstreams.
131. Demonstrate on a synoptic chart, or with a diagram, the probable location of a jetstream in the atmosphere. Describe the possible benefits and hazards associated with operating in the vicinity of a jetstream.
132. Define clear air turbulence (CAT). Explain the conditions likely to cause CAT and state where CAT is most likely to be encountered.

## INTERPRETATION OF METEOROLOGICAL INFORMATION

133. With reference to the information provided, (Met Forms 214, 215, TAF and METAR bulletins), interpret the likely weather. Indicate the suitability of the weather for a representative training/private/commercial flight, VFR or IFR as appropriate.

### **f. NAVIGATION (see also questions in a. AIR LAW above.)**

#### VISUAL

134. State the "1 in 60" rule and explain its relevance to pilot navigation.
135. With the aid of a diagram, explain the theory and practical application of [one or more of] the following navigation techniques:
  - o Standard closing angle
  - o New track reference
  - o Drift lines, opening and closing angles
  - o Feature crawling
136. Explain how to supplement visual navigation techniques with reference to ground based navigation aids or GPS. Discuss how such techniques might enhance navigation accuracy and reduce pilot workload, particularly when navigating in reduced visibility or through congested airspace.
137. Describe an appropriate activity cycle to adopt during a visual navigation exercise.
138. Explain how to carry out a weather avoidance procedure (for example to route around a large rain shower then return to track).
139. Explain how to carry out an unplanned diversion (for example to discontinue a planned leg because of deteriorating weather and re-route towards an alternate destination).
140. Describe suitable actions to take when lost or uncertain of position.

## INSTRUMENT FLIGHT

141. Define decision altitude/height (DA/H) and minimum descent altitude/height (MDA/H). Explain the difference between DA/H and MDA/H in terms of a pilot's considerations and actions at upon arriving at either.
142. Define the term, "required visual reference." Explain the relevance of required visual reference with relation to an instrument approach.
143. Define the term, "circling approach." Explain when and how to conduct a circling approach, including the actions to take in the event of loss of visual reference.
144. Define the term, "aircraft approach category." Explain the relationship between aircraft approach category and instrument approach procedures. State the approach category for the aircraft you operate.
145. Define the term, "approach ban." With reference to a suitable document, explain the legal status of the approach ban and its relevance to instrument approach procedures.
146. Explain how unusually low temperatures might affect the calculation of DA/H and MDA/H.
147. Explain the principles of operation, practical limitations and errors associated with ILS.
148. State the actions required to receive and check ILS signals.
149. Describe the procedure for flying an ILS approach and calculation of personal minima, either with or without glide path information.
150. Explain the principles of operation, practical limitations and errors associated with VOR.
151. Explain the principles of operation, practical limitations and errors associated with DME.
152. State the actions required to receive and check a VOR bearing and DME range.

153. Describe the procedure for intercepting and maintaining a track towards and away from VOR facility.
154. Describe the procedure for intercepting and maintaining a DME arc.
155. Explain the principles of operation, practical limitations and errors associated with GPS.
156. State the actions required to receive and display GPS present position and to navigate to a waypoint using GPS information.
157. Demonstrate how to insert, check and activate a basic flight plan in the GPS unit in your aircraft.
158. Demonstrate how to use the "Nearest" and "Direct to" facility of the GPS unit in your aircraft.
159. Explain how to complement "traditional" VFR navigation planning with the use of GPS.
160. Explain the certification requirements before GPS may be used as BRNAV or PRNAV.
161. Explain the principle of operation, practical limitations and errors associated with ADF.
162. State the actions required to receive and check an NDB bearing.
163. Describe the procedure for intercepting and maintaining a track towards or away from an NDB facility.
164. Describe the procedure for flying a non-precision approach (VOR/NDB or GNSS) and the calculation of personal minima.
165. Explain the basic principles of operation of secondary surveillance radar.
166. State the differences between Mode A, Mode C and Mode S.
167. With reference to a suitable document, explain the requirements of the "standard" ICAO instrument holding pattern. Describe the entry procedures for the three sectors.
168. Explain how to adjust heading and timing in the hold to account for the effect of wind.
169. Explain the procedure for flying an SRA approach and the calculation of personal minima.
170. With reference to a suitable document and/or chart, explain how to select a preferred IFR routing and level(s) from a nominated departure aerodrome in the south of the UK to a nominated destination aerodrome in the north of the UK (or vice versa).

**g. OPERATIONAL PROCEDURES**

171. State which aircraft documents are required to be carried on local (A to A) and land away (A to B) flights.
172. Demonstrate how to check the aircraft documents to ensure it is in a fit and legal state for flight, and ascertain what defects and deficiencies (if any) are outstanding. State what entries (if any) are required of the pilot in command.
173. State the requirements for a pilot to:
  - o Operate at night
  - o Carry passengers at night
174. With reference to a suitable document demonstrate how to calculate the onset of official "night time".
175. Demonstrate how to check the validity of a licence and the various ratings and medical certificate contained therein.
176. State the privileges and limitations of the following ratings (as appropriate). Explain the validity period of the rating(s) and requirements to revalidate or renew the rating(s):
  - o Flight Instructor
  - o Class rating instructor
  - o Instrument rating instructor
  - o SE class
  - o ME Class
  - o SET class
  - o IMC rating
  - o Instrument rating
  - o Aeroplane type rating
177. With reference to a suitable document, explain the purpose for wake vortex separation minima and state which figures are applicable for your aircraft for take-off and landing.
178. With reference to a suitable document, explain how to complete and submit a flight plan for a representative VFR and/or IFR flight.
179. With reference to a suitable document explain noise abatement procedures at [a designated airfield or] your home airfield.
180. With reference to a suitable document explain when you must file an MOR.
181. Explain the safety considerations that should be observed before intentional spinning.
182. Explain the differences between a distress call and an urgency call. Give a practical example of when and how to make a distress or urgency call.

## **h. PRINCIPLES OF FLIGHT**

### **GENERAL**

183. Define the following terms:

- Relative airflow
- Total reaction
- Lift
- Drag
- Chord line
- Chord length
- Angle of attack
- Centre of pressure
- Wing area
- Mean camber line

184. Explain how lift is generated from a conventional aerofoil section.

185. Sketch and explain the pressure distribution and streamlines around an aerofoil at various angles of attack up to and including the stall.

186. Explain the meaning of Coefficient of Lift (Cl) and list the factors affecting Cl.

187. Explain and illustrate how the Cl varies with angle of attack for a conventional general aviation aerofoil. Illustrate the effect of [two or more of] the following on the AOA/Cl curve:

- Camber
- Aspect ratio
- Shape (i.e. rectangular, tapered, elliptical, swept-back)
- Flaps and Slats

188. Define the following terms:

- Drag
- Zero Lift Drag (also known as profile drag)
- Lift Dependent Drag (also known as induced drag)
- Laminar and turbulent flow
- Transition point, separation point and adverse pressure gradient

189. Explain how the characteristics of the boundary layer affect zero lift drag.

190. Explain the relationship between zero lift drag and airspeed.

191. Explain and illustrate how lift dependent or induced drag varies with the following:

- Angle of Attack
- Weight
- Manoeuvre (Load factor)
- Aspect ratio

192. Construct a Total Drag Curve and explain the relevance of the following speeds:

- Minimum drag speed
- Minimum power speed
- Best EAS/ Drag ratio

193. Explain the meaning of Coefficient of Drag (CD) and explain the significance of CD in the drag formula.

194. Construct and explain a graph of zero lift CD and lift dependent CD against angle of attack.

195. Draw a graph to show CL/CD relationship with varying angles of attack. Indicate the position of the best L/D ratio and explain the relevance of this point.

## STABILITY

196. Define the following types of stability:
- Positive
  - Neutral
  - Negative
197. Explain with the aid of a diagram the difference between static and dynamic stability.
198. Explain how positive static directional stability is achieved and describe how it is affected by:
- Centre of gravity
  - Fin and rudder design
199. Explain how positive longitudinal stability is achieved and describe how it is affected by:
- Centre of gravity
  - Tail plane design
200. Explain how positive lateral stability is achieved and describe how it is affected by:
- Dihedral
  - High or low wing aircraft configuration
  - Operation of flap
  - Swept back wings
201. Explain aerodynamic damping and the effect of altitude.
202. Explain manoeuvre stability and the effect of altitude.
203. Explain how the interaction of directional and lateral stability can lead to spiral instability or Dutch roll.

## FLIGHT CONTROLS

204. Explain how control effectiveness is determined by:
- Size
  - Shape
  - Position of the control surface
  - Speed
205. Explain the meaning of aerodynamic balance when referring to flight controls and describe how aerodynamic balance is achieved with the following:
- Inset hinge
  - Horn balance
  - Fixed tab
  - Trim tab
  - Geared tab
206. Explain the meaning of mass balance when referring to flight controls and describe how mass balance is achieved.
207. Explain the terms flexural and torsional flutter.
208. Explain adverse aileron yaw and describe how the following design features may assist in countering it:
- Differential ailerons
  - Frieze ailerons
  - Aileron/rudder coupling
  - Spoilers

## STALLING, AUTOROTATION and SPINNING

209. Explain the meaning of the term "stall".
210. Define basic stalling speed and demonstrate where you would find information regarding the basic stalling speed for your aircraft.
211. Discuss the reliability and effectiveness of the following as symptoms and warnings of the approaching stall:
- o Speed
  - o Aircraft attitude
  - o Control effectiveness
  - o Stall warning devices
  - o Buffet
212. Explain how stalling speed is affected by:
- o Weight
  - o Load factor (manoeuvre)
  - o Thrust
  - o Use of Flap
213. Explain why an aeroplane may suffer a wing drop at or close to the stall.
214. Explain the loss of roll damping at angles above the critical AOA.
215. Explain the development and describe the symptoms of autorotation.
216. Describe the motion of an aircraft in a developed spin.
217. Define B/A ratio and explain how it affects the spinning characteristics of an aeroplane.
218. Describe the difference between an erect spin and an inverted spin both theoretically and as experienced from the cockpit.
219. Describe the spin recovery actions for your aeroplane for:
- o An incipient spin
  - o A fully developed erect spin

## PROPELLER THEORY

220. Show with the aid of a diagram the aerodynamic forces acting on a propeller blade. Explain how these forces vary with propeller RPM and forward airspeed.
221. Explain propeller efficiency and describe when a fixed pitch propeller is at its most efficient in a typical simple single engine aeroplane.
222. Explain the advantages of a variable pitch propeller. Describe the effect of varying throttle settings and forward airspeed on engine RPM and propeller pitch.
223. Define aerodynamic and centrifugal twisting moments and describe how such forces act on a propeller blade.
224. Explain how the following can cause a swing on take-off in a propeller driven aircraft:
- o Crosswind
  - o Asymmetric blade effect
  - o Wheel drag
  - o Gyroscopic effect
  - o Slipstream effect

## ADDITIONAL MULTI-ENGINE CLASS AND TYPE RATING QUESTIONS

225. Define [as appropriate to class/type]:
- o Vmca
  - o Vmcg
  - o Vtoss
  - o V1
  - o V2
  - o Vyse
  - o Vxse
  - o Critical speed

226. Explain how the following factors affect V<sub>mca</sub> and critical speed:
- thrust
  - centre of gravity
  - altitude
  - feathering
227. Define the term, “Asymmetric committal height (altitude)” and explain the reason for adopting a committal height when operating a multi-engine aircraft.
228. Explain the effect of engine failure:
- In straight and level flight
  - In a turn
  - Visually
  - On instruments
  - At high power/low power
  - At high speed/low speed
229. State which engine (if any) is the “critical” engine for your aeroplane, and explain why.
230. Describe the forces acting on a multi-engine aeroplane in straight and level, asymmetric flight.
231. Explain why applying up to 5° bank towards the live engine improves performance.
232. State the factors affecting controllability following an engine failure.
233. Explain how to obtain a representative zero thrust setting for a multi-engine aeroplane.
234. State and explain the factors affecting climb performance following engine failure.

#### **i. TRAINING ADMINISTRATION**

235. With reference to the appropriate document(s), state the content of the theoretical and practical training and where relevant the skill test schedule for [one or more of] the following licences, ratings or qualifications:
- JAR-FCL PPL
  - CAA National PPL
  - Single-engine (Land) class rating
  - Single-engine (Sea) class rating
  - Multi-engine (Land) class rating
  - Single-engine turbine class rating
  - Single-pilot type rating
  - Night qualification
  - IMC rating
  - Single-pilot single-engine instrument rating
  - Single-pilot multi-engine instrument rating
236. State the administrative requirements and demonstrate completion of the records to be kept, for the appropriate course of instruction.
237. State the administrative requirements and demonstrate completion of the appropriate application forms for issue of the licence or rating (as appropriate) upon completion of the above course of training.
238. State how [one or more of] the following are to be achieved and recorded:
- Familiarisation training (e.g. a new variant within the SEP class)
  - Differences training (e.g. variable pitch propeller, tail wheel, a new type or variant within the MEP class, single lever power controls or electronic “glass” flight instrument displays.)
  - Revalidation of SE class ratings by experience
  - 90 day night currency for carrying passengers
  - Night currency for carrying passengers
  - NPPL SSEP self certification
  - PPL 150nm qualifying cross-country
  - CPL 300nm qualifying cross-country
239. State the requirements for the activities of a restricted flight or assistant flying instructor to be supervised and explain the process for removal of the restriction.

**j. ADDITIONAL QUESTIONS FOR AEROBATIC INSTRUCTION**

240. State the statute requirements for a safety harness when carrying out aerobatic manoeuvres (ANO Schedule 4).
241. State the Rules of the Air regarding the conduct of aerobatic manoeuvres (ANO rules of air, rule18).
242. Define pilot disorientation. Discuss the following factors and their possible contributory effect on pilot disorientation:
- o Flying with a cold
  - o Flying with an ear infection
  - o Flying with a poorly defined horizon, poor visibility or over a monochromatic surface such as calm water or cloud
  - o Sun glare
243. Explain the physiological and psychological causes of motion (air) sickness. Give examples of strategies for:
- o Avoiding airsickness
  - o Coping with airsickness
244. Explain the physiological effects of positive, negative and lateral acceleration (g loading) on a pilot including:
- o "Greyout", "blackout" and "redout"
  - o Methods of combating the effects of g and developing g tolerance
  - o g induced loss of consciousness (g-loc)
245. Demonstrate, with reference to appropriate aircraft documents (CofA, ARC, Release to Service, Technical Log, Deferred Defect Log etc), that an aeroplane has been correctly maintained, serviced and prepared for spinning and/or aerobatic flight.
246. Demonstrate, with reference to the pilot operating handbook or aeroplane flight manual for a specific machine, that the aeroplane is within the weight and balance limitations for spinning and/or aerobatic flight and indicate the permitted aerobatic manoeuvres.
247. Explain how the following factors may limit or restrict the spinning and/or aerobatic capabilities of an aeroplane:
- o Weight
  - o Centre of gravity
  - o Fuel quantity, fuel distribution and fuel tank selection
  - o Baggage
  - o Passengers
248. State, with reference to the pilot operating handbook or aeroplane manual for a specific machine, the following airframe limitations as applicable:
- o Airspeed limits
  - o g-limits
  - o Rolling g-limits
  - o Flick roll limits
249. State, with reference to the pilot operating handbook or aeroplane manual for a specific machine, the following engine and system limitations and considerations as applicable:
- o Maximum RPM limit (fixed pitch prop)
  - o Maximum RPM limit, RPM prohibited range, RPM/MAP limits (VPP)
  - o Temperature and pressure limits
  - o Zero, negative g or inverted limits dictated by the fuel system
  - o Zero, negative g or inverted limits dictated by the oil system
250. Explain how the design of the following systems may limit or restrict the spinning and/or aerobatic capabilities of an aeroplane:
- o Oil system
  - o Fuel system
  - o Propeller control mechanism (VPP)
  - o Flight controls
  - o Undercarriage, brake and parking brake mechanism
  - o Flaps, slats and slots