**SUBPART C. PRIVATE PILOT LICENCE ( PPL ),**

**SAILPLANE PILOT LICENCE ( SPL ) *and***

**BALLOON PILOT LICENCE ( BPL ).**

***AMC 1.* FCL. 210 ; FCL. 215**

*SYLLABUS of THEORETICAL KNOWLEDGE for the PPL ( A ) and PPL ( H )*

The following Tables contain the syllabi for the courses of theoretical knowledge, as well as for the theoretical knowledge examinations for the PPL ( A ) and PPL ( H ). The training and examination should cover aspects related to non-technical skills in an integrated manner, taking into account the particular risks associated to the licence and the activity. An approved course shall comprise at least 100 hours of theoretical knowledge instruction. This theoretical knowledge instruction provided by the ATO should include a certain element of formal classroom work but may include also such facilities as interactive video, slide or tape presentation, computer-based training and other media distance learning courses. The training organization responsible for the training has to check if all the appropriate elements of the training course of theoretical knowledge instruction have been completed to a satisfactory standard before recommending the applicant for the examination.

The applicable items for each licence are marked with “ **x** “. An “ **x** “ on the main title of a subject means that all the sub-divisions are applicable.

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **1**. | **AIR LAW and ATC PROCEDURES** | PPL | Bridge Course | PPL | Bridge Course |
|  | **International Law : Conventions, Agreements and**  **Organizations** |  |  |  |  |
|  | ***The Convention on International Civil Aviation ( Chicago ) Doc. 7300 / 6*** |  |  |  |  |
|  | **Part I.** **Air Navigation :** relevant parts of the following  Chapters :  *a) general principles and application of the convention ;*  *b) flight over territory of Contracting States ;*  *c) nationality of aircraft ;*  *d) measures to facilitate air navigation ;*  *e) conditions to be fulfilled on aircraft ;*  *f) international standards and recommended practices ;*  *g) validity of endorsed certificates and licences ;*  *h) notification of differences.* | x |  | x |  |
|  | **Part II. The International Civil Aviation Organization**  **( ICAO ) :** Objectives and Composition | x |  | x |  |
|  | **Annex 8. Airworthiness of Aircraft** |  |  |  |  |
|  | *Foreword and Definitions* | x |  | x |  |
|  | *Certificate of Airworthiness* | x |  | x |  |
|  | **Annex 7. Aircraft Nationality & Registration Marks** |  |  |  |  |
|  | *Foreword and Definitions* | x |  | x |  |
|  | *Common - and Registration Marks* | x |  | x |  |
|  | *Certificate of Registration and Aircraft Nationality* | x |  | x |  |
|  | **Annex 1. Personnel Licensing** |  |  |  |  |
|  | *Definitions* |  |  |  |  |
|  | *Relevant parts of Annex 1 connected to Part- FCL and Part-MED* |  |  |  |  |

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| **1**. | **AIR LAW and ATC PROCEDURES** | PPL | Bridge Course | PPL | Bridge Course |
|  | **Annex 2. Rules of the Air** |  |  |  |  |
|  | *Essential definitions, applicability of the rules of the air, general rules ( except water operations ), visual flight rules, signals and interception of civil aircraft* | x |  | x |  |
|  | **Procedures for Air Navigation :** aircraft operations  Doc. 8168 - OPS / 611, Volume 1 |  |  |  |  |
|  | ***Altimeter Setting Procedures*** *( including ICAO Doc. 7030*  *– regional supplementary procedures )* |  |  |  |  |
|  | *Basic requirements ( except tables ), procedures applicable to operators and pilots ( except tables )* | x |  | x |  |
|  | ***Secondary Surveillance Radar Transponder Operating Procedures*** *( including ICAO Doc. 7030 )* |  |  |  |  |
|  | *Operation of Transponders* | x |  | x |  |
|  | *Phraseology* | x |  | x |  |
|  | **Annex 11, Doc. 4444 Air Traffic Management** |  |  |  |  |
|  | *Definitions* | x |  | x |  |
|  | *General provisions for air traffic services* | x |  | x |  |
|  | *Visual separation in the vicinity of aerodromes* | x |  | x |  |
|  | *Procedures for aerodrome control services* | x |  | x |  |
|  | *Radar services* | x |  | x |  |
|  | *Flight information service and alerting service* | x |  | x |  |
|  | *Phraseologies* | x |  | x |  |
|  | *Procedures related to emergencies, communication failure and contingencies* | x |  | x |  |
|  | **Annex 15. Aeronautical Information Service** |  | |  | |
|  | *Introduction, Essential Definitions* | x |  | x |  |
|  | *AIP, NOTAM, AIRAC and AIC* | x |  | x |  |
|  | **Annex 14. Volume 1 an& 2 : Aerodromes** | x |  | x |  |
|  | *Definitions* | x |  | x |  |
|  | *Aerodrome Data : conditions of the movement area and related facilities* | x |  | x |  |
|  | *Visual aids for navigation :*  *a) indicators and signaling devices ;*  *b) markings;*  *c) lights ;*  *d) signs ;*  *e) markers.* | x |  | x |  |
|  | *Visual aids for denoting obstacles :*  *a) marking of objects ;*  *b) lighting of objects.* | x |  | x |  |
|  | *Visual aids for denoting restricted use of areas* | x |  | x |  |
|  | *Emergency and other services :*  *a) rescue and fire fighting ;*  *b) apron management service.* | x |  | x |  |
|  | **Annex 12. Search and Rescue** |  |  |  |  |
|  | *Essential Definitions* | x |  | x |  |

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| **1**. | **AIR LAW and ATC PROCEDURES** | PPL | Bridge Course | PPL | Bridge Course |
|  | **Annex 12. Search and Rescue -** *[ continued ]* |  |  |  |  |
|  | *Operating Procedures :*  *a) procedures for PIC at the scene of an accident ;*  *b) procedures for PIC intercepting a distress transmission ;*  *c) search and rescue signals.* | x |  | x |  |
|  | *Search and Rescue Signals :*  *a) signals with surface craft ;*  *b) ground or air visual signal code ;*  *c) air or ground signals.* | x |  | x |  |
|  | **Annex 17. Security** |  |  |  |  |
|  | *General : aims and objectives* | x |  | x |  |
|  | **Annex 13. Aircraft Accident Investigation** |  |  |  |  |
|  | *Essential Definitions* | x |  | x |  |
|  | *Applicability* | x |  | x |  |
|  | **National Law** |  |  |  |  |
|  | *National law and differences to relevant ICAO Annexes and relevant EU regulations.* | x |  | x |  |
| **2.** | **HUMAN PERFORMANCE** | | | | |
|  | **Human Factors :** Basic Concepts |  |  |  |  |
|  | **Human Factors in Aviation** |  |  |  |  |
|  | *Becoming a competent pilot* | x |  | x |  |
|  | **Basic Aviation Physiology and Health Maintenance** |  |  |  |  |
|  | The atmosphere :  *a ) composition ;*  *b ) gas laws.* | x |  | x |  |
|  | Respiratory and circulatory systems :  *a ) oxygen requirement of tissues ;*  *b ) functional anatomy ;*  *c ) main forms of hypoxia ( hypoxic and anaemic ) :*  *1) sources, effects and counter- measures of carbon monoxide ;*  *2) counter measures and hypoxia ;*  *3) symptoms of hypoxia.*  *d ) hyperventilation ;*  *e ) the effects of accelerations on the circulatory system ;*  *f ) hypertension and coronary heart disease*. | x |  | x |  |
|  | **Man and Environment** |  |  |  |  |
|  | *Central, peripheral and autonomic nervous systems* | x |  | x |  |
|  | Vision :  *a ) functional anatomy ;*  *b ) visual field, foveal and peripheral vision ;*  *c ) binocular and monocular vision ;*  *d ) monocular vision cues ;*  *e ) night vision ;*  *f ) visual scanning and detection techniques and importance of “ look - out “ ;*  *g ) defective vision.* | x |  | x |  |
|  |  | x |  | x |  |
|  |  | x |  | x |  |

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| **2.** | **HUMAN PERFORMANCE** | PPL | Bridge Course | PPL | Bridge Course |
|  | **Man and Environment -** *[ continued ]* |  |  |  |  |
|  | Hearing :  *a ) descriptive and functional anatomy ;*  *b ) flight related hazards to hearing ;*  *c ) hearing loss.* | x |  | x |  |
|  | Equilibrium :  *a ) functional anatomy ;*  *b ) motion and acceleration ;*  *c ) motion sickness.* | x |  | x |  |
|  | Integration of sensory inputs :  a ) spatial disorientation : *forms, recognition and avoidance ;*  b ) illusions : *forms, recognition and avoidance :*  *1 ) physical origin ;*  *2 ) physiological origin ;*  c ) approach and landing problems. | x |  | x |  |
|  | **Health and Hygiene** |  |  |  |  |
|  | Personal Hygiene : *personal fitness* | x |  | x |  |
|  | Body rhythm and sleep :  *a ) rhythm disturbances ;*  *b ) symptoms, effects and management.* | x |  | x |  |
|  | Problem areas for pilots :  *a ) common minor ailments including cold, influenza and*  *gastro-intestinal upset ;*  *b ) entrapped gases and barotrauma, ( scuba diving ) ;*  *c ) obesity;*  *d ) food hygiene ;*  *e ) infectious diseases ;*  *f ) nutrition ;*  *g ) various toxic gases and materials.* | x |  | x |  |
|  | Intoxication :  *a ) prescribed medication ;*  *b ) tobacco ;*  *c ) alcohol and drugs ;*  *d ) caffeine ;*  *e ) self - medication.* | x |  | x |  |
|  | **Basic Aviation Psychology** |  |  |  |  |
|  | ***Human Information Processing*** |  |  |  |  |
|  | Attention and vigilance :  *a ) selectivity of attention ;*  *b ) divided attention.* | x |  | x |  |
|  | Perception :  *a ) perceptual illusions ;*  *b ) subjectivity of perception ;*  *c ) processes of perception.* | x |  | x |  |
|  | Memory :  *a ) sensory memory ;*  *b ) working or short term memory ;*  *c ) long term memory to include motor memory ( skills ).* | x |  | x |  |

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| **2.** | **HUMAN PERFORMANCE** | PPL | Bridge Course | PPL | Bridge Course |
|  | **Human Error and Reliability** |  |  |  |  |
|  | Reliability of human behaviour | x |  | x |  |
|  | Error generation : *social environment ( group, organization )* | x |  | x |  |
|  | **Decision Making** |  |  |  |  |
|  | Decision - making concepts :  *a ) structure ( phases ) ;*  *b ) limits ;*  *c ) risk assessment ;*  *d ) practical application.* | x |  | x |  |
|  | **Avoiding and Managing Errors : Cockpit Management** |  |  |  |  |
|  | Safety awareness :  *a ) risk area awareness ;*  *b ) situational awareness.* | x |  | x |  |
|  | Communication : *verbal and non - verbal communication* | x |  | x |  |
|  | **Human Behaviour** |  |  |  |  |
|  | Personality and attitudes :  *a ) development ;*  *b ) environmental influences.* | x |  | x |  |
|  | Identification of hazardous attitudes *( error proneness )* | x |  | x |  |
|  | **Human Overload and Under-load** |  |  |  |  |
|  | Arousal | x |  | x |  |
|  | Stress :  *a ) definition(s) ;*  *b ) anxiety and stress ;*  *c ) effects of stress.* | x |  | x |  |
|  | Fatigue and stress management :  *a ) types, causes and symptoms of fatigue ;*  *b ) effects of fatigue ;*  *c ) coping strategies ;*  *d ) management techniques ;*  *e ) health and fitness programmes* | x |  | x |  |
| **3.** | **METEOROLOGY** | | | | |
|  | **The Atmosphere** |  |  |  |  |
|  | ***Composition, Extent and Vertical Division*** |  |  |  |  |
|  | Structure of the atmosphere | x |  | x |  |
|  | Troposphere | x |  | x |  |
|  | ***Air Temperature*** | x |  | x |  |
|  | *Definition and units* | x |  | x |  |
|  | *Vertical distribution of temperature* | x |  | x |  |
|  | *Transfer of heat* | x |  | x |  |
|  | *Lapse rates, stability and instability* | x |  | x |  |
|  | *Development of inversions and types of inversions* | x |  | x |  |
|  | *Temperature near the earth’s surface, surface effects, diurnal and seasonal variation, effect of clouds and effect of wind* | x |  | x |  |

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| **3.** | **METEOROLOGY** | PPL | Bridge Course | PPL | Bridge Course |
|  | ***Atmospheric Pressure*** |  |  |  |  |
|  | *Barometric pressure and isobars* | x |  | x |  |
|  | *Pressure variation with height* | x |  | x |  |
|  | *Reduction of pressure to mean sea level* | x |  | x |  |
|  | *Relationship between surface pressure centres and pressure centres aloft* | x |  | x |  |
|  | ***Air Density*** |  |  |  |  |
|  | *Relationship between pressure, temperature and density* | x |  | x |  |
|  | *ISA* | x |  | x |  |
|  | ***ICAO Standard Atmosphere*** | x |  | x |  |
|  | ***Altimetry*** |  |  |  |  |
|  | *Terminology and Definitions* | x |  | x |  |
|  | *Altimeter and altimeter settings* | x |  | x |  |
|  | *Calculations* | x |  | x |  |
|  | *Effect of accelerated airflow due to topography* | x |  | x |  |
|  | ***Wind*** |  |  |  |  |
|  | ***Definition and measurement of wind*** |  |  |  |  |
|  | *Definition and measurement* | x |  | x |  |
|  | ***Primary cause of wind*** |  |  |  |  |
|  | *Primary cause of wind, pressure gradient, coriolis force and gradient wind* | x |  | x |  |
|  | *Variation of wind in the friction layer* | x |  | x |  |
|  | *Effects of convergence and divergence* | x |  | x |  |
| **4.** | **COMMUNICATIONS** | | | | |
|  | **VFR Communications** |  |  |  |  |
|  | ***Definitions*** |  |  |  |  |
|  | *Meanings and significance of associated terms* | x |  | x |  |
|  | *ATS abbreviations* | x |  | x |  |
|  | *Q - code groups commonly used in RTF air - ground communications* | x |  | x |  |
|  | *Categories of messages* | x |  | x |  |
|  | ***General Operating Procedures*** |  |  |  |  |
|  | *Transmission of letters* | x |  | x |  |
|  | *Transmission of numbers ( including level information )* | x |  | x |  |
|  | *Transmission of time* | x |  | x |  |
|  | *Transmission technique* | x |  | x |  |
|  | *Standard words and phrases ( relevant RTF phraseology included )* | x |  | x |  |
|  | *R / T call signs for aeronautical stations including use of abbreviated call signs* | x |  | x |  |
|  | *R / T call signs for aircraft including use of abbreviated call signs* | x |  | x |  |
|  | *Transfer of communication* | x |  | x |  |
|  | *Test procedures including readability scale* | x |  | x |  |
|  | *Read back and acknowledgement requirements* | x |  | x |  |

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| **4.** | **COMMUNICATIONS** | PPL | Bridge Course | PPL | Bridge Course |
|  | ***Relevant Weather Information Terms ( VFR )*** |  |  |  |  |
|  | *Aerodrome weather* | x |  | x |  |
|  | *Weather broadcast* | x |  | x |  |
|  | ***Action required to be taken in case of communication***  ***failure*** | x |  | x |  |
|  | ***Distress and Urgency Procedures*** |  |  |  |  |
|  | *Distress ( definition, frequencies, watch of distress frequencies, distress signal and distress message )* | x |  | x |  |
|  | *Urgency ( definition, frequencies, urgency signal and urgency message )* | x |  | x |  |
|  | ***General principles of VHF propagation* *and allocation of frequencies*** | x |  | x |  |
| **5.** | **PRINCIPLES of FLIGHT** | | | | |
| **5. 1** | **PRINCIPLES OF FLIGHT : Aeroplane** | | | | |
|  | **Subsonic Aerodynamics** |  |  |  |  |
|  | ***Basics Concepts, Laws and Definitions*** |  |  |  |  |
|  | Laws and definitions :  *a ) conversion of units ;*  *b ) Newton´s laws ;*  *c ) Bernoulli’s equation and venture ;*  *d ) static pressure, dynamic pressure and total pressure ;*  *e ) density ;*  *f ) IAS and TAS.* | x |  | x |  |
|  | Basics about airflow :  *a ) streamline ;*  *b ) two - dimensional airflow ;*  *c ) three - dimensional airflow.* | x |  | x |  |
|  | Aerodynamic forces on surfaces :  *a ) resulting airforce ;*  *b ) lift ;*  *c ) drag ;*  *d ) angle of attack.* | x |  | x |  |
|  | Shape of an aerofoil section:  *a ) thickness to chord ratio ;*  *b ) chord line ;*  *c ) camber line ;*  *d ) camber ;*  *e ) angle of attack.* | x |  | x |  |
|  | The wing shape :  *a ) aspect ratio ;*  *b ) root chord ;*  *c ) tip chord ;*  *d ) tapered wings ;*  *e ) wing plan-form.* | x |  | x |  |
|  | ***The two-dimensional airflow about an aerofoil*** |  |  |  |  |
|  | *Streamline pattern* | x |  | x |  |
|  | *Stagnation point* | x |  | x |  |
|  | *Pressure distribution* | x |  | x |  |
|  | *Centre of pressure* | x |  | x |  |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **5. 1** | **PRINCIPLES OF FLIGHT : Aeroplane** | PPL | Bridge Course | PPL | Bridge Course |
|  | *Influence of angle of attack* | x |  | x |  |
|  | *Flow separation at high angles of attack* | x |  | x |  |
|  | *The lift –* ***α*** *graph* | x |  | x |  |
|  | ***The Coefficients*** |  |  |  |  |
|  | The lift coefficient **Cl** : *the lift formula* |  |  |  |  |
|  | The drag coefficient **Cd** : *the drag formula* | x |  | x |  |
|  | ***The three-dimensional airflow round a wing and a fuselage*** |  |  |  |  |
|  | Streamline pattern :  *a ) span - wise flow and causes ;*  *b ) tip vortices and angle of attack ;*  *c ) upwash and downwash due to tip vortices ;*  *d ) wake turbulence behind an aeroplane ( causes,*  *distribution and duration of the phenomenon ).* | x |  | x |  |
|  | Induced drag :  *a ) influence of tip vortices on the angle of attack ;*  *b ) the induced local  ;*  *c ) influence of induced angle of attack on the direction*  *of the lift vector ;*  *d ) induced drag and angle of attack.* | x |  | x |  |
|  | ***Drag*** |  |  |  |  |
|  | The parasite drag :  *a ) pressure drag ;*  *b ) interference drag ;*  *c ) friction drag.* | x |  | x |  |
|  | The parasite drag and speed | x |  | x |  |
|  | The induced drag and speed | x |  | x |  |
|  | The total drag | x |  | x |  |
|  | ***The ground effect*** |  |  |  |  |
|  | Effect on take-off and landing characteristics of an aeroplane | x |  | x |  |
|  | ***The stall*** |  |  |  |  |
|  | Flow separation at increasing angles of attack :  *a ) the boundary layer :*  *1 ) laminar layer ;*  *2 ) turbulent layer ;*  *3 ) transition.*  *b ) separation point ;*  *c ) influence of angle of attack ;*  *d ) influence on :*  *1 ) pressure distribution ;*  *2 ) location of centre of pressure ;*  *3 ) CL ;*  *4 ) CD ;*  *5 ) pitch moments.*  *e ) buffet ;*  *f ) use of controls.* | x |  | x |  |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **5. 1** | **PRINCIPLES OF FLIGHT : Aeroplane** | PPL | Bridge Course | PPL | Bridge Course |
|  | The stall speed :  *a ) in the lift formula ;*  *b ) 1 g stall speed ;*  *c ) influence of :*  *1 ) the centre of gravity ;*  *2 ) power setting ;*  *3 ) altitude ( IAS ) ;*  *4 ) wing loading ;*  *5 ) load factor n :*  *( i ) definition ;*  *( ii ) turns ;*  *( iii ) forces.* | x |  | x |  |
|  | The initial stall in span - wise direction:  *a ) influence of plan-form ;*  *b ) geometric twist ( wash out ) ;*  *c ) use of ailerons.* | x |  | x |  |
|  | Stall warning :  *a ) importance of stall warning ;*  *b ) speed margin ;*  *c ) buffet ;*  *d ) stall strip ;*  *e ) flapper switch ;*  *f ) recovery from stall.* | x |  | x |  |
|  | *Special phenomena of stall :*  *a ) the power - on stall ;*  *b ) climbing and descending turns ;*  *c ) T - tailed aeroplane ;*  *d ) avoidance of spins :*  *1 ) spin development ;*  *2 ) spin recognition ;*  *3 ) spin recovery.*  *e ) ice ( in stagnation point and on surface ) :*  *1 ) absence of stall warning ;*  *2 ) abnormal behaviour of the aircraft during stall.* | x |  | x |  |
|  | ***C L augmentation*** |  |  |  |  |
|  | Trailing edge flaps and the reasons for use in take-off and landing :  *a ) influence on CL -* ***α****-graph ;*  *b ) different types of flaps ;*  *c ) flap asymmetry ;*  *d ) influence on pitch movement.* | x |  | x |  |
|  | Leading edge devices and the reasons for use in take-off and landing | x |  | x |  |
|  | ***The boundary layer*** |  |  |  |  |
|  | Different types :  *a ) laminar ; b ) turbulent.* | x |  | x |  |

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| **5. 1** | **PRINCIPLES OF FLIGHT : Aeroplane** | PPL | Bridge Course | PPL | Bridge Course |
|  | ***Special circumstances*** |  |  |  |  |
|  | Ice and other contamination :  *a ) ice in stagnation point ;*  *b ) ice on the surface ( frost, snow and clear ice ) ;*  *c ) rain ;*  *d ) contamination of the leading edge ;*  *e ) effects on stall ;*  *f ) effects on loss of controllability ;*  *g ) effects on control surface moment ;*  *h ) influence on high lift devices during take- off, landing*  *and low speeds.* | x |  | x |  |
|  | ***Stability*** |  |  |  |  |
|  | ***Condition of equilibrium in steady horizontal flight*** |  |  |  |  |
|  | Precondition for static stability | x |  | x |  |
|  | Equilibrium :  *a ) lift and weight ;*  *b ) drag and thrust.* | x |  | x |  |
|  | ***Methods of achieving balance*** |  |  |  |  |
|  | Wing and empennage *( tail and canard )* | x |  | x |  |
|  | Control surfaces | x |  | x |  |
|  | Ballast or weight trim | x |  | x |  |
|  | ***Static and dynamic longitudinal stability*** |  |  |  |  |
|  | Basics and definitions :  *a ) static stability, positive, neutral and negative ;*  *b ) precondition for dynamic stability ;*  *c ) dynamic stability, positive, neutral and negative.* | x |  | x |  |
|  | Location of centre of gravity :  *a ) aft limit and minimum stability margin ;*  *b ) forward position ;*  *c ) effects on static and dynamic stability.* | x |  | x |  |
|  | ***Dynamic lateral or directional stability*** |  |  |  |  |
|  | Spiral dive and corrective actions | x |  | x |  |
|  | ***Control*** |  |  |  |  |
|  | ***General*** |  |  |  |  |
|  | Basics, the three planes and three axis | x |  | x |  |
|  | Angle of attack change | x |  | x |  |
|  | ***Pitch control*** |  |  |  |  |
|  | Elevator | x |  | x |  |
|  | Downwash effects | x |  | x |  |
|  | Location of centre of gravity | x |  | x |  |
|  | ***Yaw control*** |  |  |  |  |
|  | Pedal or rudder | x |  | x |  |
|  | ***Roll control*** |  |  |  |  |
|  | Ailerons : *function in different phases of flight* | x |  | x |  |
|  | Adverse yaw | x |  | x |  |

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| **5. 1** | **PRINCIPLES OF FLIGHT : Aeroplane** | PPL | Bridge Course | PPL | Bridge Course |
|  | Means to avoid adverse yaw :  *a ) frieze ailerons ;*  *b ) differential ailerons deflection.* | x |  | x |  |
|  | ***Means to reduce control forces*** |  |  |  |  |
|  | Aerodynamic balance :  *a ) balance tab and anti - balance tab ;*  *b ) servo tab.* | x |  | x |  |
|  | ***Mass balance*** |  |  |  |  |
|  | Reasons to balance : *means* | x |  | x |  |
|  | ***Trimming*** |  |  |  |  |
|  | Reasons to trim | x |  | x |  |
|  | Trim tabs | x |  | x |  |
|  | ***Limitations*** |  |  |  |  |
|  | ***Operating limitations*** |  |  |  |  |
|  | Flutter | x |  | x |  |
|  | v **f e** | x |  | x |  |
|  | v **n o** , v **n e** | x |  | x |  |
|  | ***Manoeuvring envelope*** |  |  |  |  |
|  | Manoeuvring load diagram :  *a ) load factor ;*  *b ) accelerated stall speed ;*  *c ) v* ***a*** *;*  *d ) manoeuvring limit load factor or certification category.* | x |  | x |  |
|  | Contribution of mass | x |  | x |  |
|  | ***Gust envelope*** |  |  |  |  |
|  | Gust load diagram | x |  | x |  |
|  | Factors contributing to gust loads | x |  | x |  |
|  | ***Propellers*** |  |  |  |  |
|  | ***Conversion of engine torque to thrust*** |  |  |  |  |
|  | Meaning of pitch | x |  | x |  |
|  | Blade twist | x |  | x |  |
|  | Effects of ice on propeller | x |  | x |  |
|  | ***Engine failure or engine stop*** |  |  |  |  |
|  | Windmilling drag | x |  | x |  |
|  | ***Moments due to propeller operation*** |  |  |  |  |
|  | Torque reaction | x |  | x |  |
|  | Asymmetric slipstream effect | x |  | x |  |
|  | Asymmetric blade effect | x |  | x |  |
|  | ***Flight mechanics*** |  |  |  |  |
|  | ***Forces acting on an aeroplane*** |  |  |  |  |
|  | Straight horizontal steady flight | x |  | x |  |
|  | Straight steady climb | x |  | x |  |
|  | Straight steady descent | x |  | x |  |
|  | Straight steady glide | x |  | x |  |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **5. 1** | **PRINCIPLES OF FLIGHT : Aeroplane** | PPL | Bridge Course | PPL | Bridge Course |
|  | Steady coordinated turn :  *a ) bank angle ;*  *b ) load factor ;*  *c ) turn radius ;*  *d ) rate one turn.* | x |  | x |  |
| **5. 2** | **PRINCIPLES OF FLIGHT : Helicopter** | | | | |
|  | **Subsonic Aerodynamics** | | |  |  |
|  | Basic concepts, laws and definitions | | | x | x |
|  | Conversion of units | | | x | x |
|  | Definitions and basic concepts about air :  *a ) the atmosphere and International Standard Atmosphere ;*  *b ) density ;*  *c ) influence of pressure and temperature on density.* | | | x | x |
|  | Newton’s laws :  *a )* Newton’s second law : *Momentum equation ;*  *b )* Newton’s third law : *action and reaction.* | | | x | x |
|  | Basic concepts about airflow :  *a ) steady airflow and unsteady airflow ;*  *b ) Bernoulli’s equation ;*  *c ) static pressure, dynamic pressure, total pressure and stagnation point;*  *d ) TAS and IAS ;*  *e ) two - dimensional airflow and three - dimensional airflow ;*  *f ) viscosity and boundary layer.* | | | x | x |
|  | Two - dimensional airflow | | | x | x |
|  | Aerofoil section geometry :  *a ) aerofoil section ;*  *b ) chord line, thickness and thickness to chord ratio of a section ;*  *c ) camber line and camber ;*  *d ) symmetrical and asymmetrical aerofoil’s sections.* | | | x | x |
|  | Aerodynamic forces on aerofoil elements :  *a ) angle of attack ;*  *b ) pressure distribution ;*  *c ) lift and lift coefficient ;*  *d ) relation lift coefficient : angle of attack ;*  *e ) profile drag and drag coefficient ;*  *f ) relation drag coefficient : angle of attack ;*  *g ) resulting force, centre of pressure and pitching moment.* | | | x | x |
|  | Stall :  *a ) boundary layer and reasons for stalling ;*  *b ) variation of lift and drag as a function of angle of attack ;*  *c ) displacement of the centre of pressure and pitching moment.* | | | x | x |
|  | Disturbances due to profile contamination :  *a ) ice contamination ;*  *b ) ice on the surface ( frost, snow and clear ice ).* | | | x | x |
|  | The three-dimensional airflow round a wing and a fuselage | | | x | x |
|  | The wing :  *a ) plan-form, rectangular and tapered wings ;*  *b ) wing twist.* | | | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **5. 2** | **PRINCIPLES OF FLIGHT : Helicopter** | PPL | Bridge Course | PPL | Bridge Course |
|  | Airflow pattern and influence on lift :  *a ) span wise flow on upper and lower surface ;*  *b ) tip vortices ;*  *c ) span-wise lift distribution.* | | | x | x |
|  | Induced drag : *causes and vortices* | | | x | x |
|  | The airflow round a fuselage :  *a ) components of a fuselage ;*  *b ) parasite drag ;*  *c ) variation with speed.* | | | x | x |
|  | ***Transonic aerodynamics and compressibility effects*** | | |  |  |
|  | Airflow velocities | | | x | x |
|  | Airflow speeds :  *a ) speed of sound ;*  *b ) subsonic, high subsonic and supersonic flows.* | | | x | x |
|  | Shock waves :  *a ) compressibility and shock waves ;*  *b ) the reasons for their formation at upstream high subsonic airflow ;*  *c ) their effect on lift and drag.* | | | x | x |
|  | Influence of wing plan-form : *sweep - angle* | | | x | x |
|  | ***Rotorcraft types*** | | | x | x |
|  | Rotorcraft | | | x | x |
|  | Rotorcraft types :  a ) autogyro ;  b ) helicopter. | | | x | x |
|  | Helicopters | | | x | x |
|  | Helicopters configurations : *the single main rotor helicopter* | | | x | x |
|  | The helicopter, characteristics and associated terminology :  *a ) general lay-out, fuselage, engine and gearbox ;*  *b ) tail rotor, fenestron and NOTAR ;*  *c ) engines ( reciprocating and turbo shaft engines ) ;*  *d ) power transmission ;*  *e ) rotor shaft axis, rotor hub and rotor blades ;*  *f ) rotor disc and rotor disc area ;*  *g ) teetering rotor ( two blades ) and rotors with more than two blades ;*  *h ) skids and wheels ;*  *i ) helicopter axes and fuselage centre line ;*  *j ) roll axis, pitch axis and normal or yaw axis ;*  *k ) gross mass, gross weight and disc loading.* | | | x | x |
|  | ***Main rotor aerodynamics*** | | | x | x |
|  | Hover flight outside ground effect | | | x | x |
|  | Airflow through the rotor discs and round the blades :  *a ) circumferential velocity of the blade sections ;*  *b ) induced airflow, through the disc and downstream ;*  *c ) downward fuselage drag ;*  *d ) equilibrium of rotor thrust, weight and fuselage drag ;*  *e ) rotor disc induced power ;*  *f ) relative airflow to the blade ;*  *g ) pitch angle and angle of attack of a blade section ;* | | | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **5. 2** | **PRINCIPLES OF FLIGHT : Helicopter** | PPL | Bridge Course | PPL | Bridge Course |
|  | *h ) lift and profile drag on the blade element ;*  *i ) resulting lift and thrust on the blade and rotor thrust ;*  *j ) collective pitch angle changes and necessity of blade feathering ;*  *k ) required total main rotor-torque and rotor-power ;*  *l ) influence of the air density.* | | | x | x |
|  | Anti - torque force and tail rotor :  *a ) force of tail rotor as a function of main rotor - torque ;*  *b ) anti - torque rotor power ;*  *c ) necessity of blade feathering of tail rotor blades and yaw pedals.* | | | x | x |
|  | Maximum hover altitude OGE:  *a ) total power required and power available ;*  *b ) maximum hover altitude as a function of pressure altitude and OAT.* | | | x | x |
|  | Vertical climb | | | x | x |
|  | Relative airflow and Angles of Attack ( AoA ):  *a ) climb velocity VC, induced and relative velocity and AoA ;*  *b ) collective pitch angle and blade feathering.* | | | x | x |
|  | Power and vertical speed:  *a ) induced power, climb power and profile power ;*  *b ) total main rotor power and main rotor torque ;*  *c ) tail rotor power ;*  *d ) total power requirement in vertical flight.* | | | x | x |
|  | Forward flight | | | x | x |
|  | Airflow and forces in uniform inflow distribution :  *a ) assumption of uniform inflow distribution on rotor disc ;*  *b ) advancing blade ( 90° ) and retreating blade ( 270° ) ;*  *c ) airflow velocity relative to the blade sections, area of reverse flow ;*  *d ) lift on the advancing and retreating blades at constant pitch angles;*  *e ) necessity of cyclic pitch changes ;*  *f ) compressibility effects on the advancing blade tip and speed limitations;*  *g ) high AoA on the retreating blade, blade stall and speed limitations;*  *h ) thrust on rotor disc and tilt of thrust vector ;*  *i ) vertical component of the thrust vector and gross weight equilibrium;*  *(j) horizontal component of the thrust vector and drag equilibrium.* | | | x | x |
|  | The flare *( power flight ) :*  *a ) thrust reversal and increase in rotor thrust ;*  *b ) increase of rotor RPM on non governed rotor.* | | | x | x |
|  | Power and maximum speed :  *a ) induced power as a function of helicopter speed ;*  *b ) rotor profile power as a function of helicopter speed ;*  *c ) fuselage drag and parasite power as a function of forward speed ;*  *d ) tail rotor power and power ancillary equipment ;*  *e ) total power requirement as a function of forward speed ;*  *f ) influence of helicopter mass, air density and drag of additional*  *external equipment ;*  *g ) translational lift and influence on power required.* | | | x | x |
|  | Hover and forward flight in ground effect | | | x | x |
|  | Airflow in ground effect and downwash : *rotor power decrease as a function of rotor height above the ground at constant helicopter mass* | | | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **5. 2** | **PRINCIPLES OF FLIGHT : Helicopter** | PPL | Bridge Course | PPL | Bridge Course |
|  | Vertical descent | | | x | x |
|  | Vertical descent, power on :  *a ) airflow through the rotor, low and moderate descent speeds ;*  *b ) vortex ring state, settling with power and consequences.* | | | x | x |
|  | Autorotation :  *a ) collective lever position after failure ;*  *b ) up flow through the rotor, auto-rotation and anti-autorotation rings;*  *c ) tail rotor thrust and yaw control ;*  *d ) control of rotor RPM with collective lever ;*  *e ) landing after increase of rotor thrust by pulling collective and*  *reduction in vertical speed.* | | | x | x |
|  | Forward flight : *Autorotation* | | | x | x |
|  | Airflow through the rotor disc :  *a ) descent speed and up flow through the disc ;*  *b ) the flare, increase in rotor thrust, reduction of vertical speed and*  *ground speed.* | | | x | x |
|  | Flight and landing :  *a ) turning ;*  *b ) flare ;*  *c ) autorotative landing ;*  *d ) height or velocity avoidance graph and dead man’s curve.* | | | x | x |
|  | ***Main rotor mechanics*** | | | x | x |
|  | Flapping of the blade in hover | | | x | x |
|  | Forces and stresses on the blade :  *a ) centrifugal force on the blade and attachments ;*  *b ) limits of rotor RPM ;*  *c ) lift on the blade and bending stresses on a rigid attachment ;*  *d ) the flapping hinge of the articulated rotor and flapping hinge offset;*  *e) the flapping of the hinge less rotor and flexible element.* | | | x | x |
|  | Coning angle in hover:  *a ) lift and centrifugal force in hover and blade weight negligible ;*  *b ) flapping, tip path plane and disc area.* | | | x | x |
|  | Flapping angles of the blade in forward flight | | | x | x |
|  | Forces on the blade in forward flight without cyclic feathering :  *a ) aerodynamic forces on the advancing and retreating blades without*  *cyclic feathering ;*  *b ) periodic forces and stresses, fatigue and flapping hinge ;*  *c ) phase lag between the force and the flapping angle ( about 90° ) ;*  *d ) flapping motion of the hinged blades and tilting of the cone and*  *flap back of rotor ;*  *e ) rotor disc attitude and thrust vector tilt.* | | | x | x |
|  | Cyclic pitch *( feathering )* in helicopter mode, forward flight :  *a ) necessity of forward rotor disc tilt and thrust vector tilt ;*  *b ) flapping and tip path plane, virtual rotation axis or no flapping*  *axis and plane of rotation ;*  *c ) shaft axis and hub plane ;*  *d ) cyclic pitch change ( feathering ) and rotor thrust vector tilt ;* | | | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **5. 2** | **PRINCIPLES OF FLIGHT : Helicopter** | PPL | Bridge Course | PPL | Bridge Course |
|  | *e ) collective pitch change, collective lever, swash plate, pitch link and*  *pitch horn ;*  *f ) cyclic stick, rotating swash plate and pitch link movement and phase*  *angle.* | | |  |  |
|  | Blade lag motion | | | x | x |
|  | Forces on the blade in the disc plane *( tip path plane )* in forward  flight :  *a ) forces due to the Coriolis effect because of the flapping ;*  *b ) alternating stresses and the need of the drag or lag hinge.* | | | x | x |
|  | The drag or lag hinge:  *a ) the drag hinge in the fully articulated rotor ;*  *b ) the lag flexure in the hinge less rotor ;*  *c ) drag dampers.* | | | x | x |
|  | Ground resonance :  *a) blade lag motion and movement of the centre of gravity of the*  *blades and the rotor ;*  *b ) oscillating force on the fuselage ;*  *c) fuselage, undercarriage and resonance.* | | | x | x |
|  | Rotor systems | | | x | x |
|  | See - saw or teetering rotor | | | x | x |
|  | Fully articulated rotor :  *a ) three hinges arrangement ;*  *b ) bearings and elastomeric hinges.* | | | x | x |
|  | Hinge less rotor and bearing less rotor | | | x | x |
|  | Blade sailing :  *a ) low rotor RPM and effect of adverse wind ;*  *b ) minimizing the danger ;*  *c ) droop stops.* | | | x | x |
|  | Vibrations due to main rotor :  *a ) origins of the vibrations : in plane and vertical ;*  *b ) blade tracking and balancing.* | | | x | x |
|  | ***Tail rotors*** | | | x | x |
|  | Conventional tail rotor | | | x | x |
|  | Rotor description :  *a ) two-blades tail rotors with teetering hinge ;*  *b ) rotors with more than two blades ;*  *c ) feathering bearings and flapping hinges ;*  *d ) dangers to people and to the tail rotor, rotor height and safety* | | | x | x |
|  | Aerodynamics :  *a ) induced airflow and tail rotor thrust ;*  *b ) thrust control by feathering, tail rotor drift and roll ;*  *c ) effect of tail rotor failure and vortex ring.* | | | x | x |
|  | The fenestron : *technical lay - out* | | | x | x |
|  | The NOTAR : *technical lay - out* | | | x | x |
|  | Vibrations : high frequency vibrations due to the tail rotors | | | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **5. 2** | **PRINCIPLES OF FLIGHT : Helicopter** | PPL | Bridge Course | PPL | Bridge Course |
|  | ***Equilibrium, stability and control*** | | | x | x |
|  | Equilibrium and helicopter attitudes | | | x | x |
|  | Hover :  *a ) forces and equilibrium conditions ;*  *b ) helicopter pitching moment and pitch angle ;*  *c ) helicopter rolling moment and roll angle.* | | | x | x |
|  | Forward flight :  *a ) forces and equilibrium conditions ;*  *b ) helicopter moments and angles ;*  *c ) effect of speed on fuselage attitude.* | | | x | x |
|  | Control | | | x | x |
|  | Control power  *a ) fully articulated rotor ;*  *b ) hinge less rotor ;*  *c ) teetering rotor.* | | | x | x |
|  | Static and dynamic roll over | | | x | x |
|  | ***Helicopter performances*** | | |  |  |
|  | Engine performances | | | x | x |
|  | Piston engines :  *a ) power available ;*  *b ) effects of density altitude.* | | | x | x |
|  | Turbine engines :  *a ) power available ;*  *b ) effects of ambient pressure and temperature.* | | | x | x |
|  | Helicopter performances | | | x | x |
|  | Hover and vertical flight :  *a ) power required and power available ;*  *b ) OGE and IGE maximum hover height ;*  *c ) influence of AUM, pressure, temperature and density.* | | | x | x |
|  | Forward flight :  *a ) maximum speed ;*  *b ) maximum rate of climb speed ;*  *c ) maximum angle of climb speed ;*  *d ) range and endurance ;*  *e ) influence of AUM, pressure, temperature and density.* | | | x | x |
|  | Manoeuvring :  *a ) load factor ;*  *b ) bank angle and number of* ***g****’s ;*  *c ) manoeuvring limit load factor.* | | | x | x |
|  | Special conditions :  *a ) operating with limited power ;*  *b ) over pitch and over torque.* | | | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **6.** | **OPERATIONAL PROCEDURES** | PPL | Bridge Course | PPL | Bridge Course |
|  | **General** |  |  |  |  |
|  | **Operation of Aircraft :**  **ICAO Annex 6, General Requirements** |  |  |  |  |
|  | Definitions | x | x | x | x |
|  | Applicability | x | x | x | x |
|  | **Special operational procedures and hazards**  ***( general aspects )*** | x | x | x | x |
|  | **Noise Abatement** |  |  |  |  |
|  | Noise abatement procedures | x | x | x | x |
|  | Influence of the flight procedure *( departure, cruise and approach )* | x | x | x | x |
|  | Runway incursion awareness *( meaning of surface markings and signals )* | x | x | x | x |
|  | **Fire or Smoke** |  |  |  |  |
|  | Carburettor fire | x | x | x | x |
|  | Engine fire | x | x | x | x |
|  | Fire in the cabin and cockpit, *( choice of extinguishing agents according to fire classification and use of the extinguishers )* | x | x | x | x |
|  | Smoke in the cockpit *( effects and action to be taken )* and smoke in the cockpit and cabin *( effects and actions taken )* | x | x | x | x |
|  | **Windshear and Microburst** |  |  |  |  |
|  | Effects and recognition during departure and approach | x | x | x | x |
|  | Actions to avoid and actions taken during encounter | x | x | x | x |
|  | **Wake Turbulence** |  |  |  |  |
|  | Cause | x | x | x | x |
|  | List of relevant parameters | x | x | x | x |
|  | Actions taken when crossing traffic, during take-off and landing | x | x | x | x |
|  | **Emergency and Precautionary Landings** |  |  |  |  |
|  | Definition | x | x | x | x |
|  | Cause | x | x | x | x |
|  | Passenger information | x | x | x | x |
|  | Evacuation | x | x | x | x |
|  | Action after landing | x | x | x | x |
|  | **Contaminated Runways** |  |  |  |  |
|  | Kinds of contamination | x | x |  |  |
|  | Estimated surface friction and friction coefficient | x | x |  |  |
|  | **Rotor downwash** |  |  | x | x |
|  | **Operation influence by meteorological conditions (Hel-pter)** |  |  |  |  |
|  | White out, sand or dust |  |  | x | x |
|  | Strong winds |  |  | x | x |
|  | Mountain environment |  |  | x | x |
|  | **Emergency Procedures** |  |  |  |  |
|  | **Influence by technical problems** |  |  |  |  |
|  | Engine failure |  |  | x | x |
|  | Fire in cabin, cockpit or engine |  |  | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **6.** | **OPERATIONAL PROCEDURES** | PPL | Bridge Course | PPL | Bridge Course |
|  | Tail, rotor or directional control failure |  |  | x | x |
|  | Ground resonance |  |  | x | x |
|  | Blade stall |  |  | x | x |
|  | Settling with power *( vortex ring )* |  |  | x | x |
|  | Overpitch |  |  | x | x |
|  | Overspeed : rotor or engine |  |  | x | x |
|  | Dynamic rollover |  |  | x | x |
|  | Mast bumping |  |  | x | x |
| **7.** | **FLIGHT PERFORMANCE and PLANNING** | | | | |
| **7. 1** | **MASS and BALANCE : *Aeroplanes or Helicopters*** |  |  |  |  |
|  | **Purpose of Mass and Balance Considerations** |  |  |  |  |
|  | ***Mass Limitations*** |  |  |  |  |
|  | Importance in regard to structural limitations | x | x | x | x |
|  | Importance in regard to performance limitations | x | x | x | x |
|  | ***CG Limitations*** |  |  |  |  |
|  | Importance in regard to stability and controllability | x | x | x | x |
|  | Importance in regard to performance | x | x | x | x |
|  | **Loading** |  |  |  |  |
|  | ***Terminology*** |  |  |  |  |
|  | Mass terms | x | x | x | x |
|  | Load terms *( including fuel terms )* | x | x | x | x |
|  | ***Mass Limits*** |  |  |  |  |
|  | Structural limitations | x | x | x | x |
|  | Performance limitations | x | x | x | x |
|  | Baggage compartment limitations | x | x | x | x |
|  | ***Mass Calculations*** |  |  |  |  |
|  | Maximum masses for take-off and landing | x | x | x | x |
|  | Use of standard masses for passengers, baggage and crew | x | x | x | x |
|  | ***Fundamentals of CG Calculations*** |  |  |  |  |
|  | Definition of centre of gravity | x | x | x | x |
|  | Conditions of equilibrium *( balance of forces and balance of moments )* | x | x | x | x |
|  | Basic calculations of CG | x | x | x | x |
|  | ***Mass and Balance details of Aircraft*** |  |  |  |  |
|  | ***Contents of Mass and Balance Documentation*** |  |  |  |  |
|  | Datum and moment arm | x | x | x | x |
|  | CG position as distance from datum | x | x | x | x |
|  | ***Extraction of basic Mass and Balance Data from***  ***Aircraft Documentation*** |  |  |  |  |
|  | BEM | x | x | x | x |
|  | CG position or moment at BEM | x | x | x | x |
|  | Deviations from standard configuration | x | x | x | x |
|  | **Determination of CG Position** |  |  |  |  |
|  | ***Methods*** |  |  |  |  |
|  | Arithmetic method | x | x | x | x |
|  | Graphic method | x | x | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **7. 1** | **MASS and BALANCE : *Aeroplanes or Helicopters*** | PPL | Bridge Course | PPL | Bridge Course |
|  | ***Load and Trim Sheet*** |  |  |  |  |
|  | General considerations | x | x | x | x |
|  | Load Sheet and CG envelope for light aeroplanes and for helicopters | x | x | x | x |
| **7. 2** | **PERFORMANCE :**  ***Aeroplanes*** |  |  |  |  |
|  | **Introduction** |  |  |  |  |
|  | Performance classes | x | x |  |  |
|  | Stages of flight | x | x |  |  |
|  | Effect of aeroplane mass, wind, altitude, runway slope and runway conditions | x | x |  |  |
|  | Gradients | x | x |  |  |
|  | **SE Aeroplanes** |  |  |  |  |
|  | Definitions of terms and speeds | x | x |  |  |
|  | ***Take-off and Landing Performance*** |  |  |  |  |
|  | Use of aeroplane flight manual data | x | x |  |  |
|  | ***Climb and Cruise Performance*** |  |  |  |  |
|  | Use of aeroplane flight data | x | x |  |  |
|  | Effect of density altitude and aeroplane mass | x | x |  |  |
|  | Endurance and the effects of the different recommended power or thrust settings | x | x |  |  |
|  | Still air range with various power or thrust settings | x | x |  |  |
| **7. 3** | **FLIGHT PLANNING and FLIGHT MONITORING** |  |  |  |  |
|  | **Flight Planning for VFR Flights** |  |  |  |  |
|  | ***VFR Navigation Plan*** |  |  |  |  |
|  | Routes, Airfields, Heights and Altitudes from VFR Charts | x | x | x | x |
|  | Courses and Distances from VFR Charts |  |  |  |  |
|  | Aerodrome Charts and Aerodrome Directory | x | x | x | x |
|  | Communications and Radio Navigation Planning Data | x | x | x | x |
|  | Completion of Navigation Plan | x | x | x | x |
|  | **Fuel Planning** |  |  |  |  |
|  | General knowledge | x | x | x | x |
|  | ***Pre-flight Calculation of Fuel Required*** |  |  |  |  |
|  | Calculation of extra fuel | x | x | x | x |
|  | Completion of the fuel section of the navigation plan *( fuel log )* and calculation of total fuel | x | x | x | x |
|  | **Pre - flight Preparation** |  |  |  |  |
|  | ***AIP and NOTAM Briefing*** |  |  |  |  |
|  | Ground facilities and services | x | x | x | x |
|  | Departure, destination and alternate aerodromes | x | x | x | x |
|  | Airway routings and airspace structure | x | x | x | x |
|  | ***Meteorological Briefing*** |  |  |  |  |
|  | Extraction and analysis of relevant data from meteorological documents | x | x | x | x |
|  | **ICAO Flight Plan *( ATS Flight Plan)*** |  |  |  |  |
|  | ***Individual Flight Plan*** |  |  |  |  |
|  | Format of Flight Plan | x | x | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **7. 3** | **FLIGHT PLANNING and FLIGHT MONITORING** | PPL | Bridge Course | PPL | Bridge Course |
|  | Completion of the Flight Plan | x | x | x | x |
|  | Submission of the Flight Plan | x | x | x | x |
|  | **Flight Monitoring and in-flight Re- planning** |  |  |  |  |
|  | ***Flight Monitoring*** |  |  |  |  |
|  | Monitoring of track and time | x | x | x | x |
|  | In-flight fuel management | x | x | x | x |
|  | In-flight re-planning in case of deviation from planned data | x | x | x | x |
| **7. 4** | **PERFORMANCE : *Helicopters*** |  |  |  |  |
|  | **General** |  |  |  |  |
|  | ***Introduction*** |  |  |  |  |
|  | Stages of flight |  |  | x | x |
|  | Effect on performance of atmospheric, airport or heliport and helicopter conditions |  |  | x | x |
|  | **Applicability of Airworthiness Requirements** |  |  | x | x |
|  | ***Definitions and Terminology*** |  |  | x | x |
|  | ***Performance : SE Helicopters*** |  |  | x | x |
|  | Definitions of Terms :  *a ) masses ;*  *b ) velocities : v* ***x****, v* ***y*** *;*  *c ) velocity of best range and of maximum endurance ;*  *d ) power limitations ;*  *e ) altitudes.* |  |  | x | x |
|  | ***Take-off, Cruise and Performance*** |  |  |  |  |
|  | Use and interpretation of diagrams and tables :  a ) Take - off :  *1 ) take-off run and distance available ;*  *2 ) take-off and initial climb ;*  *3 ) effects of mass, wind and density altitude ;*  *4 ) effects of ground surface and gradient.*  b ) Landing :  *1 ) effects of mass, wind, density altitude and approach speed;*  *2 ) effects of ground surface and gradient.*  c ) In - flight :  *1 ) relationship between power required and power available;*  *2 ) performance diagram ;*  *3 ) effects of configuration, mass, temperature and altitude ;*  *4 ) reduction of performance during climbing turns ;*  *5 ) autorotation ;*  *6 ) adverse effects ( icing, rain and condition of the airframe )* |  |  | x | x |
| **8.** | **AIRCRAFT GENERAL KNOWLEDGE** | | | | |
| **8. 1** | **AIRFRAME and SYSTEMS, ELECTRICS,**  **POWERPLANT and EMERGENCY EQUIPMENT** |  |  |  |  |
|  | **System Design, Loads, Stresses, Maintenance** |  |  |  |  |
|  | Loads and combination loadings applied to an aircraft’s structure | x | x | x | x |
|  | **Airframe** |  |  |  |  |
|  | ***Wings, Tail Surfaces and Control Surfaces*** |  |  |  |  |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **8. 1** | **AIRFRAME and SYSTEMS, ELECTRICS,**  **POWERPLANT and EMERGENCY EQUIPMENT** | PPL | Bridge Course | PPL | Bridge Course |
|  | Design and Constructions | x | x |  |  |
|  | Structural components and materials | x | x |  |  |
|  | Stresses | x | x |  |  |
|  | Structural limitations | x | x |  |  |
|  | **Fuselage, Doors, Floor, Wind-screen and Windows** |  |  |  |  |
|  | Design and Constructions | x | x | x | x |
|  | Structural components and materials | x | x | x | x |
|  | Stresses | x | x | x | x |
|  | Structural limitations | x | x | x | x |
|  | **Flight and Control Surfaces** |  |  |  |  |
|  | Design and Constructions |  |  | x | x |
|  | Structural components and materials |  |  | x | x |
|  | Stresses and aero elastic vibrations |  |  | x | x |
|  | Structural limitations |  |  | x | x |
|  | **Hydraulics** |  |  |  |  |
|  | ***Hydromechanics : basic principles*** | x | x | x | x |
|  | Hydraulic Systems | x | x | x | x |
|  | Hydraulic fluids : types and characteristics, limitations | x | x | x | x |
|  | System components : design, operation, degraded modes of operation, indications and warnings | x | x | x | x |
|  | **Landing Gear, Wheels, Tyres and Brakes** |  |  |  |  |
|  | ***Landing Gear*** |  |  |  |  |
|  | Types and materials | x | x | x | x |
|  | ***Nose Wheel Steering : design and operation*** | x | x |  |  |
|  | ***Brakes*** |  |  |  |  |
|  | Types and materials | x | x | x | x |
|  | System components: design, operation, indications and warnings | x | x | x | x |
|  | ***Wheels and Tyres*** |  |  |  |  |
|  | Types and operational limitations | x | x | x | x |
|  | **Helicopter Equipments** |  |  | x | x |
|  | ***Flight Controls*** |  |  |  |  |
|  | Mechanical or powered | x | x | x | x |
|  | Control systems and mechanical | x | x | x | x |
|  | System components : design, operation, indications and warnings, degraded modes of operation and jamming | x | x | x | x |
|  | ***Secondary Flight Controls*** |  |  |  |  |
|  | System components : design, operation, degraded modes of operation, indications and warnings | x | x |  |  |
|  | **Anti-icing Systems** |  |  |  |  |
|  | Types and operation *( pitot and windshield )* | x | x | x | x |
|  | **Fuel System** |  |  |  |  |
|  | **Piston Engine** |  |  |  |  |
|  | System components : design, operation, degraded modes of operation, indications and warnings | x | x | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **8. 1** | **AIRFRAME and SYSTEMS, ELECTRICS,**  **POWERPLANT and EMERGENCY EQUIPMENT** | PPL | Bridge Course | PPL | Bridge Course |
|  | **Turbine Engine** |  |  |  |  |
|  | System components : design, operation, indications and warnings, degraded modes of operation, indications and warnings |  |  | x | x |
|  | **Electrics** |  |  |  |  |
|  | ***Electrics : general and definitions*** |  |  |  |  |
|  | Direct current : voltage, current, resistance, conductivity, Ohm’s law, power and work | x | x | x | x |
|  | Alternating current : voltage, current, amplitude, phase, frequency and resistance | x | x | x | x |
|  | Circuits : series and parallel | x | x | x | x |
|  | Magnetic field : effects in an electrical circuit | x | x | x | x |
|  | **Batteries** |  |  |  |  |
|  | Types, characteristics and limitations | x | x | x | x |
|  | Battery chargers, characteristics and limitations | x | x | x | x |
|  | ***Static Electricity : general*** |  |  |  |  |
|  | Basic principles | x | x | x | x |
|  | Static dischargers | x | x | x | x |
|  | Protection against interference | x | x | x | x |
|  | Lightning effects | x | x | x | x |
|  | ***Generation : production, distribution and use*** |  |  |  |  |
|  | DC Generation : types, design, operation, degraded modes of operation, indications and warnings | x | x | x | x |
|  | AC Generation : types, design, operation, degraded modes of operation, indications and warnings | x | x | x | x |
|  | ***Electric Components*** |  |  |  |  |
|  | Basic elements : basic principles of switches, circuit - - breakers and relays |  |  |  |  |
|  | ***Distribution*** |  |  |  |  |
|  | General :  *a ) bus bar, common earth and priority ;*  *b ) AC and DC comparison.* | x | x | x | x |
|  | **Piston Engines** |  |  |  |  |
|  | ***General*** |  |  |  |  |
|  | Types of internal combustion engine : basic principles and definitions | x | x | x | x |
|  | Engine : design, operation, components and materials | x | x | x | x |
|  | ***Fuel*** |  |  |  |  |
|  | Types, grades, characteristics and limitations | x | x | x | x |
|  | Alternate fuel : characteristics and limitations | x | x | x | x |
|  | ***Carburettor or Injection System*** |  |  |  |  |
|  | Carburettor : design, operation, degraded modes of operation, indications and warnings | x | x | x | x |
|  | Injection : design, operation, degraded modes of operation, indications and warnings | x | x | x | x |
|  | Icing | x | x | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **8. 1** | **AIRFRAME and SYSTEMS, ELECTRICS,**  **POWERPLANT and EMERGENCY EQUIPMENT** | PPL | Bridge Course | PPL | Bridge Course |
|  | ***Air Cooling Systems*** |  |  |  |  |
|  | Design, operation, degraded modes of operation, indications and warnings | x | x | x | x |
|  | ***Lubrication Systems*** |  |  |  |  |
|  | Lubricants : types, characteristics and limitations | x | x | x | x |
|  | Design, operation, degraded modes of operation, indications and warnings | x | x | x | x |
|  | ***Ignition Circuits*** |  |  |  |  |
|  | Design, operation, degraded modes of operation | x | x | x | x |
|  | ***Mixture*** |  |  |  |  |
|  | Definition, characteristic mixtures, control instruments, associated control levers and indications | x | x | x | x |
|  | **Propellers** |  |  |  |  |
|  | Definitions and general :  *a ) aerodynamic parameters ;*  *b ) types ;*  *c ) operating modes.* | x | x |  |  |
|  | Constant speed propeller : design, operation and system components | x | x |  |  |
|  | Propeller handling : associated control levers, degraded modes of operation, indications and warnings | x | x |  |  |
|  | **Performance and Engine Handling** |  |  |  |  |
|  | Performance : influence of engine parameters, influence of atmospheric conditions, limitations and power augmentation systems | x | x | x | x |
|  | Engine handling : power and mixture settings during various flight phases and operational limitations | x | x | x | x |
|  | **Turbine Engines** |  |  |  |  |
|  | Definitions |  |  | x | x |
|  | Coupled turbine engine : design, operation, components and materials |  |  | x | x |
|  | Free turbine engine : design, operation, components and materials |  |  | x | x |
|  | ***Fuel*** |  |  |  |  |
|  | Types, characteristics and limitations |  |  | x | x |
|  | ***Main Engine Components*** |  |  |  |  |
|  | Compressor :  *a ) types, design, operation, components and materials ;*  *b ) stresses and limitations ;*  *c ) stall, surge and means of prevention.* |  |  | x | x |
|  | Combustion chamber :  *a ) types, design, operation, components and materials ;*  *b ) stresses and limitations ;*  *c ) emission problems* |  |  | x | x |
|  | Turbine :  *a ) types, design, operation, components and materials ;*  *b ) stresses, creep and limitations.* |  |  | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **8. 1** | **AIRFRAME and SYSTEMS, ELECTRICS,**  **POWERPLANT and EMERGENCY EQUIPMENT** | PPL | Bridge Course | PPL | Bridge Course |
|  | Exhaust :  *a ) design, operation and materials ;*  *b ) noise reduction.* |  |  | x | x |
|  | Fuel control units : *types, operation and sensors.* |  |  | x | x |
|  | Helicopter air intake : *different types, design, operation, materials and optional equipments* |  |  | x | x |
|  | **Additional Components and Systems** |  |  |  |  |
|  | Helicopter additional components and systems : *lubrication system, ignition circuit, starter, accessory gearbox, free wheel units : design, operation and components* |  |  | x | x |
|  | **Performance Aspects** |  |  |  |  |
|  | Torque, performance aspects, engine handling and limitations:  *a ) engine ratings ;*  *b ) engine performance and limitations ;*  *c ) engine handling.* |  |  | x | x |
|  | **Protection and Detection Systems** |  |  |  |  |
|  | ***Fire Detection Systems*** |  |  |  |  |
|  | Operation and indications |  |  | x | x |
|  | **Miscellaneous Systems** |  |  |  |  |
|  | ***Rotor Design*** |  |  | x | x |
|  | ***Rotor Heads*** |  |  |  |  |
|  | ***Main Rotor*** |  |  | x | x |
|  | Types |  |  | x | x |
|  | Structural components and materials, stresses and structural limitations |  |  | x | x |
|  | Design and construction |  |  | x | x |
|  | Adjustment |  |  | x | x |
|  | ***Tail Rotor*** |  |  |  |  |
|  | Types |  |  | x | x |
|  | Structural components and materials, stresses and structural limitations |  |  |  |  |
|  | Design and construction |  |  | x | x |
|  | Adjustment |  |  | x | x |
|  | **Transmission** |  |  |  |  |
|  | ***Main Gear Box*** |  |  |  |  |
|  | Different types, design, operation and limitations |  |  | x | x |
|  | ***Rotor Brake*** |  |  |  |  |
|  | Different types, design, operation and limitations |  |  | x | x |
|  | ***Auxiliary Systems*** |  |  | x | x |
|  | ***Drive Shaft and Associated Installation*** |  |  | x | x |
|  | **Intermediate and Tail Gear Box** |  |  |  |  |
|  | Different types, design, operation and limitations |  |  | x | x |
|  | **Blades** |  |  |  |  |
|  | ***Main Rotor Blade*** |  |  |  |  |
|  | Design and construction |  |  | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **8. 1** | **AIRFRAME and SYSTEMS, ELECTRICS,**  **POWERPLANT and EMERGENCY EQUIPMENT** | PPL | Bridge Course | PPL | Bridge Course |
|  | Structural components and materials |  |  | x | x |
|  | Stresses |  |  | x | x |
|  | Structural Limitations |  |  | x | x |
|  | Adjustment |  |  | x | x |
|  | Tip shape |  |  | x | x |
|  | ***Tail Rotor Blade*** |  |  |  |  |
|  | Design and Construction |  |  | x | x |
|  | Structural components and materials |  |  | x | x |
|  | Stresses |  |  | x | x |
|  | Structural limitations |  |  | x | x |
|  | Adjustment |  |  | x | x |
| **8. 2** | **INSTRUMENTATION** |  |  |  |  |
|  | **Instrument and Indication Systems** |  |  |  |  |
|  | ***Pressure Gauge*** |  |  |  |  |
|  | Different types, design, operation, characteristics and accuracy | x | x | x | x |
|  | ***Temperature Sensing*** |  |  |  |  |
|  | Different types, design, operation, characteristics and accuracy | x | x | x | x |
|  | ***Fuel Gauge*** |  |  |  |  |
|  | Different types, design, operation, characteristics and accuracy | x | x | x | x |
|  | ***Flow Meter*** |  |  |  |  |
|  | Different types, design, operation, characteristics and accuracy | x | x | x | x |
|  | ***Position Transmitter*** |  |  |  |  |
|  | Different types, design, operation, characteristics and accuracy | x | x | x | x |
|  | ***Torque Meter*** |  |  |  |  |
|  | Design, operation, characteristics and accuracy | x | x | x | x |
|  | ***Tachometer*** |  |  |  |  |
|  | Design, operation, characteristics and accuracy | x | x | x | x |
|  | **Measurement of Aerodynamic Parameters** |  |  |  |  |
|  | ***Pressure Measurement*** |  |  |  |  |
|  | Static pressure, dynamic pressure, density and definitions | x | x | x | x |
|  | Design, operation, errors and accuracy | x | x | x | x |
|  | **Temperature Measurement : *Aeroplane*** |  |  |  |  |
|  | Design, operation, errors and accuracy | x | x |  |  |
|  | Displays | x | x |  |  |
|  | **Temperature Measurement : *Helicopter*** |  |  |  |  |
|  | Design, operation, errors and accuracy |  |  | x | x |
|  | Displays |  |  | x | x |
|  | ***Altimeter*** |  |  |  |  |
|  | Standard atmosphere | x | x | x | x |
|  | The different barometric references ( QNH, QFE and 1013.25 ) | x | x | x | x |
|  | Height, indicated altitude, true altitude, pressure altitude and density altitude | x | x | x | x |
|  | Design, operation, errors and accuracy | x | x | x | x |
|  | Displays | x | x | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **8. 2** | **INSTRUMENTATION** | PPL | Bridge Course | PPL | Bridge Course |
|  | ***Vertical Speed Indicator*** |  |  |  |  |
|  | Design, operation, errors and accuracy | x | x | x | x |
|  | Displays | x | x | x | x |
|  | ***Air Speed Indicator*** |  |  |  |  |
|  | The different speeds IAS, CAS, TAS : *definition, usage and relationships* | x | x | x | x |
|  | Design, operation, errors and accuracy | x | x | x | x |
|  | Displays | x | x | x | x |
|  | **Magnetism : *Direct Reading Compass*** |  |  |  |  |
|  | ***Earth Magnetic Field*** | x | x | x | x |
|  | ***Direct Reading Compass*** |  |  |  |  |
|  | Design, operation, data processing, accuracy and deviation | x | x | x | x |
|  | Turning and acceleration errors | x | x | x | x |
|  | ***Gyroscopic Instruments*** |  |  |  |  |
|  | ***Gyroscope :* *Basic Principles*** |  |  |  |  |
|  | Definitions and design | x | x | x | x |
|  | Fundamental properties | x | x | x | x |
|  | Drifts | x | x | x | x |
|  | ***Turn and Bank Indicator*** |  |  |  |  |
|  | Design, operation and errors | x | x | x | x |
|  | ***Attitude Indicator*** |  |  |  |  |
|  | Design, operation, errors and accuracy | x | x | x | x |
|  | ***Directional Gyroscope*** |  |  |  |  |
|  | Design, operation, errors and accuracy | x | x | x | x |
|  | **Communication Systems** |  |  |  |  |
|  | ***Transmission modes : VHF, HF and SATCOM*** |  |  |  |  |
|  | Principles, bandwidth, operational limitations and use | x | x | x | x |
|  | ***Voice Communication*** |  |  |  |  |
|  | Definitions, general and applications | x | x | x | x |
|  | **Alerting Systems and Proximity Systems** |  |  |  |  |
|  | ***Flight Warning Systems*** |  |  |  |  |
|  | Design, operation, indications and alarms | x | x | x | x |
|  | ***Stall Warning*** |  |  |  |  |
|  | Design, operation, indications and alarms | x | x |  |  |
|  | ***Radio - Altimeter*** |  |  |  |  |
|  | Design, operation, errors, accuracy and indications |  |  | x | x |
|  | ***Rotor or Engine over speed Alert System*** |  |  |  |  |
|  | Design, operation, displays and alarms |  |  | x | x |
|  | **Integrated Instruments : *Electronic Displays*** |  |  |  |  |
|  | ***Display Units*** |  |  |  |  |
|  | Design, different technologies and limitations | x | x | x | x |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **9.** | **NAVIGATION** | PPL | Bridge Course | PPL | Bridge Course |
| **9. 1** | **GENERAL NAVIGATION** |  |  |  |  |
|  | **Basics of Navigation** |  |  |  |  |
|  | ***The Solar System*** |  |  |  |  |
|  | Seasonal and apparent movements of the sun | x |  | x |  |
|  | ***The Earth*** |  |  |  |  |
|  | Great circle, small circle and rhumb line | x |  | x |  |
|  | Latitude and difference of latitude | x |  | x |  |
|  | Longitude and difference of longitude | x |  | x |  |
|  | Use of latitude and longitude co-ordinates to locate any specific position | x |  | x |  |
|  | ***Time and Time Conversions*** |  |  |  |  |
|  | Apparent time | x |  | x |  |
|  | UTC | x |  | x |  |
|  | LMT | x |  | x |  |
|  | Standard times | x |  | x |  |
|  | Dateline | x |  | x |  |
|  | Definition of sunrise, sunset and civil twilight | x |  | x |  |
|  | ***Directions*** |  |  |  |  |
|  | True north, magnetic north and compass north | x |  | x |  |
|  | Compass deviation | x |  | x |  |
|  | Magnetic poles, isogonals, relationship between true and magnetic | x |  | x |  |
|  | ***Distance*** |  |  |  |  |
|  | Units of distance and height used in navigation : *nautical miles, statute miles, kilometres, metres and ft.* | x |  | x |  |
|  | Conversion from one unit to another | x |  | x |  |
|  | Relationship between nautical miles and minutes of latitude and minutes of longitude |  |  |  |  |
|  | **Magnetism and Compasses** |  |  |  |  |
|  | ***General Principles*** |  |  |  |  |
|  | Terrestrial magnetism | x |  | x |  |
|  | Resolution of the earth’s total magnetic force into vertical and horizontal components | x |  | x |  |
|  | Variation - annual change | x |  | x |  |
|  | ***Aircraft Magnetism*** |  |  |  |  |
|  | The resulting magnetic fields | x |  | x |  |
|  | Keeping magnetic materials clear of the compass | x |  | x |  |
|  | **Charts** |  |  |  |  |
|  | ***General Properties of Miscellaneous Types of Projections*** |  |  |  |  |
|  | Direct Mercator | x |  | x |  |
|  | Lambert conformal conic | x |  | x |  |
|  | ***The Representation of Meridians, Parallels, Great***  ***Circles and Rhumb Lines*** |  |  |  |  |
|  | Direct Mercator | x |  | x |  |
|  | Lambert conformal conic | x |  | x |  |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **9. 1** | **GENERAL NAVIGATION** | PPL | Bridge Course | PPL | Bridge Course |
|  | ***The use of Current Aeronautical Charts*** |  |  |  |  |
|  | Plotting positions | x |  | x |  |
|  | Methods of indicating scale and relief  *( ICAO topographical chart )* | x |  | x |  |
|  | Conventional signs | x |  | x |  |
|  | Measuring tracks and distances | x |  | x |  |
|  | Plotting bearings and distances | x |  | x |  |
|  | **DR Navigation** |  |  |  |  |
|  | ***Basis of DR*** |  |  |  |  |
|  | Track | x |  | x |  |
|  | Heading *( compass, magnetic and true )* | x |  | x |  |
|  | Wind velocity | x |  | x |  |
|  | Air speed *( IAS, CAS and TAS )* | x |  | x |  |
|  | Ground speed | x |  | x |  |
|  | ETA | x |  | x |  |
|  | Drift and wind correction angle | x |  | x |  |
|  | DR position fix | x |  | x |  |
|  | ***Use of the Navigational Computer*** |  |  |  |  |
|  | Speed | x |  | x |  |
|  | Time | x |  | x |  |
|  | Distance | x |  | x |  |
|  | Fuel consumption | x |  | x |  |
|  | Conversions | x |  | x |  |
|  | Air speed | x |  | x |  |
|  | Wind velocity | x |  | x |  |
|  | True altitude | x |  | x |  |
|  | ***The Triangle of Velocities*** |  |  |  |  |
|  | Heading | x |  | x |  |
|  | Ground speed | x |  | x |  |
|  | Wind velocity | x |  | x |  |
|  | Track and drift angle | x |  | x |  |
|  | ***Measurement of DR Elements*** |  |  |  |  |
|  | Calculation of altitude | x |  | x |  |
|  | Determination of appropriate speed | x |  | x |  |
|  | **In - Flight Navigation** |  |  |  |  |
|  | Use of visual observations and application to in-flight navigation | x |  | x |  |
|  | ***Navigation in Cruising Flight, use of Fixes to revise***  ***Navigation Data*** |  |  |  |  |
|  | Ground speed revision | x |  | x |  |
|  | Off - track corrections | x |  | x |  |
|  | Calculation of wind speed and direction | x |  | x |  |
|  | ETA revisions | x |  | x |  |
|  | ***Flight Log*** | x |  | x |  |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **9. 2** | **RADIO NAVIGATION** | PPL | Bridge Course | PPL | Bridge Course |
|  | **Basic Radio Propagation Theory** |  |  |  |  |
|  | ***Antennas*** |  |  |  |  |
|  | Characteristics | x |  | x |  |
|  | ***Wave Propagation*** |  |  |  |  |
|  | Propagation with the frequency bands | x |  | x |  |
|  | ***Radio Aids*** |  |  |  |  |
|  | ***Ground DF*** |  |  |  |  |
|  | Principles | x |  | x |  |
|  | Presentation and interpretation | x |  | x |  |
|  | Coverage | x |  | x |  |
|  | Range | x |  | x |  |
|  | Errors and accuracy | x |  | x |  |
|  | Factors affecting range and accuracy | x |  | x |  |
|  | ***NDB / ADF*** |  |  |  |  |
|  | Principles | x |  | x |  |
|  | Presentation and interpretation | x |  | x |  |
|  | Coverage | x |  | x |  |
|  | Range | x |  | x |  |
|  | Errors and accuracy | x |  | x |  |
|  | Factors affecting range and accuracy | x |  | x |  |
|  | ***VOR*** |  |  |  |  |
|  | Principles | x |  | x |  |
|  | Presentation and interpretation | x |  | x |  |
|  | Coverage | x |  | x |  |
|  | Range | x |  | x |  |
|  | Errors and accuracy | x |  | x |  |
|  | Factors affecting range and accuracy | x |  | x |  |
|  | ***DME*** |  |  |  |  |
|  | Principles | x |  | x |  |
|  | Presentation and interpretation | x |  | x |  |
|  | Coverage | x |  | x |  |
|  | Range | x |  | x |  |
|  | Errors and accuracy | x |  | x |  |
|  | Factors affecting range and accuracy | x |  | x |  |
|  | **Radar** |  |  |  |  |
|  | ***Ground Radar*** |  |  |  |  |
|  | Principles | x |  | x |  |
|  | Presentation and interpretation | x |  | x |  |
|  | Coverage | x |  | x |  |
|  | Range | x |  | x |  |
|  | Errors and accuracy | x |  | x |  |
|  | Factors affecting range and accuracy | x |  | x |  |

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| **N 0** |  | **Aeroplane** | | **Helicopter** | |
| **9. 2** | **RADIO NAVIGATION** | PPL | Bridge Course | PPL | Bridge Course |
|  | ***Secondary Surveillance Radar and Transponder*** |  |  |  |  |
|  | Principles | x |  | x |  |
|  | Presentation and interpretation | x |  | x |  |
|  | Modes and codes | x |  | x |  |
|  | **GNSS** |  |  |  |  |
|  | ***GPS, GLONASS or GALILEO*** |  |  |  |  |
|  | Principles | x |  | x |  |
|  | Operation | x |  | x |  |
|  | Errors and accuracy | x |  | x |  |
|  | Factors affecting range and accuracy | x |  | x |  |
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***AMC 2.* FCL. 210 ; FCL. 215**

*SYLLABUS of THEORETICAL KNOWLEDGE for the PPL ( AS )*

The following Table contains the syllabi for the courses of theoretical knowledge, as well as for the theoretical knowledge examinations for the PPL(As). The training and examination should cover aspects related to non-technical skills in an integrated manner, taking into account the particular risks associated to the licence and the activity.

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| **N0** |  | **PPL** |
| **1.** | **AIR LAW and ATC PROCEDURES** | |
|  | International Law : *conventions, agreements and organizations* | **x** |
|  | Airworthiness of aircraft | **x** |
|  | Aircraft nationality and registration marks | **x** |
|  | Personnel licensing | **x** |
|  | Rules of the Air | **x** |
|  | Procedures for air navigation services : *aircraft operations* | **x** |
|  | Air Traffic Services and Air Traffic Management | **x** |
|  | Aeronautical Information Service | **x** |
|  | Aerodromes | **x** |
|  | Search and Rescue | **x** |
|  | Security | **x** |
|  | Aircraft Accident and Incident Investigation | **x** |
|  | National Law | **x** |
| **2.** | **HUMAN PERFORMANCE** | |
|  | Human factors : *basic concepts* | **x** |
|  | Basic aviation physiology and health maintenance | **x** |
|  | Basic aviation psychology | **x** |

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| **N0** |  | **PPL** |
| **3.** | **METEOROLOGY** | |
|  | The atmosphere | **x** |
|  | Wind | **x** |
|  | Thermodynamics | **x** |
|  | Clouds and fog | **x** |
|  | Precipitation | **x** |
|  | Air masses and fronts | **x** |
|  | Pressure systems | **x** |
|  | Climatology | **x** |
|  | Flight hazards | **x** |
|  | Meteorological information | **x** |
| **4.** | **COMMUNICATIONS** | |
|  | ***VFR Communications*** |  |
|  | Definitions | **x** |
|  | General operating procedures | **x** |
|  | Relevant weather information terms *( VFR )* | **x** |
|  | Action required to be taken in case of communication failure | **x** |
|  | Distress and urgency procedures | **x** |
|  | General principles of VHF propagation and allocation of frequencies | **x** |
| **5.** | **PRINCIPLES of FLIGHT** | |
|  | Basics of aerostatics | **x** |
|  | Basics of subsonic aerodynamics | **x** |
|  | Aerodynamics of airships | **x** |
|  | Stability | **x** |
|  | Controllability | **x** |
|  | Limitations | **x** |
|  | Propellers | **x** |
|  | Basics of airship flight mechanics | **x** |
| **6.** | **OPERATIONAL PROCEDURES** | |
|  | General requirements | **x** |
|  | Special operational procedures and hazards *( general aspects )* | **x** |
|  | Emergency procedures | **x** |
| **7.** | **FLIGHT PERFORMANCE and PLANNING** | |
| **7. 1** | **MASS and BALANCE** |  |
|  | Purpose of mass and balance considerations | **x** |
|  | Loading | **x** |
|  | Fundamentals of CG calculations | **x** |
|  | Mass and balance details of aircraft | **x** |
|  | Determination of CG position | **x** |
|  | Passenger, cargo and ballast handling | **x** |
| **7. 2** | **PERFORMANCE** |  |
|  | Airworthiness requirements | **x** |
|  | Basics of airship performance | **x** |
|  | Definitions and terms | **x** |
|  | Stages of flight | **x** |
|  | Use of flight manual | **x** |
| **7. 2** | **FLIGHT PLANNING and FLIGHT MONITORING** |  |
|  | Flight planning for VFR flights | **x** |
|  | Fuel planning | **x** |
|  | Pre - flight preparation | **x** |
|  | ATS Flight Plan | **x** |
|  | Flight monitoring and in - flight re - planning | **x** |

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| **N0** |  | **PPL** |
| **8.** | **AIRCRAFT GENERAL KNOWLEDGE** | |
| **8. 1** | **ENVELOPE, AIRFRAME and SYSTEMS, ELECTRICS, POWERPLANT and**  **EMERGENCY EQUIPMENT** |  |
|  | Design, materials, loads and stresses | **x** |
|  | Envelope and airbags | **x** |
|  | Framework | **x** |
|  | Gondola | **x** |
|  | Flight controls | **x** |
|  | Landing gear | **x** |
|  | Hydraulics and pneumatics | **x** |
|  | Heating and air conditioning | **x** |
|  | Fuel system | **x** |
|  | Piston engines *( propellers )* | **x** |
|  | Turbine engines *( basics )* | **x** |
|  | Electrics | **x** |
|  | Fire protection and detection systems | **x** |
|  | Maintenance | **x** |
| **8. 2** | **INSTRUMENTATION** |  |
|  | Sensors and instruments | **x** |
|  | Measurement of air data and gas parameters | **x** |
|  | Magnetism : *direct reading compass and flux valve* | **x** |
|  | Gyroscopic instruments | **x** |
|  | Communication systems | **x** |
|  | Alerting systems | **x** |
|  | Integrated instruments : *electronic displays* | **x** |
|  | Flight management system *( general basics )* | **x** |
|  | Digital circuits and computers | **x** |
| **9.** | **NAVIGATION** | |
| **9. 1** | **GENERAL NAVIGATION** |  |
|  | Basics of navigation | **x** |
|  | Magnetism and compasses | **x** |
|  | Charts | **x** |
|  | DR navigation | **x** |
|  | In - flight navigation | **x** |
| **9. 2** | **RADIO NAVIGATION** |  |
|  | Basic radio propagation theory | **x** |
|  | Radio aids | **x** |
|  | Radar | **x** |
|  | GNSS | **x** |
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***AMC 3.* FCL. 210 ; FCL. 215**

*SYLLABUS of THEORETICAL KNOWLEDGE for the BPL and SPL*

The syllabi for the theoretical knowledge instruction and examination for the LAPL ( B ) and LAPL ( S ) in AMC 1. FCL. 115 and FCL. 120 should be used for the BPL and SPL, respectively.

***AMC 1.* FCL. 215 ; FCL. 235**

*THEORETICAL KNOWLEDGE EXAMINATION and SKILL TEST for the PPL ( A )*

*a ) Theoretical Knowledge Examination :*

1 ) The examinations should comprise a total of 120 multiple-choice questions covering all the subjects ;

2 ) Communication practical classroom testing may be conducted ;

3 ) The period of 18 months mentioned in FCL. 025 ( b )( 2 ) should be counted from the end of the calendar month when the applicant first attempted an examination.

*b ) Skill Test :*

Further training may be required following any failed skill test or part thereof. There should be no limit to the number of skill tests that may be attempted ;

*c ) Conduct of the Test :*

1 ) If the applicant chooses to terminate a skill test for reasons considered inadequate by the FE, the applicant should retake the entire skill test. If the test is terminated for reasons considered adequate by the FE, only those sections not completed should be tested in a further flight ;

2 ) Any maneuver or procedure of the test may be repeated once by the applicant. The FE may stop the test at any stage if it is considered that the applicant’s demonstration of flying skill requires a complete retest ;

3 ) An applicant should be required to fly the aircraft from a position where the PIC functions can be performed and to carry out the test as if there is no other crew member. Responsibility for the flight should be allocated in accordance with national regulations.

***AMC 1.* FCL. 235 Skill Test**

*CONTENTS of the SKILL TEST for the ISSUE of a PPL ( A )*

a ) The route to be flown for the navigation test should be chosen by the FE. The route may end at the aerodrome of departure or at another aerodrome. The applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board. The navigation section of the test should have a duration that allows the pilot to demonstrate his / her ability to complete a route with *at least* ***3***  *( three ) identified waypoints* and may, as agreed between the applicant and FE, be flown as a separate test ;

b ) An applicant should indicate to the FE the checks and duties carried out, including the identification of radio facilities. Checks should be completed in accordance with the authorized checklist for the aeroplane on which the test is being taken. During pre-flight preparation for the test the applicant should be required to determine power settings and speeds. Performance data for take-off, approach and landing should be calculated by the applicant in compliance with the operations manual or flight manual for the aeroplane used.

FLIGHT TEST TOLERANCE

c ) The applicant should demonstrate the ability to :

1 ) operate the aeroplane within its limitations ;

2 ) complete all maneuvers with smoothness and accuracy ;

3 ) exercise good judgment and airmanship ;

4 ) apply aeronautical knowledge ;

5 ) maintain control of the aeroplane at all times in such a manner that the successful outcome of a procedure or maneuver is never seriously in doubt.

d ) The following limits are for general guidance. The FE should make allowance for turbulent conditions and the handling qualities and performance of the aeroplane used :

1 ) **Height :**

( i ) normal flight ± **150** ft

( ii ) with simulated engine failure ± **200**  ft *( if ME aeroplane is used )* ;

2 ) **Heading or Tracking of Radio Aids** :

( i ) normal flight ± **10** °

( ii ) with simulated engine failure ± **15** ° *( if ME aeroplane is used ) ;*

3 ) **Speed** :

( i ) take-off and approach + **15** / – **5** knots

( ii ) all other flight regimes ± **15** knots.

CONTENT of the SKILL TEST

e ) The skill test contents and sections set out in this AMC should be used for the skill test for the issue of a PPL ( A ) on SE and ME aeroplanes or on TMGs.

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| **SECTION 1. PRE - FLIGHT OPERATIONS and DEPARTURE** | |
| *Use of Checklist, Airmanship, control of aeroplane by external visual reference,*  *anti / de-icing procedures, etc.. , apply in all sections.* | |
| **a** | Pre-flight documentation, NOTAM and weather briefing |
| **b** | Mass and balance and performance calculation |
| **c** | Aeroplane inspection and servicing |
| **d** | Engine starting and after starting procedures |
| **e** | Taxiing and aerodrome procedures, pre-take-off procedures |
| **f** | Take-off and after take-off checks |
| **g** | Aerodrome departure procedures |
| **h** | ATC compliance and R / T procedures |
| **SECTION 2. GENERAL AIRWORK** | |
| **a** | ATC compliance and R / T procedures |
| **b** | Straight and level flight, with speed changes |
| **c** | Climbing : *i. best rate of climb ;*  *ii. climbing turns ;*  *iii. leveling off.* |
| **d** | Medium *(* ***30 °***  *bank )* turns |
| **e** | Steep *(* ***45 °*** *bank )* turns *( including recognition and recovery from a spiral dive )* |
| **f** | Flight at critically low air speed with and without flaps |
| **g** | Stalling : *i. clean stall and recover with power ;*  *ii. approach to stall descending turn with bank angle 200, approach configuration ;*  *iii. approach to stall in landing configuration.* |
| **h** | Descending : *i. with and without power ;*  *ii. descending turns (steep gliding turns);*  *iii. leveling off.* |

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| **SECTION 3. EN - ROUTE PROCEDURES** | |
| **a** | Flight plan, dead reckoning and map reading |
| **b** | Maintenance of altitude, heading and speed |
| **c** | Orientation, timing and revision of ETAs and log keeping |
| **d** | Diversion to alternate aerodrome *( planning and implementation )* |
| **e** | Use of radio navigation aids |
| **f** | Basic instrument flying check *(* ***180 °*** *turn in simulated IMC )* |
| **g** | Flight management *( checks, fuel systems and carburettor icing, etc.. )* |
| **h** | ATC compliance and R / T procedures |
| **SECTION 4. APPROACH and LANDING PROCEDURES** | |
| **a** | Aerodrome arrival procedures |
| **b** | **\*** Precision landing *( short field landing ),* crosswind, if suitable conditions available |
| **c** | **\*** Flapless landing |
| **d** | **\*** Approach to landing with idle power *(* ***SE***  *only )* |
| **e** | Touch and Go |
| **f** | Go - around from low height |
| **g** | ATC compliance and R / T procedures |
| **h** | Actions after flight |
| **SECTION 5. ABNORMAL and EMERGENCY PROCEDURES** | |
| This section may be combined with *Sections* ***1*** *through* ***4*** | |
| **a** | Simulated engine failure after Take - off *(* ***SE*** *only )* |
| **b** | **\*** Simulated forced landing *(* ***SE*** *only )* |
| **c** | Simulated precautionary landing *(* ***SE***  *only )* |
| **d** | Simulated emergencies |
| **e** | Oral questions |
| **SECTION 6. SIMULATED ASYMMETRIC FLIGHT and RELEVANT**  **CLASS or TYPE ITEMS** | |
| This section may be combined with *Sections* ***1*** *through* ***5*** | |
| **a** | Simulated engine failure during Take-off *( at a safe altitude unless carried out in an FFS )* |
| **b** | Asymmetric approach and go - around |
| **c** | Asymmetric approach and full stop landing |
| **d** | Engine shutdown and restart |
| **e** | ATC compliance, R / T procedures or airmanship |
| **f** | As determined by the FE : any relevant items of the Class or Type Rating Skill Test to include, *if applicable* :  *i. aeroplane systems including handling of auto pilot ;*  *ii. operation of pressurization system ;*  *iii. use of de-icing and anti-icing system.* |
| **g** | Oral questions |

***\**** *These items may be combined, at the discretion of the FE.*

***AMC 2.* FCL. 235 Skill Test**

*CONTENTS of the SKILL TEST for the ISSUE of a PPL ( H )*

a ) The area and route to be flown should be chosen by the FE and all low level and hover work should be at an adequate aerodrome or site. Routes used for Section 3 may end at the aerodrome of departure or at another aerodrome.

The applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board. The navigation section of the test, as set out in this AMC should consist of *at least* ***3*** *( three ) legs*, each leg of *a minimum duration of* ***10*** *minutes*.

The Skill Test may be conducted in two flights ;

b ) An applicant should indicate to the FE the checks and duties carried out, including the identification of radio facilities. Checks should be completed in accordance with the authorized checklist or pilot operating handbook for the helicopter on which the test is being taken. During pre-flight preparation for the test the applicant is required to determine power settings and speeds. Performance data for take-off, approach and landing should be calculated by the applicant in compliance with the operations manual or flight manual for the helicopter used.

FLIGHT TEST TOLERANCE

c ) The applicant should demonstrate the ability to :

1 ) operate the helicopter within its limitations ;

2 ) complete all manoeuvres with smoothness and accuracy ;

3 ) exercise good judgement and airmanship ;

4 ) apply aeronautical knowledge ;

5 ) maintain control of the helicopter at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt ;

d ) The following limits are for general guidance. The FE should make allowance for turbulent conditions and the handling qualities and performance of the helicopter used.

1 ) **Height :**

( i ) normal flight ± **150** ft

( ii ) with simulated major emergency ± **200**  ft

( iii ) hovering IGE flight ± **2** ft

2 ) **Heading or Tracking of Radio Aids** :

( i ) normal flight ± **10** °

( ii ) with simulated major emergency ± **15** °

3 ) **Speed** :

( i ) take-off and approach + **15** / – **10** knots

( ii ) all other flight regimes ± **15** knots.

4 ) **Ground Drift** :

( i ) Take - off hover IGE ± **3** ft

( ii ) Landing no sideways or backwards movement

CONTENT of the SKILL TEST

e ) The skill test contents and sections set out in this AMC should be used for the skill test for the issue of a PPL ( H ) on SE or ME helicopters.

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| **SECTION 1. PRE - FLIGHT or POST - FLIGHT CHECKS and PROCEDURES** | | |
| *Use of Checklist, Airmanship, control of helicopter by external visual reference,*  *anti - icing procedures, etc.. , apply in all sections.* | | |
| **a** | Helicopter knowledge, *( for example technical log, fuel, mass and balance, performance ),*  flight planning, NOTAM and weather briefing | |
| **b** | Pre - flight inspection or action, location of parts and purpose | |
| **c** | Cockpit inspection and starting procedure | |
| **d** | Communication and navigation equipment checks, selecting and setting frequencies | |
| **e** | Pre - Take - off procedure, R / T procedure and ATC compliance | |
| **f** | Parking, shutdown and post - flight procedure | |
| **SECTION 3. HOVER MANOEUVRES, ADVANCED HANDLING and**  **CONFINED AREAS** | | |
| **a** | Take - off and landing *( lift - off and touch down )* | |
| **b** | Taxi and hover taxi | |
| **c** | Stationary hover with head, cross or tail wind | |
| **d** | Stationary hover turns, 360 ° left and right *( spot turns )* | |
| **e** | Forward, sideways and backwards hover manoeuvring | |
| **f** | Simulated engine failure from the hover | |
| **g** | Quick stops into and downwin | |
| **h** | Sloping ground or unprepared sites landings and take - offs | |
| **i** | Take - offs *( various profiles )* | |
| **j** | Crosswind and downwind Take - off *( if practicable )* | |
| **k** | Take-off at maximum take - off mass *( actual or simulated )* | |
| **l** | Approaches *( various profiles )* | |
| **m** | Limited power take - off and landing | |
| **n** | Autorotations, *( FE to select two items from : basic, range, low speed and 360 ° turns )* | |
| **o** | Autorotative landing | |
| **p** | Practice forced landing with power recovery | |
| **q** | Power checks, reconnaissance technique, approach and departure technique | |
| **SECTION 2. NAVIGATION - EN - ROUTE PROCEDURES** | | |
| **a** | | Navigation and orientation at various altitudes or heights and map reading |
| **b** | | Altitude or height, speed, heading control, observation of airspace and altimeter setting |
| **c** | | Monitoring of flight progress, flight log, fuel usage, endurance, ETA, assessment of  track error and re-establishment of correct track and instrument monitoring |
| **d** | | Observation of weather conditions and diversion planning |
| **e** | | Use of navigation aids *( where available )* |
| **f** | | ATC liaison with due observance of regulations, etc.. . |
| **SECTION 4. FLIGHT PROCEDURES and MANOEUVRES** | | |
| **a** | | Level flight, control of heading, altitude or height and speed |
| **b** | | Climbing and descending turns to specified headings |
| **c** | | Level turns with up to 30 ° bank, 180 ° to 360 ° left and right |
| **d** | | Level turns 180 ° left and right by sole reference to instruments |

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| **SECTION 5. ABNORMAL and EMERGENCY PROCEDURES**  **( Simulated where Appropriate )** | |
| ***Note (1)*** *where the test is conducted on an ME helicopter, a simulated engine failure*  *drill, including an SE approach and landing should be included in the test.*  ***Note ( 2 )*** *the FE should select four items from the following :* | |
| **a** | Engine malfunctions, including governor failure, carburettor or engine icing and oil system, as appropriate |
| **b** | Fuel system malfunction |
| **c** | Electrical system malfunction |
| **d** | Hydraulic system malfunction, including approach and landing without hydraulics, as applicable |
| **e** | Main rotor or anti-torque system malfunction *( FFS or discussion only )* |
| **f** | Fire drills, including smoke control and removal, as applicable |
| **g** | Other abnormal and emergency procedures as outlined in an appropriate flight manual and with reference to Appendix 9 C to Part - FCL, Sections 3 and 4, including for ME helicopters :  *a ) Simulated engine failure at Take - off :*  *1 ) rejected take-off at or before TDP or safe forced landing at or before DPATO ;*  *2 ) shortly after TDP or DPATO.*  *b ) Landing with simulated engine failure :*  *1 ) landing or go-around following engine failure before LDP or DPBL ;*  *2 ) following engine failure after LDP or safe forced landing after DPBL.* |
|  |  |

***AMC 3.* FCL. 235 Skill Test**

*CONTENT of the SKILL TEST for the ISSUE of the PPL ( AS )*

a ) The area and route to be flown is chosen by the FE. Routes used for section 3 may end at the aerodrome of departure or at another aerodrome and one destination should be a controlled aerodrome. The skill test may be conducted in two flights. The total duration of the flight(s) should be at least 60 minutes ;

b ) The applicant should demonstrate the ability to :

1 ) operate the airship within its limitations ;

2 ) complete all manoeuvres with smoothness and accuracy ;

3 ) exercise good judgement and airmanship ;

4 ) apply aeronautical knowledge ;

5 ) maintain control of the airship at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

FLIGHT TEST TOLERANCES

c ) The following limits should apply, corrected to make allowance for turbulent conditions and the handling qualities and performance of the airship used :

1 ) Height : ( i ) normal flight ± **200**  ft

( ii ) simulated major emergency ± **300** ft

2 ) Tracking on Radio Aids : ± **15 °**

3 ) Heading : ( i ) normal flight ± 15 °

( ii ) simulated major emergency ± **20 °**

CONTENT of the TEST

d ) The skill test contents and sections set out in this AMC should be used for the skill test for the issue of a PPL ( As ) ;

e ) Items in sections 5 and 6 may be performed in an FNPT ( As ) or a FS ( As ).

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| **SECTION 1. PRE - FLIGHT OPERATIONS and DEPARTURE** | |
| *Use of airship Checklists, Airmanship, control of airship by external visual reference, anti-icing procedures, and principles of threat and error management, etc.. apply in all Sections* | |
| **a** | Pre - flight, including : *flight planning, documentation, mass and balance, NOTAM and weather briefing* |
| **b** | Airship inspection and servicing |
| **c** | Off-mast procedure, ground manoeuvring and take-off |
| **d** | Performance considerations and trim |
| **e** | Aerodrome and traffic pattern operations |
| **f** | Departure procedure, altimeter setting, collision avoidance *( look-out )* |
| **g** | ATC compliance and R / T procedures |
| **SECTION 2. GENERAL AIRWORK** | |
| **a** | Control of the airship by external visual reference, including straight and level, climb, descent and look-out |
| **b** | Flight close to pressure height |
| **c** | Turns |
| **d** | Steep descents and climbs |
| **e** | Flight by reference solely to instruments, including :  i. Level flight, control of heading, altitude and air speed ;  ii. Climbing and descending turns ;  iii. Recoveries from unusual attitudes. |
| **f** | ATC compliance and R / T procedures |
| **SECTION 3. EN - ROUTE PROCEDURES** | |
| **a** | Flight Plan, dead reckoning and map reading |
| **b** | Maintenance of altitude, heading and speed and collision avoidance *( look-out procedures )* |
| **c** | Orientation, timing and revision of ETAs and log keeping |
| **d** | Observation of weather conditions and diversion to alternate aerodrome *( planning and implementation )* |
| **e** | Use of radio navigation aids |
| **f** | Flight management *( checks, fuel systems, etc.. )* |
| **g** | ATC compliance and R / T procedures |
| **SECTION 4. APPROACH and LANDING PROCEDURES** | |
| **a** | Aerodrome arrival procedures, altimeter setting, checks and look-out |
| **b** | ATC compliance and R / T procedures |
| **c** | Go - around action |
| **d** | Normal landing |
| **e** | Short field landing |
| **f** | Post - flight actions |
| **SECTION 5. ABNORMAL and EMERGENCY PROCEDURES** | |
| *This Section may be combined with Sections* ***1*** *through* ***4*** | |
| **a** | Simulated engine failure after take-off *( at a safe altitude )* and fire drill |
| **b** | Equipment malfunctions |
| **c** | Forced landing *( simulated )* |
| **d** | ATC compliance and R / T procedures |
| **e** | Oral questions |

|  |  |
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| **SECTION 6. RELEVANT TYPE ITEMS** | |
| *This Section may be combined with Sections* ***1***  *through* ***5*** | |
| **a** | Simulated engine failure during take-off *( at a safe altitude unless carried out in a FFS )* |
| **b** | Approach and go-around with failed engine(s) |
| **c** | Approach and full stop landing with failed engine(s) |
| **d** | Malfunctions in the envelope pressure system |
| **e** | ATC compliance and R / T procedures and Airmanship |
| **f** | As determined by the FE : any relevant items of the type rating skill test to include, if applicable :  i. *Airship systems ;*  ii. *Operation of envelope pressure system.* |
| **g** | Oral questions |
|  |  |
|  |  |

***AMC 1.* FCL. 210. A PPL ( A ) - Experience Requirements and Crediting**

*FLIGHT INSTRUCTION for the PPL ( A )*

*a ) Entry to Training :*

Before being accepted for training an applicant should be informed that the appropriate medical certificate must be obtained before solo flying is permitted ;

*b ) Flight Instruction :*

1 ) The PPL( A ) flight instruction syllabus takes into account the principles of threat and error management and also covers :

( i ) pre-flight operations, including mass and balance determination, aircraft inspection and servicing ;

( ii ) aerodrome and traffic pattern operations, collision avoidance precautions and procedures;

( iii ) control of the aircraft by external visual reference ;

( iv ) flight at critically low air speeds, recognition of, and recovery from, incipient and full stalls ;

( v ) flight at critically high air speeds, recognition of, and recovery from, spiral dive ;

( vi ) normal and crosswind take-offs and landings ;

( vii ) maximum performance *( short field and obstacle clearance )* take- offs, short-field landings ;

( viii ) flight by reference solely to instruments, including the completion of a level 180 ° turn;

( ix ) cross-country flying using visual reference, dead reckoning and radio navigation aids ;

( x ) emergency operations, including simulated aeroplane equipment malfunctions ;

( xi ) operations to, from and transiting controlled aerodromes, compliance with air traffic services procedures, communication procedures and phraseology.

2 ) Before allowing the applicant for a PPL( A ) to undertake his / her first solo flight, the FI should ensure that the applicant can use R / T communication.

*c ) Syllabus of Flight Instruction :*

1 ) The numbering of exercises should be used primarily as an exercise reference list and as a broad instructional sequencing guide ; therefore the demonstrations and practices need not necessarily be given in the order listed. The actual order and content will depend upon the following interrelated factors :

( i ) the applicant’s progress and ability ;

( ii ) the weather conditions affecting the flight ;

( iii ) the flight time available ;

( iv ) instructional technique considerations ;

( v ) the local operating environment ;

( vi ) applicability of the exercises to the aeroplane.

2 ) Each of the exercises involves the need for the applicant to be aware of the needs of good airmanship and look-out, which should be emphasized at all times.

**( i ) Exercise 1 a :** *Familiarization with the Aeroplane :*

(A) characteristics of the aeroplane ;

(B) cockpit layout ;

(C) systems ;

(D) checklists, drills and controls.

**( ii ) Exercise 1 b :** *Emergency Drills :*

(A) action if fire on the ground and in the air ;

(B) engine cabin and electrical system fire ;

(C) systems failure ;

(D) escape drills, location and use of emergency equipment and exits.

**( iii ) Exercise 2 :** *Preparation for and Action after Flight :*

(A) flight authorization and aeroplane acceptance ;

(B) serviceability documents ;

(C) equipment required, maps, etc. ;

(D) external checks ;

(E) internal checks ;

(F) harness, seat or rudder panel adjustments ;

(G) starting and warm-up checks ;

(H) power checks ;

(I) running down system checks and switching off the engine ;

(J) parking, security and picketing ( for example tie down ) ;

(K) completion of authorization sheet and serviceability documents.

**( iv ) Exercise 3 :** *Air Experience : Flight Exercise.*

**( v ) Exercise 4 :** *Effects of Controls :*

(A) primary effects when laterally level and when banked ;

(B) further effects of aileron and rudder ;

(C) effects of :

*(a) air speed ;*

*(b) slipstream ;*

*(c) power ;*

*(d) trimming controls ;*

*(e) flaps ;*

*(f) other controls, as applicable.*

(D) operation of :

*(a) mixture control ;*

*(b) carburettor heat ;*

*(c) cabin heating or ventilation.*

**( vi ) Exercise 5 a :** *Taxiing :*

(A) pre - taxi checks ;

(B) starting, control of speed and stopping ;

(C) engine handling ;

(D) control of direction and turning ;

(E) turning in confined spaces ;

(F) parking area procedure and precautions ;

(G) effects of wind and use of flying controls ;

(H) effects of ground surface ;

(I) freedom of rudder movement ;

(J) marshalling signals ;

(K) instrument checks ;

(L) air traffic control procedures.

**( vii ) Exercise 5 b :** *Emergencies : brake and steering failure.*

**( viii ) Exercise 6 :** *Straight and Level :*

(A) at normal cruising power, attaining and maintaining straight and level flight ;

(B) flight at critically high air speeds ;

(C) demonstration of inherent stability ;

(D) control in pitch, including use of trim ;

(E) lateral level, direction and balance and trim ;

(F) at selected air speeds *( use of power ) ;*

(G) during speed and configuration changes ;

(H) use of instruments for precision.

**( ix ) Exercise 7 :** *Climbing :*

(A) entry, maintaining the normal and max rate climb and leveling off ;

(B) leveling off at selected altitudes ;

(C) en-route climb *( cruise climb )* ;

(D) climbing with flap down ;

(E) recovery to normal climb ;

(F) maximum angle of climb ;

(G) use of instruments for precision.

**( x ) Exercise 8 :**  *Descending :*

(A) entry, maintaining and leveling off ;

(B) leveling off at selected altitudes ;

(C) glide, powered and cruise descent *( including effect of power and air speed ) ;*

(D) side slipping *( on suitable types ) ;*

(E) use of instruments for precision flight.

**( xi ) Exercise 9 :** *Turning :*

(A) entry and maintaining medium level turns ;

(B) resuming straight flight ;

(C) faults in the turn *( for example in correct pitch, bank and balance ) ;*

(D) climbing turns ;

(E) descending turns ;

(F) faults in the turns ( slipping and skidding on suitable types ) ;

(G) turns onto selected headings, use of gyro heading indicator and compass ;

(H) use of instruments for precision.

**( xii ) Exercise 10 a :** *Slow Flight :*

***Note :*** *the objective is to improve the student’s ability to recognize inadvertent flight at critically low speeds and provide practice in maintaining the aeroplane in balance while returning to normal air speed.*

(A) safety checks ;

(B) introduction to slow flight ;

(C) controlled flight down to critically slow air speed ;

(D) application of full power with correct attitude and balance to achieve normal climb speed.

**( xiii ) Exercise 10 b :** *Stalling :*

(A) safety checks ;

(B) symptoms ;

(C) recognition ;

(D) clean stall and recovery without power and with power ;

(E) recovery when a wing drops ;

(F) approach to stall in the approach and in the landing configurations, with and without

power and recovery at the incipient stage.

**( xiv ) Exercise 11 :**  *Spin Avoidance :*

(A) safety checks ;

(B) stalling and recovery at the incipient spin stage *( stall with excessive wing drop,*

*about 45 ° ) ;*

(C) instructor induced distractions during the stall.

***Note 1:*** *at least two hours of stall awareness and spin avoidance flight training should*

*be completed during the course.*

***Note 2 :*** *consideration of manoeuvre limitations and the need to refer to the aeroplane*

*manual and mass and balance calculations.*

**( xv ) Exercise 12 :** *Take-off and Climb to Downwind Position :*

(A) pre-take-off checks ;

(B) into wind take-off ;

(C) safeguarding the nose wheel ;

(D) crosswind take-off ;

(E) drills during and after take-off ;

(F) short take-off and soft field procedure / techniques including performance calculations ;

(G) noise abatement procedures.

**( xvi ) Exercise 13 :** *Circuit, Approach and Landing :*

(A) circuit procedures, downwind and base leg ;

(B) powered approach and landing ;

(C) safeguarding the nose wheel ;

(D) effect of wind on approach and touchdown speeds and use of flaps ;

(E) crosswind approach and landing ;

(F) glide approach and landing ;

(G) short landing and soft field procedures or techniques ;

(H) flapless approach and landing ;

(I) wheel landing *( tail wheel aeroplanes ) ;*

(J) missed approach and go-around ;

(K) noise abatement procedures.

**( xvii ) Exercise 12 / 13 :** *Emergencies :*

(A) abandoned take-off ;

(B) engine failure after take-off ;

(C) mislanding and go-around ;

(D) missed approach.

***Note :*** *in the interests of safety it will be necessary for pilots trained on nose wheel*

*aeroplanes to undergo dual conversion training before flying tail wheel aeroplanes,*

*and vice-versa.*

**( xviii ) Exercise 14 :** *First Solo :*

(A) instructor’s briefing, observation of flight and de-briefing ;

***Note :*** *during flights immediately following the solo circuit consolidation the following*

*should be revised :*

(B) procedures for leaving and rejoining the circuit ;

(C) the local area, restrictions, map reading ;

(D) use of radio aids for homing ;

(E) turns using magnetic compass, compass errors.

**( xix ) Exercise 15 :** *Advanced Turning :*

(A) steep turns ( 45 ° ), level and descending ;

(B) stalling in the turn and recovery ;

(C) recoveries from unusual attitudes, including spiral dives.

**( xx ) Exercise 16 :** *Forced Landing without Power :*

(A) forced landing procedure ;

(B) choice of landing area, provision for change of plan ;

(C) gliding distance ;

(D) descent plan ;

(E) key positions ;

(F) engine cooling ;

(G) engine failure checks ;

(H) use of radio ;

(I) base leg ;

(J) final approach ;

(K) landing ;

(L) actions after landing.

**( xxi ) Exercise 17 :** *Precautionary Landing :*

(A) full procedure away from aerodrome to break-off height ;

(B) occasions necessitating ;

(C) in-flight conditions ;

(D) landing area selection :

*(a) normal aerodrome ;*

*(b) disused aerodrome ;*

*(c) ordinary field.*

(E) circuit and approach ;

(F) actions after landing.

**( xxii ) Exercise 18 a :** *Navigation :*

(A) flight planning :

(a) weather forecast and actuals ;

(b) map selection and preparation :

*(1) choice of route ;*

*(2) controlled airspace ;*

*(3) danger, prohibited and restricted areas ;*

*(4) safety altitudes.*

(c) calculations :

*(1) magnetic heading(s) and time(s) en-route ;*

*(2) fuel consumption ;*

*(3) mass and balance ;*

*(4) mass and performance.*

(d) flight information :

*(1) NOTAMs etc.. ;*

*(2) radio frequencies ;*

*(3) selection of alternate aerodromes.*

(e) aeroplane documentation ;

(f) notification of the flight :

*(1) pre-flight administrative procedures ;*

*(2) flight plan form.*

(B) departure :

(a) organization of cockpit workload ;

(b) departure procedures :

*(1) altimeter settings ;*

*(2) ATC liaison in controlled or regulated airspace ;*

*(3) setting heading procedure ;*

*(4) noting of ETAs.*

(c) maintenance of altitude and heading ;

(d) revisions of ETA and heading ;

(e) log keeping ;

(f) use of radio ;

(g) use of Navaids ;

(h) minimum weather conditions for continuation of flight ;

(i) in-flight decisions ;

(j) transiting controlled or regulated airspace ;

(k) diversion procedures ;

(l) uncertainty of position procedure ;

(m) lost procedure.

(C) arrival and aerodrome joining procedure :

(a) ATC liaison in controlled or regulated airspace ;

(b) altimeter setting ;

(c) entering the traffic pattern ;

(d) circuit procedures ;

(e) parking ;

(f) security of aeroplane ;

(g) refuelling ;

(h) closing of flight plan, if appropriate ;

(i) post-flight administrative procedures.

**( xxiii ) Exercise 18 b :** *Navigation Problems at Lower Levels and in Reduced Visibility :*

(A) actions before descending ;

(B) hazards *( for example obstacles and terrain ) ;*

(C) difficulties of map reading ;

(D) effects of wind and turbulence ;

(E) vertical situational awareness *( avoidance of controlled flight into terrain ) ;*

(F) avoidance of noise sensitive areas ;

(G) joining the circuit ;

(H) bad weather circuit and landing.

**( xxiv ) Exercise 18 c :** *Radio Navigation :*

(A) use of GNSS :

(a) selection of waypoints ;

(b) to or from indications and orientation ;

(c) error messages.

(B) use of VHF omni-range :

(a) availability, AIP and frequencies ;

(b) selection and identification ;

(c) OBS ;

(d) to or from indications and orientation ;

(e) CDI ;

(f) determination of radial ;

(g) intercepting and maintaining a radial ;

(h) VOR passage ;

(i) obtaining a fix from two VORs.

(C) use of ADF equipment : NDBs :

(a) availability, AIP and frequencies ;

(b) selection and identification ;

(c) orientation relative to the beacon ;

(d) homing.

(D) use of VHF / DF :

(a) availability, AIP, frequencies ;

(b) R / T procedures and ATC liaison ;

(c) obtaining a QDM and homing.

(E) use of en-route or terminal radar :

(a) availability and AIP ;

(b) procedures and ATC liaison ;

(c) pilot’s responsibilities ;

(d) BITD ;

(d) secondary surveillance radar :

*(1) transponders ;*

*(2) code selection ;*

*(3) interrogation and reply.*

(F) use of DME :

(a) station selection and identification ;

(b) modes of operation : distance, groundspeed and time to run.

**( xxv ) Exercise 19 :** *Basic Instrument Flight :*

(A) physiological sensations ;

(B) instrument appreciation ; attitude instrument flight ;

(C) instrument limitations ;

(D) basic manoeuvres ;

(a) straight and level at various air speeds and configurations ;

(b) climbing and descending ;

(c) standard rate turns, climbing and descending, onto selected headings ;

(d) recoveries from climbing and descending turns.

*(1) a BITD may be used for flight training for :*

*(i) flight by reference solely to instruments ;*

*(ii) navigation using radio navigation aids ;*

*(iii) basic instrument flight.*

*(2) The use of the BITD should be subject to the following :*

*(i) the training should be complemented by exercises on an aeroplane ;*

*(ii) the record of the parameters of the flight must be available ;*

*(iii) a FI ( A ) or STI ( A ) should conduct the instruction.*

***AMC 1.* FCL. 210. H PPL ( H ) - Experience Requirements and Crediting**

*FLIGHT INSTRUCTION for the PPL ( H )*

*a ) Entry to Training :*

Before being accepted for training an applicant should be informed that the appropriate medical certificate must be obtained before solo flying is permitted ;

*b ) Ground Instruction :*

Enhanced ground instruction in weather interpretation, planning and route assessment, decision making on encountering DVE including reversing course or conducting a precautionary landing ;

*c ) Flight Instruction :*

1) The PPL( H ) flight instruction syllabus should take into account the principles of threat and error management and cover :

(i) pre-flight operations, including mass and balance determination, helicopter inspection and servicing ;

(ii) aerodrome and traffic pattern operations, collision avoidance precautions and procedures ;

(iii) control of the helicopter by external visual reference ;

(iv) take-offs, landings, hovering, look-out turns and normal transitions from and to the hover ;

(v) emergency procedures, basic autorotations, simulated engine failure, ground resonance recovery if relevant to type ;

(vi) sideways and backwards flight, turns on the spot ;

(vii) incipient vortex ring recognition and recovery ;

(viii) touchdown autorotations, simulated engine-off landings, practice forced landings. Simulated equipment malfunctions and emergency procedures relating to malfunctions of engines, controls, electrical and hydraulic circuits ;

(ix) steep turns ;

(x) transitions, quick stops, out of wind manoeuvres, sloping ground landings and take-offs ;

(xi) limited power and confined area operations, including selection of and operations to and from unprepared sites ;

(xii) flight by sole reference to basic flight instruments, including completion of a level 180 ° turn and recovery from unusual attitudes to simulate inadvertent entry into cloud *( this training may be conducted by an FI( H ) )* ;

(xiii) cross-country flying by using visual reference, DR, GNNS and, where available, radio navigation aids ; simulation of deteriorating weather conditions and actions to divert or conduct precautionary landing ;

(xiv) operations to, from and transiting controlled aerodromes ; compliance with air traffic services procedures, communication procedures and phraseology ;

2 ) Before allowing the applicant for a PPL( H ) to undertake his / her first solo flight, the FI should ensure that the applicant can use R / T communication ;

3 ) Wherever possible, flight simulation should be used to demonstrate to student pilots the effects of flight into DVE and to enhance their understanding and need for avoidance of this potentially fatal flight regime.

*d ) Syllabus of Flight Instruction :*

1 ) The numbering of exercises should be used primarily as an exercise reference list and as a broad instructional sequencing guide ; therefore the demonstrations and practices need not necessarily be given in the order listed. The actual order and content will depend upon the following interrelated factors :

(i) the applicant’s progress and ability ;

(ii) the weather conditions affecting the flight ;

(iii) the flight time available ;

(iv) instructional technique considerations ;

(v) the local operating environment ;

(vi) applicability of the exercises to the helicopter.

2 ) Each of the exercises involves the need for the applicant to be aware of the needs of good airmanship and look-out, which should be emphasized at all times.

**( i ) Exercise 1 a :** *Familiarization with the Helicopter :*

(A) characteristics of the helicopter, external features;

(B) cockpit layout;

(C) systems;

(D) checklists, procedures and controls.

**( ii ) Exercise 1 b :** *Emergency Procedures :*

(A) action if fire on the ground and in the air;

(B) engine, cabin and electrical system fire;

(C) systems failures;

(D) escape drills, location and use of emergency equipment and exits.

**( iii ) Exercise 2 :** *Preparation for and action after flight :*

(A) flight authorization and helicopter acceptance;

(B) serviceability documents;

(C) equipment required, maps, etc.;

(D) external checks;

(E) internal checks;

(F) seat, harness and flight controls adjustments;

(G) starting and warm-up checks clutch engagement and starting rotors;

(H) power checks;

(I) running down system checks and switching off the engine;

(J) parking, security and picketing;

(K) completion of authorization sheet and serviceability documents.

**( iv ) Exercise 3 :** *Air Experience :*

(A) to introduce the student to rotary wing flight;

(B) flight exercise.

**( v ) Exercise 4 :** *Effects of Controls :*

(A) function of flight controls, primary and secondary effect;

(B) effects of :

*(a) air speed;*

*(b) power changes (torque);*

*(c) yaw (sideslip);*

*(d) disc loading (bank and flare);*

*(e) controls of selecting hydraulics on/off;*

*(f) control friction.*

(C) instruments;

(D) use of carburettor heat or anti-icing control.

**( vi ) Exercise 5 :** *Power and Attitude Changes :*

(A) relationship between cyclic control position, disc attitude, fuselage attitude and air speed;

(B) flapback;

(C) power required diagram in relation to air speed;

(D) power and air speed changes in level flight;

(E) use of instruments for precision;

(F) engine and air speed limitations.

**( vii ) Exercise 6 :** *Straight and Level :*

(A) at normal cruising power, attaining and maintaining straight and level flight;

(B) control in pitch, including use of control friction or trim;

(C) maintaining direction and balance, *( ball or yawstring use ) ;*

(D) setting power for selected air speeds and speed changes;

(E) use of instruments for precision.

**( viii ) Exercise 7** **:** *Climbing :*

(A) optimum climb speed, best angle or rate of climb from power required diagram;

(B) initiation, maintaining the normal and maximum rate of climb, levelling off;

(C) levelling off at selected altitudes or heights; (D) use of instruments for precision.

**( ix ) Exercise 8 :** *Descending :*

(A) optimum descent speed, best angle or rate of descent from power required diagram;

(B) initiation, maintaining and leveling off;

(C) leveling off at selected altitudes or heights;

(D) descent (including effect of power and air speed);

(E) use of instruments for precision.

**( x ) Exercise 9 :** *Turning :*

(A) initiation and maintaining medium level turns;

(B) resuming straight flight;

(C) altitude, bank and co-ordination;

(D) climbing and descending turns and effect on rate of climb or descent;

(E) turns onto selected headings, use of gyro heading indicator and compass;

(F) use of instruments for precision.

**( xi ) Exercise 10 :** *Basic Autorotation :*

(A) safety checks, verbal warning and look-out;

(B) entry, development and characteristics;

(C) control of air speed and RRPM, rotor and engine limitations;

(D) effect of AUM, IAS, disc loading, G forces and density altitude;

(E) re-engagement and go-around procedures *( throttle over- ride or ERPM control ) ;*

(F) vortex condition during recovery;

(G) gentle and medium turns in autorotation;

(H) demonstration of variable flare simulated engine off landing.

**( xii ) Exercise 11 a :** *Hovering :*

(A) demonstrate hover IGE, importance of wind effect and attitude, ground cushion, stability in the

hover and effects of over controlling;

(B) student holding cyclic stick only;

(C) student handling collective lever *( and throttle )* only;

(D) student handling collective lever, *( throttle )* and pedals;

(E) student handling all controls;

(F) demonstration of ground effect;

(G) demonstration of wind effect;

(H) demonstrate gentle forward running touchdown;

(I) specific hazards for example snow, dust and litter.

**( xiii ) Exercise 11 b :** *Hover Taxiing and Spot Turns :*

(A) revise hovering;

(B) precise ground speed and height control;

(C) effect of wind direction on helicopter attitude and control margin;

(D) control and co-ordination during spot turns;

(E) carefully introduce gentle forward running touchdown.

**( xiv ) Exercise 11 c :** *Hovering and Taxiing Emergencies :*

(A) revise hovering and gentle forward running touchdown, explain *( demonstrate where*

*applicable )* effect of hydraulics failure in the hover;

(B) demonstrate simulated engine failure in the hover and hover taxi

(C) demonstrate dangers of mishandling and over-pitching.

**( xv ) Exercise 12 :** *Take - off and Landing :*

(A) pre-take-off checks or drills;

(B) look-out;

(C) lifting to hover;

(D) after take-off checks;

(E) danger of horizontal movement near ground;

(F) danger of mishandling and overpitching;

(G) landing *( without sideways or backwards movement ) ;*

(H) after landing checks or drills;

(I) take-off and landing crosswind and downwind.

**( xvi ) Exercise 13 :** *Transitions from hover to climb and approach to hover :*

(A) look-out;

(B) revise take-off and landing;

(C) ground effect, translational lift and its effects;

(D) flapback and its effects;

(E) effect of wind speed and direction during transitions from or to the hover;

(F) the constant angle approach;

(G) demonstration of variable flare simulated engine off landing.

**( xvii ) Exercise 14 a :**  *Circuit, Approach and Landing :*

(A) revise transitions from hover to climb and approach to hover;

(B) circuit procedures, downwind and base leg;

(C) approach and landing with power;

(D) pre-landing checks;

(E) effect of wind on approach and IGE hover;

(F) crosswind approach and landing;

(G) go-around;

(H) noise abatement procedures.

**( xviii ) Exercise 14 b :** *Steep and limited power approaches and Landings :*

(A) revise the constant angle approach;

(B) the steep approach *( explain danger of high sink rate and low air speed ) ;*

(C) limited power approach ( explain danger of high speed at touch-down ) ;

(D) use of the ground effect;

(E) variable flare simulated engine off landing.

**( xix) Exercise 14 c :** *Emergency Procedures :*

(A) abandoned take-off;

(B) missed approach and go-around;

(C) hydraulic off landing *( if applicable );*

(D) tail rotor control or tail rotor drive failure *( briefing only );*

(E) simulated emergencies in the circuit to include:

(*a) hydraulics failure;*

*(b) simulated engine failure on take-off, crosswind, downwind and base leg;*

*(c) governor failure.*

**( xx ) Exercise 15 :** *First Solo :*

(A) instructor’s briefing, observation of flight and debriefing;

(B) warn of change of attitude from reduced and laterally displaced weight;

(C) warn of low tail, low skid or wheel during hover, landing;

(D) warn of dangers of loss of RRPM and overpitching;

(E) pre-take-off checks;

(F) into wind take-off;

(G) procedures during and after take-off;

(H) normal circuit, approaches and landings;

(I) action if an emergency.

**( xxi ) Exercise 16 :** *Sideways and backwards hover manoeuvring :*

(A) manoeuvring sideways flight heading into wind;

(B) manoeuvring backwards flight heading into wind;

(C) combination of sideways and backwards manoeuvring;

(D) manoeuvring sideways and backwards and heading out of wind;

(E) stability and weather cocking;

(F) recovery from backwards manoeuvring (pitch nose down);

(G) limitations for sideways and backwards manoeuvring.

**( xxii ) Exercise 17 :** *Spot Turns :*

(A) revise hovering into wind and downwind;

(B) turn on spot through 360º:

*(a) around pilots position;*

*(b) around tail rotor;*

*(c) around helicopter geometric centre;*

*(d) square and safe visibility clearing turn.*

(C) rotor RPM control, torque effect, cyclic limiting stops due to CG position and wind speed and

direction ;

**( xxiii ) Exercise 18 :** *Hover OGE and vortex ring :*

(A) establishing hover OGE;

(B) drift, height or power control;

(C) demonstration of incipient stage of vortex ring, recognition and recovery (from a safe altitude);

(D) loss of tail rotor effectiveness.

**( xxiv ) Exercise 19 :** *Simulated EOL :*

(A) the effect of weight, disc loading, density attitude and RRPM decay;

(B) revise basic autorotation entry;

(C) optimum use of cyclic and collective to control speed or RRPM;

(D) variable flare simulated EOL;

(E) demonstrate constant attitude simulated EOL;

(F) demonstrate simulated EOL from hover or hover taxi;

(G) demonstrate simulated EOL from transition and low level.

**( xxv ) Exercise 20 :** *Advanced Autorotation :*

(A) over a selected point at various height and speed;

(B) revise basic autorotation: note ground distance covered;

(C) range autorotation;

(D) low speed autorotation;

(E) constant attitude autorotation (terminate at safe altitude);

(F) ‘S’ turns;

(G) turns through 180 ° and 360 °;

(H) effects on angles of descent, IAS, RRPM and effect of AUM.

**( xxvi ) Exercise 21 :** *Practice forced landings :*

(A) procedure and choice of the forced landing area;

(B) forced landing checks and crash action;

(C) re-engagement and go-around procedures.

**( xxvii ) Exercise 22 :**  *Steep Turns :*

(A) steep (level) turns (30 ° bank);

(B) maximum rate turns (45 ° bank if possible);

(C) steep autorotative turns;

(D) faults in the turn: balance, attitude, bank and co-ordination;

(E) RRPM control and disc loading;

(F) vibration and control feedback;

(G) effect of wind at low level.

**( xxviii ) Exercise 23 :** *Transitions :*

(A) revise ground effect, translational lift and flapback;

(B) maintaining constant height, (20-30 ft AGL);

(C) transition from hover to minimum 50 knots IAS and back to hover;

(D) demonstrate effect of wind.

**( xxix ) Exercise 24 :**  *Quick Stops :*

(A) use of power and controls;

(B) effect of wind;

(C) quick stops into wind;

(D) quick stops from crosswind and downwind terminating into wind;

(E) danger of vortex ring;

(F) danger of high disc loading.

**( xxx ) Exercise 25 a :**  *Navigation :*

(A) flight planning:

(a) weather forecast and actuals;

(b) map selection and preparation and use;

*(1) choice of route:*

*(2) controlled airspace, danger and prohibited areas;*

*(3) safety altitudes and noise abatement considerations.*

(c) calculations:

*(1) magnetic heading(s) and time(s) en-route;*

*(2) fuel consumption;*

*(3) mass and balance.*

(d) flight information:

*(1) NOTAMs, etc.;*

*(2) radio frequencies;*

*(3) selection of alternate landing sites.*

(e) helicopter documentation;

(f) notification of the flight:

*(1) pre-flight administrative procedures;*

*(2) flight plan form (where appropriate).*

(B) departure:

(a) organization of cockpit workload;

(b) departure procedures:

*(1) altimeter settings;*

*(2) ATC liaison in controlled or regulated airspace;*

*(3) setting heading procedure;*

*(4) noting of ETAs.*

(c) maintenance of height or altitude and heading;

(d) revisions of ETA and heading:

*(1) 10 ° line, double track and track error and closing angle;*

*(2) 1 in 60 rule;*

*(3) amending an ETA.*

(e) log keeping;

(f) use of radio;

(g) use of navaids (if fitted);

(h) minimum weather conditions for continuation of flight;

(i) in-flight decisions;

(j) transiting controlled or regulated airspace;

(k) uncertainty of position procedure;

(l) lost procedure.

(C) arrival and aerodrome joining procedure:

(a) ATC liaison in controlled or regulated airspace;

(b) altimeter setting;

(c) entering the traffic pattern;

(d) circuit procedures.

(e) parking;

(f) security of helicopter;

(g) refuelling;

(h) closing of flight plan (if appropriate);

(i) post-flight administrative procedures.

**( xxxi ) Exercise 25 b :** *Navigation problems at low heights and in reduced visibility :*

(A) actions before descending;

(B) hazards (for example obstacles and other aircraft);

(C) difficulties of map reading;

(D) effects of wind and turbulence;

(E) avoidance of noise sensitive areas;

(F) actions in the event of encountering DVE;

(G) decision to divert or conduct precautionary landing;

(H) bad weather circuit and landing;

(I) appropriate procedures and choice of landing area;

(J) precautionary landing.

**( xxxii ) Exercise 25 c :**  *Radio Navigation :*

(A) use of GNSS:

(a) selection of waypoints;

(b) to or from indications and orientation;

(c) error messages;

(d) hazards of over-reliance on the use of GNSS in the continuation of flight in DVE.

(B) use of VHF omni range:

(a) availability, AIP and frequencies;

(b) selection and identification;

(c) OBS;

(d) to or from indications and orientation;

(e) CDI;

(f) determination of radial;

(g) intercepting and maintaining a radial;

(h) VOR passage;

(i) obtaining a fix from two VORs.

(C) use of ADF equipment: NDBs:

(a) availability, AIP and frequencies;

(b) selection and identification;

(c) orientation relative to the beacon;

(d) homing.

(D) use of VHF/DF:

(a) availability, AIP and frequencies;

(b) RTF procedures and ATC liaison;

(c) obtaining a QDM and homing.

(E) use of en-route or terminal radar:

(a) availability and AIP;

(b) procedures and ATC liaison;

(c) pilots responsibilities;

(d) secondary surveillance radar *( if transponder fitted ) :*

*(1) transponders;*

*(2) code selection;*

*(3) interrogation and reply.*

(F) use of DME:

(a) station selection and identification;

(b) modes of operation: distance, groundspeed and time to run.

**( xxxiii ) Exercise 26 :** *Advanced take-off, landings and transitions :*

(A) landing and take-off out of wind (performance reduction);

(B) ground effect, translational lift and directional stability variation when out of wind;

(C) downwind transitions;

(D) vertical take-off over obstacles;

(E) running take-off;

(F) cushion creep take-off;

(G) reconnaissance of landing site;

(H) running landing;

(I) zero speed landing;

(J) crosswind and downwind landings;

(K) steep approach;

(L) go-around.

**( xxxiv ) Exercise 27 :** *Sloping Ground :*

(A) limitations and assessing slope angle;

(B) wind and slope relationship: blade and control stops;

(C) effect of CG when on slope;

(D) ground effect on slope and power required;

(E) right skid up slope;

(F) left skid up slope;

(G) nose up slope;

(H) avoidance of dynamic roll over, dangers of soft ground and sideways movement on touchdown;

(I) danger of striking main or tail rotor by harsh control movement near ground.

**( xxxv ) Exercise 28 :**  *Limited Power :*

(A) take-off power check;

(B) vertical take-off over obstacles;

(C) in-flight power check;

(D) running landing;

(E) zero speed landing;

(F) approach to low hover;

(G) approach to hover;

(H) approach to hover OGE;

(I) steep approach;

(J) go-around.

**( xxxvi ) Exercise 29 :** *Confined Areas :*

(A) landing capability and performance assessment;

(B) locating landing site and assessing wind speed and direction;

(C) reconnaissance of landing site;

(D) select markers;

(E) select direction and type of approach;

(F) circuit;

(G) approach to committed point and go-around;

(H) approach;

(I) clearing turn;

(J) landing;

(K) power check and performance assessment in and out of ground effect;

(L) normal take-off to best angle of climb speed;

(M) vertical take-off from hover.

**( xxxvii ) Exercise 30 :** *Basic Instrument Flight :*

(A) physiological sensations;

(B) instrument appreciation:

(a) attitude instrument flight;

(b) instrument scan.

(C) instrument limitations;

(D) basic manoeuvres:

(a) straight and level at various air speeds and configurations;

(b) climbing and descending;

(c) standard rate turns, climbing and descending, onto selected headings.

(E) recoveries from climbing and descending turns; (F) recoveries from unusual attitudes.

**( xxxviii ) Exercise 31 a :** *Night flying ( if night rating required ) :*

(A) pre-flight inspection using torch, pan lights, etc.;

(B) take-off (no sideways or backwards manoeuvring);

(C) hover taxi (higher and slower than by day);

(D) transition to climb;

(E) level flight;

(F) approach and transition to hover;

(G) landing;

(H) autorotation;

(I) practice forced landing *( with flares if appropriate : simulated ) ;*

(J) night emergencies *( for example failure of lights, etc. ).*

**( xxxix ) Exercise 31 b :** *Night cross - country ( if night rating required ) :*

(A) navigation principles as for day cross-country;

(B) map marking *( highlighting built-up areas with thicker lines, etc.. ).*

***AMC 1.* FCL. 210. As PPL ( As ) - Experience Requirements and Crediting**

*FLIGHT INSTRUCTION for the PPL ( As )*

*a ) Entry to Training :*

Before being accepted for training an applicant should be informed that the appropriate medical certificate must be obtained before solo flying is permitted ;

*b ) Flight Instruction :*

1 ) The PPL( As ) flight instruction syllabus should take into account the principles of threat and error management and cover :

(i) pre-flight operations, including mass and balance determination, airship inspection and servicing ;

(ii) ground manoeuvring, masting and unmasting procedures ;

(iii) aerodrome and traffic pattern operations, collision avoidance precautions and procedures;

(iv) control of the airship by external visual reference ;

(v) take-offs and landings ;

(vi) flight by reference solely to instruments, including the completion of a level 180 ° turn;

(vii) cross-country flying using visual reference, dead reckoning and radio navigation aids ;

(viii) emergency operations, including simulated airship equipment malfunctions ;

(ix) operations to, from and transiting controlled aerodromes, compliance with air traffic services procedures, communication procedures and phraseology.

2 ) Before allowing the applicant for a PPL( As ) to undertake his / her first solo flight, the FI should ensure that the applicant can use R / T communication.

c ) Syllabus of Flight Instruction :

1 ) The numbering of exercises should be used primarily as an exercise reference list and as a broad instructional sequencing guide ; therefore the demonstrations and practices need not necessarily be given in the order listed. The actual order and content will depend upon the following interrelated factors :

(i) the applicant’s progress and ability ;

(ii) the weather conditions affecting the flight ;

(iii) the flight time available ;

(iv) instructional technique considerations ;

(v) the local operating environment ;

(vi) applicability of the exercises to the airship.

2 ) Each of the exercises involves the need for the applicant to be aware of the needs of good airmanship and look-out, which should be emphasized at all times.

**( i ) Exercise 1 a :** *Familiarization with the Airship :*

(A) characteristics of the airship;

(B) cockpit layout;

(C) systems;

(D) checklists, drills and controls.

**( ii ) Exercise 1 b :** *Emergency Drills :*

(A) action if fire on the ground and in the air;

(B) engine cabin and electrical system fire;

(C) systems failure;

(D) escape drills, location and use of emergency equipment and exits.

**( iii ) Exercise 2 :** *Preparation for and action after flight :*

(A) flight authorization and airship acceptance;

(B) serviceability documents;

(C) equipment required, maps, etc.. ;

(D) mass and balance;

(E) external checks;

(F) ground crew briefing;

(G) internal checks;

(H) harness, seat or rudder panel adjustments;

(I) starting and warm-up checks;

(J) power checks;

(K) running down system checks and switching off the engine;

(L) parking, security and masting;

(M) completion of authorisation sheet and serviceability documents.

**( iv ) Exercise 3 :** *Air Experience : flight exercise.*

**( v ) Exercise 4 :** *Effects of Controls :*

(A) primary effects; (B) further effects;

(C) effects of:

(a) air speed;

(b) power;

(c) trimming controls;

(d) other controls, as applicable.

(D) operation of :

(a) mixture control;

(b) carburettor heat;

(c) cabin heating or ventilation.

**( vi ) Exercise 5 :** *Ground manoeuvring :*

(A) pre-taxi checks;

(B) starting, control of speed and stopping;

(C) engine handling;

(D) masting procedures;

(E) control of direction and turning;

(F) effects of wind;

(G) effects of ground surface;

(H) marshalling signals;

(I) instrument checks;

(J) air traffic control procedures;

(K) emergencies.

(vii) Exercise 6a: Take-off procedures:

(A) pre-take-off checks;

(B) take-off with different static heaviness;

(C) drills during and after take-off;

(D) noise abatement procedures.

**( viii ) Exercise 6 b :** *Emergencies :*

(A) abandoned take-off;

(B) engine failure after take-off;

(C) malfunctions of thrust vector control;

(D) aerodynamic control failures;

(E) electrical and system failures.

**( ix ) Exercise 7 :** *Climbing :*

(A) entry, maintaining the normal and max rate climb and leveling off;

(B) levelling off at selected altitudes;

(C) maximum angle of climb;

(D) maximum rate of climb.

**( x ) Exercise 8 :** *Straight and Level :*

(A) attaining and maintaining straight and level flight;

(B) flight at or close to pressure height;

(C) control in pitch, including use of trim;

(D) at selected air speeds *( use of power ) ;*

(E) during speed changes;

(F) use of instruments for precision.

**( xi ) Exercise 9 :** *Descending :*

(A) entry, maintaining and levelling off;

(B) levelling off at selected altitudes;

(C) maximum rate of descent;

(D) maximum angle of descent;

(E) use of instruments for precision flight.

**( xii ) Exercise 10 :** *Turning :*

(A) entry and maintaining level turns;

(B) resuming straight flight;

(C) faults in the turn;

(D) climbing turns;

(E) descending turns;

(F) turns onto selected headings, use of gyro heading indicator and compass;

(G) use of instruments for precision.

**( xiii ) Exercise 11 :** *Hovering : hovering manoeuvres ( as applicable ) ;*

**( xiv ) Exercise 12 a :** *Approach and Landing :*

(A) effect of wind on approach and touchdown speeds;

(B) landing with different static heaviness;

(C) missed approach and go-around procedures;

(D) noise abatement procedures.

**( xv ) Exercise 12 b :**  *Emergencies :*

(A) aborted approach or go-around;

(B) malfunction of thrust vector control;

(C) envelope emergencies;

(D) fire emergencies;

(E) aerodynamic control failures;

(F) electrical and system failures.

**( xvi ) Exercise 13 :** *Precautionary Landing :*

(A) occasions necessitating;

(B) in-flight conditions;

(C) landing area selection;

(D) circuit and approach;

(E) actions after landing;

**( xvii ) Exercise 14 a :** *Navigation :*

(A) flight planning :

(a) weather forecast and actuals;

(b) map selection and preparation:

*(1) choice of route;*

*(2) airspace structure;*

*(3) sensitive areas;*

*(4) safety altitudes.*

(c) calculations:

*(1) magnetic heading(s) and time(s) en-route;*

*(2) fuel consumption;*

*(3) mass and balance;*

*(4) performance.*

(d) flight information:

*(1) NOTAMs etc.;*

*(2) radio frequencies;*

*(3) selection of alternate aerodromes.*

(e) airship documentation;

(f) notification of the flight:

*(1) pre-flight administrative procedures;*

*(2) flight plan form.*

(B) departure:

(a) organisation of cockpit workload;

(b) departure procedures:

*(1) altimeter settings;*

*(2) ATC liaison in controlled or regulated airspace;*

*(3) setting heading procedure;*

*(4) noting of ETAs.*

(c) maintenance of altitude and heading;

(d) revisions of ETA and heading;

(e) log keeping;

(f) use of radio;

(g) use of navaids;

(h) minimum weather conditions for continuation of flight;

(i) in-flight decisions;

(j) transiting controlled or regulated airspace;

(k) diversion procedures;

(l) uncertainty of position procedure;

(m) lost procedure.

(C) arrival, aerodrome joining procedure:

(a) ATC liaison in controlled or regulated airspace;

(b) altimeter setting;

(c) entering the traffic pattern;

(d) circuit procedures;

(e) parking or on masting;

(f) security of airship;

(g) refuelling;

(h) closing of flight plan, if appropriate;

(i) post-flight administrative procedures.

**( xviii ) Exercise 14 b :** *Navigation problems at lower levels and in reduced visibility :*

(A) actions before descending;

(B) hazards (for example obstacles, and terrain);

(C) difficulties of map reading;

(D) effects of winds, turbulence and precipitation;

(E) vertical situational awareness;

(F) avoidance of noise sensitive areas;

(G) joining the circuit;

(H) bad weather circuit and landing.

**( xix ) Exercise 14 c :** *Radio Navigation :*

(A) use of GNSS

(a) selection of waypoints;

(b) to or from indications and orientation;

(c) error messages.

(B) use of VHF omni range *( if applicable )* :

(a) availability, AIP and frequencies;

(b) selection and identification;

(c) OBS;

(d) to or from indications and orientation;

(e) CDI;

(f) determination of radial;

(g) intercepting and maintaining a radial;

(h) VOR passage;

(i) obtaining a fix from two VORs.

(C) use of ADF equipment: NDBs (if applicable):

(a) availability, AIP and frequencies;

(b) selection and identification;

(c) orientation relative to the beacon;

(d) homing.

(D) use of VHF/DF:

(a) availability, AIP and frequencies;

(b) R/T procedures and ATC liaison;

(c) obtaining a QDM and homing.

(E) use of en-route or terminal radar:

(a) availability and AIP;

(b) procedures and ATC liaison;

(d) BITD

(c) pilot’s responsibilities;

(d) secondary surveillance radar:

*(1) transponders;*

*(2) code selection;*

*(3) interrogation and reply.*

(F) use of DME (if applicable) ;

(a) station selection and identification;

(b) modes of operation: distance, groundspeed and time to run.

**( xx ) Exercise 15 :** *Basic Instrument Flight :*

(A) physiological sensations;

(B) instrument appreciation: attitude instrument flight;

(C) instrument limitations;

(D) basic manoeuvres:

(a) straight and level;

(b) climbing and descending;

(c) turns, climbing and descending, onto selected headings;

(d) recoveries from climbing and descending turns.

(1) A BITD may be used for flight training for :

*(i) flight by reference solely to instruments;*

*(ii) navigation using radio navigation aids;*

*(iii) basic instrument flight.*

(2) The use of the BITD should be subject to the following:

*(i) the training should be complemented by exercises on an airship;*

*(ii) the record of the parameters of the flight must be available; and an FI(As) should conduct the instruction.*

***AMC 1.* FCL. 205. S ( b ) SPL - Privileges and Conditions**

*CONTENTS of the PROFICIENCY CHECK for the EXTENSION of SPL PRIVILEGES to EXERCISE COMMERCIAL PRIVILEGES on a SAILPLANE*

a ) The applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board ;

b ) An applicant should indicate to the FE the checks and duties carried out.

Checks should be completed in accordance with the authorized checklist for the sailplane on which the test is being taken.

FLIGHT TEST TOLERANCE

c ) The applicant should demonstrate the ability to :

1 ) operate the sailplane within its limitations ;

2 ) complete all manoeuvres with smoothness and accuracy ;

3 ) exercise good judgment and airmanship ;

4 ) apply aeronautical knowledge ;

5 ) maintain control of the sailplane at all times in such a manner that the successful outcome

of a procedure or manoeuvre is never seriously in doubt.

CONTENT of the SKILL TEST

d ) The applicant should demonstrate his / her skill in at least the winch or aerotow method of launching.

|  |  |
| --- | --- |
| **SECTION 1. PRE - FLIGHT OPERATIONS and TAKE - OFF** | |
| *Use of checklist, airmanship, control of sailplane by external visual reference, look- out*  *procedures, etc.. apply in all sections.* | |
| **a** | Pre-flight sailplane (daily) inspection, documentation, NOTAM and weather briefing |
| **b** | Verifying in-limits mass and balance and performance calculation |
| **c** | Passenger briefing |
| **d** | Sailplane servicing compliance |
| **e** | Pre-take-off checks |
| **SECTION 2. LAUNCH METHOD** | |
| ***Note :*** *at least for one of the three launch methods all the mentioned items are fully exercised during the skill test.* | |
| **SECTION 2 a. WINCH or CAR LAUNCH** | |
| **a** | Signals before and during launch, including messages to winch driver |
| **b** | Initial roll and take-off climb |
| **c** | Adequate profile of winch launch |
| **d** | Launch failures (simulated) |
| **e** | Situational awareness |
| **SECTION 2 b. AEROTOW LAUNCH** | |
| **a** | Signals before and during launch, including signals to or communications with tow plane pilot for any problems |
| **b** | Initial roll and take-off climb |
| **c** | Launch abandonment *( simulation only or “ talk - through “ )* |
| **d** | Correct positioning during straight flight and turns |
| **e** | Out of position and recovery |
| **f** | Correct release from tow |
| **g** | Lookout and airmanship through whole launch phase |
| **SECTION 2 c. SELF LAUNCH *( TMGs excluded )*** | |
| **a** | ATC compliance |
| **b** | Aerodrome departure procedures |
| **c** | Initial roll and take-off climb |
| **d** | Simulated engine failure after take-off |
| **e** | Engine shut down and stowage |
| **f** | Lookout and airmanship through whole launch phase |
| **SECTION 3. GENERAL AIRWORK** | |
| **a** | Maintain straight flight: attitude and speed control |
| **b** | Steep (45 ° bank) turns, look-out procedures and collision avoidance |
| **c** | Turning on to selected headings visually and with use of compass |
| **d** | Flight at high angle of attack (critically low air speed) |
| **e** | Clean stall and recovery |
| **f** | Spin avoidance and recovery |
| **g** | Local area navigation and awareness |
| **SECTION 4. CIRCUIT, APPROACH and LANDING** | |
|  | Aerodrome circuit joining procedure |
|  | Collision avoidance : look-out procedures |
|  | Pre-landing checks |
|  | Circuit, approach control and landing |
|  | Precision landing *( simulation of out-landing : short field )* |
|  | Cross wind landing if suitable conditions available |

***AMC 1.* FCL. 205. B ( b ) BPL - Privileges and Conditions**

*CONTENTS of the PROFICIENCY CHECK for the EXTENSION of BPL PRIVILEGES to EXERCISE COMMERCIAL PRIVILEGES on a BALLOON*

*a )* The take-off site should be chosen by the applicant depending on the actual meteorological conditions, the area which has to be overflown and the possible options for suitable landing sites. The applicant should be responsible for the flight planning and should ensure that all equipment and documentation for the execution of the flight are on board. The proficiency check may be conducted in two flights. The total duration of the flight(s) should be at least 60 minutes ;

*b )* An applicant should indicate to the FE the checks and duties carried out.

Checks should be completed in accordance with the flight manual or the authorized checklist for the balloon on which the test is being taken. During pre-flight preparation for the test the applicant should be required to perform crew and passenger briefings and demonstrate crowd control. The load calculation should be performed by the applicant in compliance with the operations manual or flight manual for the balloon used.

FLIGHT TEST TOLERANCE

c ) The applicant should demonstrate the ability to :

1) operate the balloon within its limitations ;

2 ) complete all manoeuvres with smoothness and accuracy ;

3 ) exercise good judgment and airmanship ;

4 ) apply aeronautical knowledge ;

5 ) maintain control of the balloon at all times in such a manner that the successful outcome of a procedure or manoeuvre is never seriously in doubt.

*d )* The following limits are for general guidance. The FE should make allowance for turbulent conditions and the handling qualities and performance of the hot-air balloon used :

Height ( 1 ) normal flight ± **100**  ft

( 2 ) with simulated emergency ± **150** ft

CONTENT of the SKILL TEST

*e )* The contents and sections of the proficiency check set out in this AMC should be used for the extension of BPL privileges to exercise commercial privileges on a ***hot-air balloon.***

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| --- | --- |
| **SECTION 1. PRE - FLIGHT OPERATIONS, INFLATION and TAKE - OFF** | |
| *Use of checklist, airmanship, control of balloon by external visual reference, look- out*  *procedures, etc.. apply in all sections.* | |
| **a** | Pre-flight documentation, flight planning, NOTAM and weather briefing |
| **b** | Balloon inspection and servicing |
| **c** | Load calculation |
| **d** | Crowd control and crew briefing |
| **e** | Passenger briefing |
| **f** | Assembly and layout |
| **g** | Inflation and pre-take-off procedures |
| **h** | Take-off |
| **i** | ATC compliance |
| **SECTION 2. GENERAL AIRWORK** | |
| **a** | Climb to level flight |
| **b** | Level flight |

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| **SECTION 2. GENERAL AIRWORK -** *cont’d*  **-** | |
| **c** | Descent to level flight |
| **d** | Operating at low level |
| **e** | ATC compliance |
| **SECTION 3. EN - ROUTE PROCEDURES** | |
| **a** | Dead reckoning and map reading |
| **b** | Marking positions and time |
| **c** | Orientation, airspace structure |
| **d** | Maintenance of altitude |
| **e** | Fuel management |
| **f** | Communication with retrieve crew |
| **g** | ATC compliance or R / T communication |
| **SECTION 4. APPROACH and LANDING PROCEDURES** | |
| **a** | Approach from low level and missed approach and fly on |
| **b** | Approach from high level and missed approach and fly on |
| **c** | Passenger pre-landing briefing |
| **d** | Pre-landing checks |
| **e** | Selection of landing field |
| **f** | Landing, dragging and deflation |
| **g** | ATC compliance or R/T communication |
| **h** | Actions after flight |
| **SECTION 5. ABNORMAL and EMERGENCY PROCEDURES** | |
| *This Section may be combined with Sections* ***1*** *through* ***4*** | |
| **a** | Simulated fire on the ground and in the air |
| **b** | Simulated pilot light and burner failures |
| **c** | Simulated passenger health problems |
| **d** | Other abnormal and emergency procedures as outlined in the appropriate flight manual |
| **e** | Oral questions |
|  |  |
|  |  |

*f )* The contents and Sections of the proficiency check set out in this AMC should be used for the extension of BPL privileges to exercise commercial privileges on a ***gas balloon***.

|  |  |
| --- | --- |
| **SECTION 1. PRE - FLIGHT OPERATIONS, INFLATION and TAKE - OFF** | |
| *Use of checklist, airmanship, control of balloon by external visual reference, look- out*  *procedures, etc.. apply in all sections.* | |
| **a** | Pre-flight documentation, flight planning, NOTAM and weather briefing |
| **b** | Balloon inspection and servicing |
| **c** | Load calculation |
| **d** | Crowd control and crew briefing |
| **e** | Passenger briefing |
| **f** | Assembly and layout |
| **g** | Inflation and pre-take-off procedures |
| **h** | Take-off |
| **i** | ATC compliance |
| **SECTION 2. GENERAL AIRWORK** | |
| **a** | Climb to level flight |
| **b** | Level flight |

|  |  |
| --- | --- |
| **SECTION 2. GENERAL AIRWORK -** *cont’d*  **-** | |
| **c** | Descent to level flight |
| **d** | Operating at low level |
| **e** | ATC liaison : compliance |
| **SECTION 3. EN - ROUTE PROCEDURES** | |
| **a** | Dead reckoning and map reading |
| **b** | Marking positions and time |
| **c** | Orientation, airspace structure |
| **d** | Maintenance of altitude |
| **e** | Ballast management |
| **f** | Communication with retrieve crew |
| **g** | ATC compliance or R / T communication |
| **SECTION 4. APPROACH and LANDING PROCEDURES** | |
| **a** | Approach from low level and missed approach and fly on |
| **b** | Approach from high level and missed approach and fly on |
| **c** | Passenger pre-landing briefing |
| **d** | Pre-landing checks |
| **e** | Selection of landing field |
| **f** | Landing, dragging and deflation |
| **g** | ATC compliance or R/T communication |
| **h** | Actions after flight |
| **SECTION 5. ABNORMAL and EMERGENCY PROCEDURES** | |
| *This Section may be combined with Sections* ***1*** *through* ***4*** | |
| **a** | Simulated closed appendix during take-off and climb |
| **b** | Simulated parachute or valve failure |
| **c** | Simulated passenger health problems |
| **d** | Other abnormal and emergency procedures as outlined in the appropriate flight manual |
| **e** | Oral questions |
|  |  |
|  |  |

***AMC 1.* FCL. 225. B BPL - Extension of Privileges to another Balloon Class or Group**

a ) The aim of the flight training is to qualify BPL holders to exercise the privileges on a different class or group of balloons ;

b ) The following **Classes** should be recognized :

1 ) Hot - air Balloons ;

2 ) Gas Balloons ;

3 ) Hot - air Airships.

c ) The following **Groups** should be recognized :

1 ) ***Group A :***

( i ) Hot - air Balloons and Hot - air Airships with a maximum envelope capacity of

3 400m³ ;

( ii ) Gas Balloons with a maximum envelope capacity of 1 260m³.

2 ) ***Group B :***

( i ) Hot - air Balloons and Hot - air Airship with an envelope capacity between 3 401m³

and 6 000m³ ;

( ii ) Gas Balloons with an envelope capacity of more than 1 260m ³.

3 ) ***Group C :***

Hot - air Balloons and Hot - air Airship with an envelope capacity between 6 001m³ and

10 500m³ .

4 ) ***Group D :***

Hot - air Balloons and Hot - air Airships with an envelope capacity of more than

10 500m³.

d ) An extension to Group B is also valid for group A.

The extension for the Group C is also valid for the groups A and B.

An extension to Group D will include the privilege for the *other* ***3*** *( three ) groups*.

e ) The ATO should issue a certificate of satisfactory completion of the instruction to licence endorsement.