

## Ground Examination Syllabus

Commercial Pilot's Licence (Aeroplanes)

Airline Transport Pilot's Licence (Aeroplanes)

### AIRCRAFT PERFORMANCE SYLLABUS

#### **1 PERFORMANCE**

##### **1.1 General Principles**

1.1.1 Objectives

1.1.1.1 The Basis and Importance of Aeroplane Performance Assessment

1.1.1.2 The Relationship Between Performance Assessment, Flight Planning and Loading

1.1.2 Definitions, abbreviations and terms used

1.1.2.1 Altitude/Height; pressure/density altitude, gross/net height, screen height, re light altitude, stabilising altitude

1.1.2.2 Temperature; ISA, OAT, TAT, reasons for difference, declared temperature

1.1.2.3 Gross and net performance

1.1.2.4 Speed associated with basic and scheduled aeroplane performance

1.1.2.5 Weight; all weights associated with aeroplane performance

1.1.2.6 Distances; definitions of distances available associated with aeroplane performance including stopway and clearway

1.1.2.7 Effect of runway slope

1.1.3 National Legislation

1.1.3.1 Differences According to State

1.1.3.2 Performance probabilities; a basic understanding of derivation and legislation for the provision of flight safety, to include EROPS and ETOPS where applicable

1.1.3.3 Operational and Airworthiness Requirements; introduction to appropriate AN(G)R and MCAR and JAR.

1.1.3.4 Scheduling of Performance Data

1.1.3.5 Performance Groups; a basic understanding of the relevance and differences between performance groups (according to state)

1.1.4 Elements of Performance Assessment

1.1.4.1 The Aerodrome; distances (refer 1.1.2.), slope (methods of determination), obstructions, runway surface, sources of data

1.1.4.2 Meteorological Data; pressure/density altitude, temperatures (those to be used appropriate to phase of flight) wind components (including regulatory factors), runway state, sources of data

##### **1.2 Performance of Aeroplanes Certificated Under Performance groups A and B MCAR 1996.**

1.2.1 Definitions, Abbreviations and Terms Used

1.2.1.1 Any which are new to this performance group; notably,  $V_{ef}$ (engine failure speed),  $V_1$ ,  $V_r$ ,  $V_2$ ,  $V_{mbe}$ ,  $V_{stop}$ ,  $V_{mcg}$ ,  $V_{mca}$ , definition of balanced field

- length
- 1.2.2 Take off requirements
  - 1.2.2.1 Operational AN(G)R and Airworthiness (BCAR/JAR) Requirements.
  - 1.2.2.2 WAT Limit: climb gradients, effect of pressure altitude and temperature and flap configuration
  - 1.2.2.3 Take-off Distances: derivation of the take-off distance required, take-off run required, emergency distance (accelerate-stop distance), scheduling of performance data for the above requirements, effect of aeroplane weight, pressure altitude and temperature, runway slope and wind velocity, wind velocity and flap configuration
  - 1.2.2.4 Runways: effect of grass and soil, contamination
  - 1.2.2.5 Use of Aeroplane Flight Manual Data and Charts; determination of maximum permitted take-off weights (MTOW)
- 1.2.3 Climb performance
  - 1.2.3.1 Use of Aeroplane Flight Manual Data (all engines operating) effect of aeroplane weight, pressure, altitude, temperature and wind, determination of rate of climb/gradient, determination of recommended and optimum climb speeds (best angle of climb, best rate of climb) flap retraction speeds, time-to climb calculations for reaching cruise altitude
- 1.2.4 Cruise performance
  - 1.2.4.1 Use of Aeroplane Flight Manual Data (all engines operating); determination of maximum cruise altitude, buffet boundary protection, cruise control (power settings, speeds, and fuel consumption for maximum range and endurance) speed/range trade-offs for optimum performance, effects of the use of maximum continuous power settings
  - 1.2.4.2 Use of Aeroplane Flight Manual Data (one engine inoperative); as for 1.2.4.1 determination of stabilizing altitude/weight, determination of drift down, range and optimum speed, effect of re-light altitude on drift down, drift down procedures (engine bleeds etc.).
- 1.2.5 Descent and landing performance
  - 1.2.5.1 WAT Limit; climb gradients, effect of pressure altitude and temperature, effect of engine bleeds.
  - 1.2.5.2 Landing Distance; effect of aeroplane weight, effect of pressure altitude and temperature, runway slope and wind velocity, state regulatory factors pertaining to the above
  - 1.2.5.3 Runways: effect of grass and soil, contamination
  - 1.2.5.4 Use of Aeroplane Flight Manual Data; determination of maximum permitted planned landing weight (regulatory safety factors), determination of approach and landing speeds ( $V_{at}$ ), determination of maximum permitted planned landing weight and landing distance required- for wet/dry, slippery/contaminated runway and descent and landing performance calculations for alternate aerodrome, re-assessment of landing performance overhead destination/alternate aerodrome (parameters to be used)
- 1.2.6 Optional Procedures
  - 1.2.6.1 Noise Abatement Procedures; effect on climb performance
  - 1.2.6.2 Variable Thrust Take-Off; principles of variable thrust take-off, limitations. methods of determining thrust required with regard to ambient conditions at a given aerodrome, effect of reduced thrust on take-off distances, effect of reduced thrust on take-off speeds ( $V_1$ ,  $V_r$ ), effect of reduced thrust on climb

- performance and obstacle clearance, procedures to be used
- 1.2.6.3 Increased V2 Procedure; principles of increased V2 procedure, limitations, effect on take-off distances (take-off speeds climb performance; obstacle clearance), significant speeds involved
- 1.2.6.4 Performance effect associated with the minimum equipment list (MEL)