

032

PERFORMANCE

**COMMERCIAL PILOT LICENCE
(FLIGHT PERFORMANCE AND PLANNING)**

JAR-FCL REF NO	LEARNING OBJECTIVES	REMARKS
032 00 00 00	<u>PERFORMANCE</u>	
032 01 00 00	<u>PERFORMANCE OF SINGLE-ENGINE AEROPLANES NOT CERTIFIED UNDER JAR/FAR 25 (LIGHT AEROPLANES) – PERFORMANCE CLASS B</u>	
032 01 01 00	<u>Definitions of terms and speeds used</u> <ul style="list-style-type: none"> – Define the following terms <ul style="list-style-type: none"> – Density altitude – Climb gradient – Unaccelerated flight – Definition of speeds in general use – Clear 50 ft speed (Take-off Safety Speed) – Touch down speed (Reference Landing Speed) 	
032 01 02 00	<u>Take-off and Landing Performance</u>	
032 01 02 01	Effect of aeroplane mass, wind, density, altitude, runway slope, runway conditions	
032 01 02 02	Use of Aeroplane Flight Manual data <ul style="list-style-type: none"> – Determine the following distances: <ul style="list-style-type: none"> – Take-off distance to 50 ft, landing distance from 50 ft , ground roll distance during landing – Climb height at given distance (of obstacle) from end of Take off Distance – Determine wind component for landing performance – Determine the take-off speeds – Determine the maximum allowed take-off weight 	Appropriate chart and data are given

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032 01 03 00	<p><u>Climb, cruise and descent performance</u></p> <ul style="list-style-type: none"> – Explain the effect of temperature, wind, altitude on climb performance – State rate of climb, angle of climb and minimum rate of descent and descent angle – Resolve the forces during a steady climb-, and glide – State the opposing forces during a horizontal steady flight – Explain the effect of mass and wind on the descent performance 	<p>Appropriate chart and data Are given</p>
032 01 03 01	<p>Use of Aeroplane Flight Manual data</p> <ul style="list-style-type: none"> – Determine the cruise true airspeed (TAS) – Determine the manifold air pressure (MAP) – Determine distance covered, time and fuel consumption during climb – Determine the range for certain conditions 	
032 01 03 02	<p>Effect of density altitude and aeroplane mass</p> <ul style="list-style-type: none"> – Explain the effect of altitude and temperature on cruise performance – Explain the effect of mass on power required, drag and airspeed – Explain the effect of altitude and temperature on the power required curve 	
032 01 03 03	<p>Endurance and the effects of the different recommended power settings</p> <ul style="list-style-type: none"> – Explain the effect of wind on the maximum endurance speed 	
032 01 03 04	<p>Still air range with various power settings</p> <ul style="list-style-type: none"> – Explain the effect of various power settings on the still air range 	
032 02 00 00	<p><u>PERFORMANCE OF MULTI-ENGINE AEROPLANES NOT CERTIFIED UNDER JAR/FAR 25 (LIGHT</u></p>	

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	<u>TWIN) – PERFORMANCE CLASS B</u>	
032 02 01 00	<u>Definitions of terms and speeds</u> <ul style="list-style-type: none"> – Define the following terms: <ul style="list-style-type: none"> – Critical engine – Speed stability, Region of reversed command and normal command – Definition of speeds – Define the following speeds: <ul style="list-style-type: none"> – V_x speed for best angle of climb – V_y speed for best rate of climb 	
032 02 01 01	Any new terms used for multi-engine aeroplane performance (032 01 01 00) <ul style="list-style-type: none"> – Explain the effect of the critical engine inoperative on the power required and the total drag – Select from a list the correct order of take-off speeds – Explain the parameter(s), which must be maintained at V_{MCA}, in case of engine failure – Explain the effect of engine failure on controllability under given conditions <ul style="list-style-type: none"> – State the effect for propeller- and light twin jet aeroplanes – Explain the significance of $V_{max\ tire}$ 	
032 02 02 00	<u>Importance of performance calculations</u>	
032 02 02 01	Determination of performance under normal conditions <ul style="list-style-type: none"> – Explain the effect of centre of gravity on fuel consumption – Explain the effect of flap setting on the ground roll distance 	

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032 02 02 02	<ul style="list-style-type: none"> – For both fixed and constant speed propellers, explain the effect of airspeed on thrust during the take-off run <p>Consideration of effects of pressure altitude, temperature, wind, aeroplane mass, runway slope and runway conditions</p> <ul style="list-style-type: none"> – Explain the effect of temperature on the brake energy limited take-off mass – Explain the effect of pressure altitude on the field length limited take-off mass – Explain the effect of runway contamination on the take-off distance – Explain the effect of mass on the speed for best angle, and best rate on the descent 	
032 02 03 00	<p><u>Elements of performance</u></p> <ul style="list-style-type: none"> – Discuss the aeroplane's C_L / C_D curve for specified configurations – Explain the certified engine thrust ratings – Explain the effect of temperature and altitude on the fuel flow for jet engine aeroplanes in given conditions – Explain the effect of bank angle at constant TAS on the load factor – Explain the effect of wind on the maximum range speed and speed for maximum climb angle – Explain the effect of mass on descent performance – Explain the effect of airspeed on the thrust of a jet engine aeroplane at constant RPM – Explain the effect of speed and angle of attack on the induced drag – Interpret the 'thrust required' and 'thrust available' curves – Interpret the 'power required' and 'power available' curves – State and explain specific range (SR) and aeroplane's specific fuel consumption (SFC) 	

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032 02 03 01	<p>Take-off and landing distances</p> <ul style="list-style-type: none"> – Explain the effect of thrust reverser on take-off mass calculation – State the percentage of accountability for head, and tailwind during take-off calculations – Determine landing distance required (dry and wet) for destination and alternate airports valid for jet- and propeller aeroplanes 	
032 02 03 02	<p>Rate of climb and descent</p> <ul style="list-style-type: none"> – Explain the effect of selected power settings, speeds, mass and flaps on the rate of climb versus airspeed curve – Explain the effect of mass, altitude and flaps on the idle descent 	
032 02 03 03	<p>Cruise altitude and altitude ceiling</p> <ul style="list-style-type: none"> – Define service, and absolute ceiling and optimum altitude – Explain effect of altitude, mass, configuration on total drag under given conditions – Describe manoeuvring capability, low, and high speed limits 	
032 02 03 04	<p>Payload/range trade-offs</p> <ul style="list-style-type: none"> – Interpret the payload-range diagram – Describe cruise technique 	
032 02 03 05	<p>Speed/Economy trade-off</p> <ul style="list-style-type: none"> – Explain the correlation between maximum endurance and fuel consumption 	
032 02 04 00	<p><u>Use of performance graphs and tabulated data</u></p>	
032 02 04 01	<p>Performance section of Aeroplane Flight Manual</p>	