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Federal Department of the Enviroment, Transport, Energy and Communications DETEC
Federal Office of Civil Aviation FOCA
Safety – Division Flight Personnel
3003 Berne

CB-IR and BIR Conversion
Oral Examination Guidance Material

This document contains a list of learning objectives in the subjects Air Law, Flight Planning & Monitoring, that may be used by IRE(A) for the conduct of Oral Examinations required in case of **a Conversion of a 3rd country License IR** to a **Competency-based IR** or **Basic IR**. The Oral Theoretical Knowledge Examination shall be logged on the relevant page of the form 60.420 or 60.422 respectively.

	Air Law
1)	Explain the requirements for plus validity and privileges of Instrument Ratings
2)	Explain why a time check has to be obtained before flight
3)	Describe the necessary action when an aircraft is experiencing a COM failure
4)	State the responsibility of the operator when unable to utilize the published departure procedures
5)	Explain when the 'omni-directional method' is used for departure
6)	Describe the solutions when an omni-directional procedures is not possible
7)	Give reasons for establishing aircraft categories for the approach
8)	State the minimum obstacle clearance provided by the minimum sector altitudes (MSA) established for an aerodrome
9)	Describe the point of origin, shape, size and sub-divisions of the area used for MSAs
10)	Explain why a Pilot should not descend below OCA/Hs which are established for -precision approach procedures -a non-precision approach procedures — visual (circling) procedures
11)	Translate the following abbreviations into plain language: DA, DH, OCA, OCH, MDA, MDH, MOC, DA/H, OCA/H, MDA/H
12)	Explain the relationship between the terms: DA, DH, OCA, OCH, MDA, MDH, MOC, DA/H, OCA/H, MDA/H
13)	Define the terms IAF, IF, FAF, MAPt and TP
14)	State the accuracy of facilities providing track (VOR, ILS, NDB)
15)	State the optimum descent gradient (preferred for a precision approach) in degrees and per cent
16)	Name the five standard segments of an instrument APP procedure and state the beginning and end for each of them
17)	Describe where an ARR route normally ends
18)	State whether or not omni-directional or sector arrivals can be provided
19)	Explain the main task for the initial APP segment
20)	Describe the main task of the intermediate APP segment

	Air Law
21)	State the main task of the final APP segment
22)	Name the two possible aims of a final APP
23)	Explain the term ‘final approach point’ in case of an ILS approach
24)	State what happens if an ILS GP becomes inoperative during the APP
25)	Describe the main task of a missed approach procedure
26)	Define the term ‘missed approach point (MAPt)’
27)	State the pilot‘s reaction if, upon reaching the MAPt, the required visual reference is not established
28)	Describe what a pilot is expected to do in the event a missed approach is initiated prior to arriving at the MAPt
29)	State whether the pilot is obliged to cross the MAPt at the height/altitude required by the procedure or whether he is allowed to cross the MAPt at an altitude/height greater than that required by the procedure
30)	Describe what is meant by ‘visual manoeuvring (circling)’
31)	State the conditions to be fulfilled before descending below MDA/H in a visual manoeuvring (circling) approach
32)	State how the pilot is expected to behave after initial visual contact during a visual manoeuvring (circling)
33)	Describe what the pilot is expected to do if visual reference is lost while circling to land from an instrument approach
34)	Describe the shape and terminology associated with the holding pattern
35)	State the bank angle and rate of turn to be used whilst flying in a holding pattern
36)	Explain why pilots in a holding pattern should attempt to maintain tracks and how this can be achieved
37)	Describe where outbound timing begins in a holding pattern
38)	State where the outbound leg in a holding terminates if the outbound leg is based on DME
39)	Describe the three heading entry sectors for entries into a holding pattern
40)	Define the terms ‘parallel entry’, ‘offset entry’ and ‘direct entry’
41)	Determine the correct entry procedure for a given holding pattern
42)	State the still air time for flying the outbound entry heading with or without DME
43)	Define the terms ‘QNH’ and ‘QFE’
44)	Define the term ‘Flight Level’ (FL)
45)	State the interval by which consecutive flight levels shall be separated
46)	Describe how flight levels are numbered
47)	Define the term ‘Transition Altitude’
48)	Define the term ‘Transition Level’

	Air Law
49)	State how the vertical position of aircraft shall be expressed at or below the Transition Altitude and Transition Level
50)	Define the term 'Transition Layer'
51)	State when the QNH altimeter setting shall be made available to departing aircraft
52)	State how a QNH altimeter setting shall be made available to aircraft approaching a controlled aerodrome for landing
53)	State where during the climb the altimeter setting shall be changed from QNH to 1013.2 hPa
54)	Describe when a pilot of an aircraft intending to land at an AD shall obtain the transition level
55)	Describe when a pilot of an aircraft intending to land at an AD shall obtain the actual QNH altimeter setting
56)	State where the altimeter settings shall be changed from 1013.2 hPa to QNH during descent for landing
57)	State the modes and codes that the pilot shall operate in the absence of any ATC directions or regional air navigation agreements
58)	State when the pilot shall 'SQUAWK IDENT'
59)	State the transponder mode and code to indicate: -a state of emergency -a Communication failure - unlawful interference
60)	Describe the consequences of a transponder failure in flight
61)	State the primary action of the pilot in the case of an unserviceable transponder before departure when no repair or replacement at this aerodrome is possible
62)	Understand the various rules and services that apply in the various classes of airspace
63)	Describe the aim of clearances issued by ATC with regard to IFR, VFR or special VFR flights and refer to the different airspaces
64)	Explain what is meant by the expression 'clearance limit'
65)	Explain the meaning of the phrases 'cleared via flight planned route', 'cleared via (designation) departure' and 'cleared via (designation) arrival' in an ATC clearance.
66)	List which items of an ATC clearance shall always be read back by the flight crew
67)	Explain the reason for speed control by ATC
68)	Explain how the change from IFR to VFR can be initiated by the PIC
69)	Define the following terms: — transition level — transition layer — and transition altitude
70)	Indicate how the vertical position of an aircraft in the vicinity of an aerodrome shall be expressed at or below the transition altitude, at or above the transition level and while climbing or descending through the transition layer

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	Air Law
71)	List the six items that are normally included in a voice position report
72)	Name the item of a position report which must be forwarded to ATC with the initial call after changing to a new frequency
73)	Understand the difference between the type of separation provided within the various classes of airspace and between the various types of flight
74)	State who is responsible for the avoidance of collision with other aircraft when operating in VMC
75)	Explain the term 'Expected Approach Time' and the procedures for its use
76)	State the reasons which could probably lead to the decision to use another take-off or landing direction than the one into the wind
77)	Define the term 'radar vectoring'
78)	Explain the procedures for the conduct of Surveillance Radar Approaches (SRA)
79)	State the Mode and Code of SSR equipment a pilot might operate in a (general) state of emergency or (specifically) in case the aircraft is subject to unlawful interference
80)	Describe the expected action of aircraft after receiving a broadcast from ATS concerning the emergency descent of an aircraft
81)	Name the colours used for the various markings (RWY, TWY, aircraft stands, apron safety lines)
82)	Describe the application and characteristics of: — RWY centre line markings — THR marking
83)	Describe the wing bars of PAPI and APAPI
84)	Interpret what the pilot will see during approach, using PAPI, APAPI, T-VASIS and ATVASIS

	Flight Planning and Flight Monitoring
1)	Select the preferred airway(s) or route(s) considering: — Altitudes and Flight levels — Standard routes — ATC restrictions — Shortest distance — Obstacles — Any other relevant data
2)	Determine courses and distances from en-route charts
3)	Determine bearings and distances of waypoints from radio navigation aids on en-route charts
4)	Define the following altitudes: — Minimum En-route Altitude (MEA) — Minimum Obstacle Clearance Altitude (MOCA) — Minimum Off Route Altitude (MORA) — Grid Minimum Off-Route Altitude (Grid MORA) — Maximum Authorised Altitude (MAA) — Minimum Crossing Altitude (MCA) — Minimum Holding Altitude (MHA)
5)	Extract the following altitudes from the chart(s): — Minimum En-route Altitude (MEA) — Minimum Obstacle Clearance Altitude (MOCA) — Minimum Off Route Altitude (MORA) — Grid Minimum Off-Route Altitude (Grid MORA) — Maximum Authorised Altitude (MAA) — Minimum Crossing Altitude (MCA) — Minimum Holding Altitude (MHA)
6)	Explain the reasons for studying SID and STAR charts
7)	State the reasons why the SID and STAR charts show procedures only in a pictorial presentation style which is not to scale
8)	Interpret all data and information represented on SID and STAR charts, particularly: — Routings. — Distances — Courses — Radials — Altitudes/Levels — Frequencies — Restrictions
9)	Identify SIDs and STARs which might be relevant to a planned flight
10)	State the reasons for being familiar with instrument approach procedures and appropriate data for departure, destination and alternate airfields
11)	Select instrument approach procedures appropriate for departure, destination and alternate airfields

	Flight Planning and Flight Monitoring
12)	Interpret all procedures, data and information represented on Instrument Approach Charts, particularly: — Courses and Radials — Distances — Altitudes/Levels/Heights — Restrictions — Obstructions — Frequencies — Speeds and times — Decision Altitudes/Heights (DA/H) and Minimum Descent Altitudes/Heights (MDA/H) — Visibility and Runway Visual Ranges (RVR) — Approach light systems
13)	Find communication frequencies and call signs for the following: — Control agencies and service facilities — Flight information services (FIS) — Weather information stations — Automatic Terminal Information Service (ATIS)
14)	Find the frequency and/or identifiers of radio navigation aids
15)	Complete the navigation plan with the courses, distances and frequencies taken from charts
16)	Find Standard Instrument Departure and Arrival Routes to be flown and/or to be expected
17)	Determine the position of Top of Climb (TOC) and Top of Descent (TOD) given appropriate data
18)	Determine variation and calculate magnetic/true courses
19)	Calculate True Air Speed (TAS) by given aircraft performance data, altitude and Outside Air Temperature (OAT)
20)	Calculate Wind Correction Angles (WCA)/Drift and Ground Speeds (GS)
21)	Determine all relevant Altitudes/Levels particularly MEA, MOCA, MORA , MAA, MCA, MRA and MSA
22)	Calculate individual and accumulated times for each leg to destination and alternate airfields
23)	Convert between volume, mass and density given in different units which are commonly used in aviation
24)	Determine relevant data from flight manual, such as fuel capacity, fuel flow/consumption at different power/thrust settings, altitudes and atmospheric conditions
25)	Calculate attainable flight time/range given fuel flow/consumption and available amount of fuel
26)	Calculate the required fuel given fuel flow/consumption and required time/range to be flown
27)	Calculate the required fuel for an IFR flight given expected meteorological conditions and expected delays under defined conditions.

	Flight Planning and Flight Monitoring
28)	Find and analyse the latest state at the departure, destination and alternate aerodromes, in particular for: — Opening hours — Work in Progress (WIP) — Special procedures due to Work in Progress (WIP) — Obstructions — Changes of frequencies for communications, navigation aids and facilities
29)	Find and analyse the latest en-route state for: — Airway(s) or Route(s) — Restricted, Dangerous and Prohibited areas — Changes of frequencies for communications, navigation aids and facilities
30)	State the reasons for a fixed format of an ICAO ATS Flight Plan (FPL)
31)	Determine the correct entries to complete an FPL plus decode and interpret the entries in a completed FPL, particularly for the following: — Aircraft identification (Item 7) — Flight rules and type of flight (Item 8) — Number and type of aircraft and wake turbulence category (Item 9) — Equipment (Item 10) — Departure aerodrome and time (Item 13) — Route (Item 15) — Destination aerodrome, total estimated elapsed time and Alternate aerodrome (Item 16) — Other information (Item 18) — Supplementary Information (Item 19)
32)	Complete the Flight Plan using information from the following: — Navigation plan — Fuel plan — Operator's records for basic aircraft information
33)	Explain the requirements for the submission of an ATS Flight Plan
34)	Explain the actions to be taken in case of Flight Plan changes
35)	State the actions to be taken in case of inadvertent changes to Track, TAS and time estimate affecting the current Flight Plan
36)	Explain the procedures for closing a Flight Plan

	Meteorology
1)	Describe qualitatively and quantitatively the temperature lapse rates of the troposphere (mean value 0.65°C/100 m or 2°C/1 000 ft and actual values)
2)	Explain the characteristics of inversions and of an isothermal layer
3)	Explain the cooling and warming of the air on the earth or sea surfaces
4)	Describe qualitatively the influence of the clouds on the cooling and warming of the surface and the air near the surface
5)	Explain the influence of the wind on the cooling and warming of the air near the surfaces
6)	Define atmospheric pressure
7)	List the units of measurement of the atmospheric pressure used in aviation (hPa, inches)
8)	Describe isobars on the surface weather charts
9)	Explain the pressure variation with height
10)	Describe qualitatively the variation of the barometric lapse rate Note: The average value for the barometric lapse rate near mean sea level is 27 ft (8 m) per 1 hPa, at about 5500 m/AMSL is 50 ft (15 m) per 1 hPa
11)	Describe and interpret contour lines (isohypses) on a constant pressure chart
12)	Describe the relationship between pressure, temperature and density
13)	Describe the vertical variation of the air density in the atmosphere
14)	Describe the effect of humidity changes on the density of air
15)	Explain the use of standardised values for the atmosphere (ISA)
16)	List the main values of the ISA (mean sea level pressure, mean sea level temperature, the vertical temperature lapse rate up to 20 km, height and temperature of the tropopause)
17)	Calculate the standard temperature in degree Celsius for a given flight level
18)	Determine a standard temperature deviation by the difference between the given outside air temperature and the standard temperature
19)	Define the following terms and abbreviations and explain how they are related to each other: height, altitude, pressure altitude, flight level, level, true altitude, true height, elevation, QNH, QFE and standard altimeter setting
20)	Describe the terms transition altitude, transition level, transition layer, terrain clearance, lowest usable flight level
21)	Calculate the different readings on the altimeter when the pilot changes the altimeter setting
22)	Illustrate with a numbered example the changes of altimeter setting and the associated changes in reading when the pilot climbs through the transition altitude or descends through the transition level
23)	Derive the reading of the altimeter of an aircraft on the ground when the pilot uses the different settings
24)	Explain the influence of the air temperature on the distance between the ground and the level read on the altimeter and between two flight levels

	Meteorology
25)	Explain the influence of pressure areas on the true altitude
26)	Determine the true altitude/height for a given altitude/height and a given ISA temperature deviation
27)	Describe why and how the wind changes direction and speed with height in the friction layer in the northern and in the southern hemisphere (rule of thumb)
28)	Describe and explain the origin and formation of mountain waves
29)	Explain how mountain waves may be identified by their associated meteorological phenomena
30)	Describe turbulence and gustiness
31)	List common types of turbulence (convective, mechanical, orographic, frontal, clear air turbulence)
32)	Indicate the sources of atmospheric humidity
33)	Define dew point
34)	Define relative humidity
35)	Describe the relationship between temperature and dew point
36)	Estimate the relative humidity of the air from the difference between dew point and temperature
37)	Explain the influence of relative humidity on the height of the cloud base
38)	List cloud types typical for stable and unstable air conditions
39)	Identify by shape cirriform, cumuliform and stratiform clouds
40)	Explain the influence of inversions on vertical movements in the atmosphere
41)	Name the factors contributing in general to the formation of fog and mist
42)	Name the factors contributing to the formation of haze
43)	Describe significant characteristics of orographic fog
44)	Summarise the conditions for the dissipation of orographic fog
45)	List and describe the types of precipitation given in the TAF and METAR codes (drizzle, rain, snow, snow grains, ice pellets, hail, small hail, snow pellets, ice crystals, freezing drizzle, freezing rain)
46)	Assign typical precipitation types and intensities to different clouds
47)	Describe the boundaries between air masses (fronts)
48)	Define front and frontal surface (frontal zone)
49)	Define a warm front
50)	Describe the cloud, weather, ground visibility and aviation hazards at a warm front depending on the stability of the warm air
51)	Explain the seasonal differences in the weather at warm fronts
52)	Describe the structure, slope and dimensions of a warm front
53)	Define a cold front
54)	Explain the seasonal differences in the weather at cold fronts

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	Meteorology
55)	Describe the structure, slope and dimensions of a cold front
56)	Describe the cloud, weather, ground visibility and aviation hazards in a warm sector
57)	Describe the cloud, weather, ground visibility and aviation hazards behind the cold front
58)	Define the term occlusion
59)	Identify on a surface weather chart the typical flat pressure pattern
60)	Describe the weather associated with a flat pressure pattern
61)	Explain the general weather conditions under which ice accretion on airframe occurs
62)	Indicate in which circumstances ice can form on an aircraft on the ground: air temperature, humidity, precipitation
63)	Explain in which circumstances ice can form on an aircraft in flight: inside clouds, in precipitation, outside clouds and precipitation
64)	Describe the different factors influencing the intensity of icing: air temperature, amount of supercooled water in a cloud or in precipitation, amount of ice crystals in the air, speed of the aircraft, shape (thickness) of the airframe parts (wings, antennas, etc)
65)	Define clear ice
66)	Define rime ice
67)	Define hoar frost
68)	State the ICAO qualifying terms for the intensity of icing
69)	Describe, in general, the hazards of icing
70)	Assess the dangers of the different types of ice accretion
71)	State the ICAO qualifying terms for the intensity of turbulence
72)	Describe the effects of turbulence on an aircraft in flight
73)	Indicate the possibilities of avoidance — in the flight planning: weather briefing, choice of track and altitude — during flight: choice of appropriate track and altitude
74)	Define wind shear (vertical and horizontal)
75)	Describe conditions where and how wind shear can form (e.g. thunderstorms, squall lines, fronts, inversions, land and sea breeze, friction layer, relief)
76)	Describe the effects on flight caused by wind shear
77)	Indicate the possibilities of avoidance — in the flight planning — during flight
78)	Name the cloud types which indicate the development of thunderstorms
79)	Describe the different types of thunderstorms, their location, the conditions for and the process of development and list their properties (air mass thunderstorms, frontal thunderstorms, squall lines, supercell storms, orographic thunderstorms)
80)	Assess the average duration of thunderstorms and their different stages

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	Meteorology
81)	Summarise the flight hazards of a fully developed thunderstorm
82)	Describe and asses 'St. Elmo's fire'
83)	Describe the effect of lightning strike on aircraft and flight execution
84)	Describe practical examples of flight techniques used to avoid the hazards of thunderstorms
85)	Describe the influence of a mountainous terrain on cloud and precipitation
86)	Describe the effects of the Foehn
87)	Describe the influence of a mountainous area on a frontal passage
88)	Indicate in a sketch of a chain of mountains the turbulent zones (mountain waves, rotors)
89)	Describe the reduction of visibility caused by precipitation: drizzle, rain, snow
90)	Describe the differences between the ground visibility, flight visibility, slant visibility and vertical visibility when an aircraft is above or within a layer of haze or fog
91)	Define ground visibility
92)	List the units used for visibility (m, km)
93)	Define runway visual range
94)	List the units used for runway visual range (m)
95)	Compare visibility and runway visual range
96)	Define ceiling
97)	Name the unit and the reference level used for information about cloud base (ft)
98)	Define vertical visibility
99)	Name the unit used for vertical visibility (ft)
100)	Interpret ground weather radar images
101)	Describe the basic principle and the type of information given by airborne weather radar
102)	Describe the limits and the errors of airborne weather radar information
103)	Interpret typical airborne weather radar images
104)	Decode and interpret significant weather charts (low, medium and high level)
105)	Describe from a significant weather chart the flight conditions at designated locations and/or along a defined flight route at a given flight level
106)	Describe, decode and interpret the following aviation weather messages (given in written and/or graphical format): METAR, SPECI, TREND, TAF, SIGMET, AIRMET, GAMET, ATIS, VOLMET, special air-report, volcanic ash advisory information
107)	List, in general, the cases when a SIGMET and an AIRMET are issued
108)	Describe, decode (by using a code table) and interpret the following messages: Runway State Message (as written in a METAR), GAFOR