

DGCA GROUND SCHOOL — AIR REGULATIONS

CHAPTER 18

Special Operational Procedures & Hazards

General Aspects — A complete, exam-focused study companion for CPL & ATPL student pilots, covering equipment lists, icing, fire, decompression, wind shear, wake turbulence, security and runway hazards.

Prepared by **Ghost Aviator** Subject — **Air Regulations** Target — **CPL / ATPL**

Format — **Notes + 109 MCQ Bank**

① HOW TO USE THESE NOTES

Every box is colour-coded so your eye learns the rule before your brain does:

- **Blue boxes** — Definitions & core concepts. Learn the language first.
- **Green boxes** — Standard Operating Procedures & allowances. What you are permitted / expected to do.
- **Red boxes** — Strict limitations, warnings & prohibitions. Cross these and you bust a regulation.
- **Amber / dashed boxes** — Memory aids & exam traps.

Every exact DGCA figure is shown like this — **240 m (800 ft)** — so the precise value is never lost. Examiners test the number, not the paraphrase.

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1 Minimum Equipment List (MEL & MMEL)

Aircraft are certified with a great deal of redundant equipment. The MEL is the document that tells the crew whether the aeroplane may legally and safely fly with a particular item unserviceable — turning a "go / no-go" judgement into a documented decision.

① DEFINITION — MEL

The operator **shall include in the Operations Manual a Minimum Equipment List (MEL)**, approved by the DGCA, which enables the **pilot-in-command** to determine whether a flight may be **commenced or continued from any intermediate stop** should any instrument, equipment or system become inoperative.

① DEFINITION — MMEL

The **Master Minimum Equipment List (MMEL)** defines the equipment on which certain in-flight failures can be allowed, and the conditions under which this allowance can be accepted. The **MMEL is drawn up by the manufacturer and approved by the DGCA.**

The relationship is a chain of authority. The manufacturer writes the master list (MMEL); the operator tailors it into its own MEL for its specific fleet and operations; and the DGCA approves both. The MEL can never be *less* restrictive than the MMEL.

Who Does What — The Approval Chain

FLOWCHART — FROM MMEL TO THE CREW'S GO/NO-GO DECISION

```
flowchart TD
    A["MANUFACTURER  
drafts the MMEL  
(Master Minimum Equipment List)"]:::mfr
    B["DGCA  
approves MMEL"]:::reg
    C["OPERATOR  
creates its own MEL  
(placed in the Operations Manual)"]:::op
    D["DGCA  
approves the MEL"]:::reg
    E["PILOT-IN-COMMAND  
uses MEL to decide:  
may the flight be commenced  
or continued?"]:::crew
    A --> B --> C --> D --> E

    classDef mfr fill:#e8f0fb,stroke:#2f6db0,color:#16365c;
    classDef reg fill:#fdf3e0,stroke:#c8961e,color:#7a5708;
    classDef op fill:#eaf6ee,stroke:#3c9a5a,color:#1f5232;
    classDef crew fill:#fdecea,stroke:#d9534f,color:#7d211d;
```

✓ SOP — DAY/NIGHT & IMC TAILORING

The DGCA may require an operator's approved MEL to **specify the operating equipment required for night and/or IMC operations, and separately for day/VMC operations**. The same aircraft may therefore be despatchable for a day VMC sector but grounded for a night IMC sector with the identical defect.

★ EXAM TRAP

MMEL = Manufacturer. MEL = found in the Operations Manual. The reference document a crew opens first when equipment fails while still parked is the **MEL** — not the Flight Manual, and not the "Abnormal & Emergency Procedures" chapter.

2 Aeroplane Flight Manual (AFM)

① CORE RULE

Aeroplanes **shall be operated in accordance with the provisions of the Flight Manual approved by the State of Design.**

⚠ LIMITATION

An aeroplane **shall be operated in compliance with the terms of its Certificate of Airworthiness and within the approved operating limitations contained in its Flight Manual.** The AFM limitations are not advisory — they are legally binding boundaries.

Factors That Must Be Accounted For

When applying AFM performance data, the crew/operator **shall take account of all factors that significantly affect the performance of the aeroplane**, including but not limited to:

✓ PERFORMANCE FACTORS

- The **mass** of the aeroplane;
- The **operating procedures**;
- The **pressure-altitude** appropriate to the elevation of the aerodrome;
- The **ambient temperature**;
- The **wind**;
- The **runway slope**; and
- The **surface condition of the runway** — i.e. presence of snow, slush, water and/or ice for landplanes; water surface condition for seaplanes.

Ice is the silent destroyer of lift. This section covers when an aircraft may take off, how contamination is detected, the two distinct fluid procedures, and why even an invisible film of ice matters.

3.1 The Ground De-icing Rule

⚠ **STRICT LIMITATION**

A flight to be planned or expected to operate in **suspected or known ground icing conditions shall NOT take off** unless the aeroplane has been **inspected for icing** and, if necessary, has been given appropriate **de-icing / anti-icing treatment**. Accumulation of ice or other naturally occurring contaminants **shall be removed** so that the aeroplane is kept in an **airworthy condition prior to take-off**.

3.2 Definition & Recognition — On Ground / In-Flight

⚠ **OPERATING PROHIBITIONS**

(a) An operator **shall not operate an aeroplane in expected or actual icing conditions unless it is certificated and equipped to operate in icing conditions**.

(b) An operator **shall not operate an aeroplane in expected or actual icing conditions at night** unless it is equipped with a means to **illuminate or detect the formation of ice**.

Any illumination used must be of a type that **will not cause glare or reflection** that would handicap crew members in the performance of their duties.

3.3 De-icing, Anti-icing & Types of Fluid

The two most common techniques for protecting an aircraft's critical surfaces are **de-icing** and **anti-icing** — they sound similar but do opposite jobs.

Table 3.1 — De-icing vs. Anti-icing

ASPECT	DE-ICING	ANTI-ICING
Purpose	Procedure by which existing frozen contamination (frost, ice, snow or slush) is removed from the aircraft.	Procedure that protects a clean surface against the accumulation of frozen contaminants for a limited period.
Fluid used	Heated Aircraft Deicing Fluid (ADF) — provides clean surfaces.	Aircraft Anti-Icing Fluid (AAF) — applied to a surface already free of frozen contaminants.
Surface state before	Surface is contaminated.	Surface is already free of frozen contamination.
Effect	Restores a clean surface.	Buys a limited "holdover" period of protection.

① CONCEPT — WHEN ARE FLUIDS NEEDED?

De/anti-icing fluids are **only required until the aircraft becomes airborne**, after which the on-board de/anti-icing system then operates. The ground fluids are a bridge to get you safely into the air; the airframe system takes over thereafter.

3.4 Performance Deterioration — On Ground / In-Flight

⚠ THE CRITICAL NUMBER

A very small amount of roughness — in thickness as low as **0.40 mm (1/64 in)** — caused by ice, snow or frost, **disrupts the airflow** over the lift and control surfaces. The consequence is **severe lift loss, increased drag and impaired manoeuvrability**, particularly during the take-off and initial climb phases.

⚠ WHAT ICE DOES TO THE AIRCRAFT

- **Interferes with movement** of control surfaces.
- **Adds significantly to aircraft weight.**
- **Severely affects instruments** by blocking static and pitot vents, or angle-of-attack vanes.
- **Obscures wind screens**; obstructs the undercarriage; forms skin friction.

Remember the instructor's rule: "There is no such thing as an insignificant amount of ice."

★ AERODYNAMIC EFFECT

Accumulation of snow or ice on an aircraft **in flight** causes an **increase in the stalling speed**. It does *not* raise the stall angle of attack — in fact contamination makes the wing stall *earlier* (at a lower angle).

3.5 Cold-Soaking & Clear Ice

① DEFINITION — COLD-SOAKING

Ice can form **even when the Outside Air Temperature (OAT) is well above 0°C (32°F)**. An aircraft with wing fuel tanks may carry fuel cold enough to lower the wing-skin temperature **below freezing**. This is **cold-soaking**. It also occurs after cruising at high altitude for a period followed by a quick descent into a humid environment — liquid water contacting the below-freezing wing then freezes onto it.

Cold-soaking can also be caused by **fuelling an aircraft with cold fuel**. With rain or high humidity present, ice can form on the cold-soaked wing and accumulate over time. This ice can be **invisible to the eye** and is often referred to as **clear ice**.

✓ DETECTING CLEAR ICE

Because clear ice is hard to see, it is detected by:

- Performing a **tactile (hands-on) inspection**; or
- Using specially designed ice-detecting systems such as a **Ground Ice Detection System (GIDS)**.

⚠ WHY CLEAR ICE IS DANGEROUS

Sheets of clear ice dislodged from the wing or fuselage during take-off or climb can be **ingested by aft-fuselage-mounted engines**, causing a **flameout or damage**. Dislodged sheets can also cause **impact damage to critical surfaces** such as the horizontal stabiliser.

3.6 Planning a Flight in Icing Conditions

DECISION FLOW — PRE-TAKE-OFF IN SUSPECTED/KNOWN ICING

GHOST AVIATOR

GHOST AVIATOR

flowchart TD

```
S["Flight expected in suspected /
known ground icing conditions"]:::st
    Q1{"Aircraft certificated &
equipped for icing?"}:::dec
    Q2{"Operation at NIGHT?"}:::dec
    N["Means to illuminate / detect
ice formation required
(no handicapping glare)"]:::warn
    I["Inspect aircraft for icing"]:::ok
    Q3{"Contamination present?"}:::dec
        T["Apply appropriate
de-icing / anti-icing treatment"]:::ok
        G["Aircraft in airworthy
condition → CLEARED to take off"]:::go
        X["Do NOT operate"]:::stop
            S --> Q1
            Q1 -- No --> X
            Q1 -- Yes --> Q2
            Q2 -- Yes --> N --> I
            Q2 -- No --> I
            I --> Q3
            Q3 -- Yes --> T --> G
            Q3 -- No --> G

classDef st fill:#e8f0fb,stroke:#2f6db0,color:#16365c;
classDef dec fill:#fdf3e0,stroke:#c8961e,color:#7a5708;
classDef ok fill:#eaf6ee,stroke:#3c9a5a,color:#1f5232;
classDef go fill:#3c9a5a,stroke:#1f5232,color:#fff;
classDef stop fill:#d9534f,stroke:#7d211d,color:#fff;
classDef warn fill:#fdecea,stroke:#d9534f,color:#7d211d;
```

① CORE CONCEPT

There is **no direct way to influence bird activity aloft**. Therefore the only chance to minimise bird-strike risk in the air is to **avoid flying through high bird concentrations**. Away from the airfield, bird-strike prevention is most effectively conducted by **warning procedures**.

Hazardous bird concentrations are well known during **migration periods** on a large temporal and spatial scale, but also occur occasionally throughout the year on a local or regional scale, **mainly governed by the diurnal cycle**. The major aspects of handling the problem are **monitoring, modelling, warning, predicting and forecasting** — producing advice passed to the aviation community.

Shell crackers

MOST EFFECTIVE
METHOD FOR
SCARING BIRDS

90%

OF BIRD STRIKES
OCCUR UNDER 500 M

135 kts

AVG. TAKE-OFF SPEED
IN THE STUDY

~2 seconds

BIRDS FLY AWAY
BEFOREHAND

✓ KEY FINDINGS

- The **most effective method for scaring birds is shell crackers**.
- **90% of bird strikes occur under 500 m**.
- Studies of birds on the ground ahead of an aircraft that has reached an average speed of **135 kts** show that **birds fly away about two seconds beforehand**.

★ CREW ACTION

If, after take-off, you (as captain) notice a flock of birds presenting a strike hazard, you must **immediately inform the appropriate ground station** — not merely file a report on arrival, and not "within a reasonable period."

Noise Abatement — Departure Climb & Approach

Noise abatement balances community quiet against flight safety. The golden principle: **safety always overrides noise**. Responsibility for establishing operating procedures for noise abatement during instrument flight (in compliance with ICAO PANS-OPS) rests with the **operator** — and the procedure specified for any one aeroplane type should be the same for all aerodromes.

5.1 Departure Climb

Operating procedures for the departure climb must ensure flight safety is maintained while minimising noise exposure on the ground. The following requirements must be satisfied:

⚠ DEPARTURE CLIMB LIMITATIONS

- Noise-abatement procedures **shall not be executed below a height of 240 m (800 ft) above aerodrome elevation**.
- The noise-abatement procedure specified by an operator for any one aeroplane type **should be the same for all aerodromes**.
- Noise-abatement climb procedures are **not to be used where wind-shear warnings exist**, or where wind shear / downburst activity is suspected.
- The **maximum acceptable body angle** specified for an aeroplane type **shall not be exceeded**.

GHOST AVIATOR

5.2 Aeroplane Operating Procedures — Approach

✓ APPROACH NOISE PROCEDURES

- Subject to safety requirements, the use of **reverse thrust over reverse idle may be prohibited** during a specified period, especially during night hours.
- During a noise-abatement approach, the aeroplane is to be in the **final landing configuration** at any point **after passing the outer marker**, or at a point **5 NM** from the threshold of the landing runway — **whichever is earlier**.
- **Noise preferential routes** are established so departing and arriving aeroplanes avoid over-flying noise-sensitive areas near the aerodrome as far as practicable.
- In establishing noise preferential routes, **no turns should be required coincident with a reduction of power** associated with a noise-abatement procedure.

⚠ WHEN NOISE ABATEMENT MUST NOT DECIDE THE RUNWAY

Noise abatement **shall not be the determining factor** in the designation of a runway under the following circumstances:

- (a) when the **crosswind component, including gust, exceeds 15 kt** ;
- (b) when the **tailwind component, including gust, exceeds 5 kt** ;
- (c) when the **runway is not clear or dry**.

① ILS & VISUAL GUIDANCE

No ILS or visual guidance precludes a runway being used for noise-abatement procedures **if landing in VMC**. In other words, the absence of ILS/visual aids is what rules a runway out for noise abatement when landing visually.

★ MEMORY HOOK

"15 – 5 – Dry." Crosswind 15 kt, tailwind 5 kt, runway not dry — any one of these and noise abatement loses its vote on runway selection.

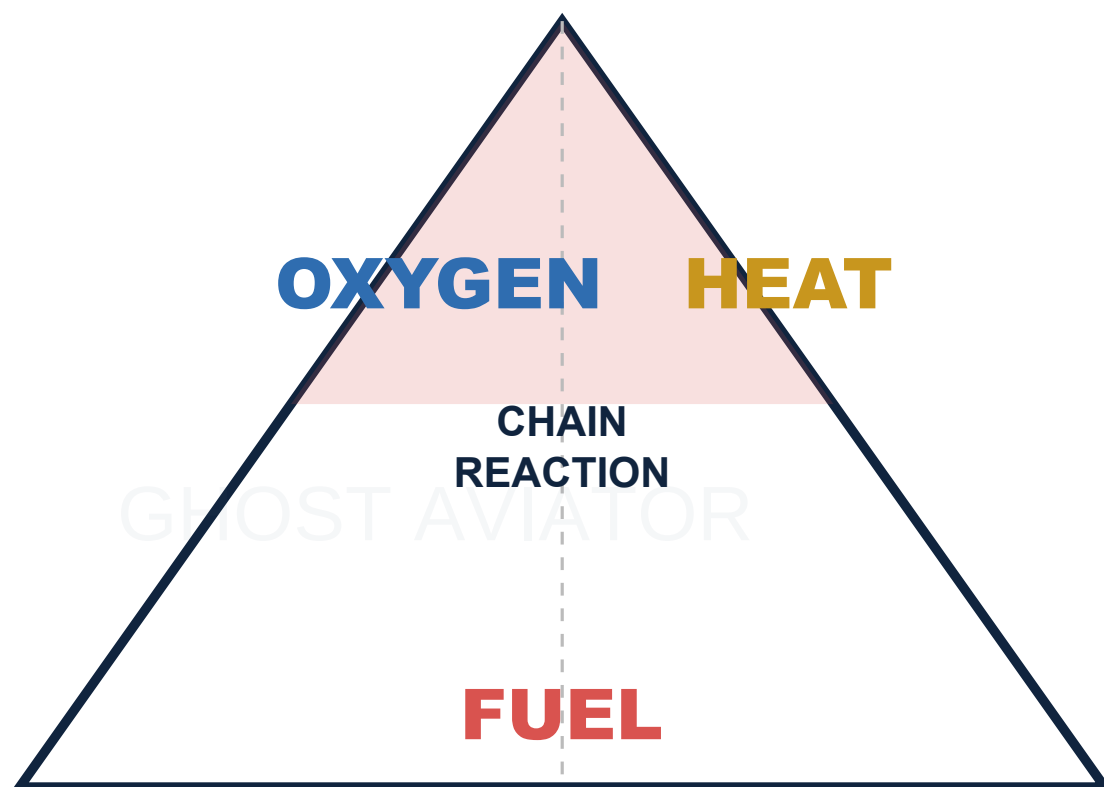
Fire-fighting strategy flows directly from one idea: a fire needs three things at once. Take any one away and the fire dies.

6.1 The Fire Triangle

① DEFINITION — COMBUSTION

Combustion consists of **three elements: oxygen, heat and fuel**. Together these create a chemical chain reaction and result in a fire. The goal of fire-fighting is to **eliminate at least one element** from the fire in order to extinguish it.

THE FIRE TRIANGLE — REMOVE ANY ONE SIDE TO EXTINGUISH



✓ **A FIRE WILL CONTINUE, UNLESS:**

- The **fuel supply has been cut off**; or
- There is **no more oxygen available**; or
- The **temperature has been cooled below the flammability temperature**.

6.2 Classes of Fire & Their Smoke

Table 6.1 — Fire Classes, Materials, Extinguishing & Smoke Signature

CLASS	MATERIALS INVOLVED	HOW TO EXTINGUISH	SMOKE CHARACTERISTICS
Class A	Wood, paper, cloth or plastic — solids, generally of organic nature.	Fires need to be cooled . Water extinguisher, or liquid with a large percentage of water (coffee, tea, juice) works. Water/glycol extinguishers are the most effective for Class A. Do NOT use liquid containing alcohol.	Usually gray/brown ; can be quite thick depending on quantity of fuel.
Class B	Flammable liquid, hydraulic fluid, oil, tar or aircraft fuel — liquid or liquefiable solid.	Cannot be extinguished with water. Use Foam or Halon extinguishers.	Usually black ; very thick, with a distinct oil/petrol-like odour.
Class C	Electrical equipment.	Must be extinguished with a non-conducting mixture to avoid electrocution and damage to circuitry. Halon extinguishers are effective.	Usually light grey or white , with a bluish tinge; very fine, disperses rapidly; distinct acrid odour.
Class D	Flammable metals — sodium, magnesium, lithium, potassium.	Special powder extinguishers only (avoids dangerous chemical reaction). Never use Halon on Class D.	—

⚠️ **HARD RULES — FIRE CLASSES**

- **Never use Halon fire extinguishers on Class D fires.**
- **Do not use liquid containing alcohol on Class A fires.**
- **Class A and C fires are the most commonly encountered fires onboard aircraft.**

6.3 Fire Extinguishers

① **DISCHARGE TIME**

Hand-held fire extinguishers discharge an extinguishing agent for **8 to 25 seconds**, depending on type and capacity. Because of this short period, it is **essential to select and use the appropriate extinguisher immediately**.

Table 6.2 — Extinguisher Types, Colour Codes & Suitable Fire Classes

EXTINGUISHER TYPE	COLOUR CODE	SUITABLE FOR
Halon / BCF (bromochlorodifluoromethane)	Green	Class A, B and C fires
Carbon dioxide (CO₂)	Black	Class B and C fires
Dry powder (DP)	Blue	Class D fires
Dry chemicals	Blue	Class A, B and C fires
Water solution (H₂O)	Red	Class A fires

✓ **HALON FACTS & PRECAUTIONS**

- A Halon extinguisher is **three times as effective as a CO₂ extinguisher** containing the same amount of agent.
- When a Halon extinguisher has been used on a **Class A fire**, the fire and surrounding area **must be cooled down with a non-alcoholic liquid**.
- When Halon is used in **crew compartments or confined areas**, **Portable Breathing Equipment (PBE)** should be used.

✓ EXTINGUISHER LOCATION & SUPPORTING EQUIPMENT

At least one **Halon 1211 type extinguisher** should be located on the **flight deck**. Galleys, personnel and cargo compartments should be equipped with proper extinguishers. Beneath fire extinguishers, the supporting fire-fighting equipment carried on board includes **crash axes or crowbars**.

⚠ HALON ENVIRONMENTAL PHASE-OUT

ICAO Standards mandate the use of an **alternative agent to Halon** due to its impact on the environment — it **depletes the ozone layer**. As of now, Halon use is **permitted only in cargo compartments till 28 Nov 2024**.

6.4 Hand Fire Extinguisher Requirements by Seating

Table 6.3 — Hand Fire Extinguishers Required in the Passenger Compartment

MAXIMUM APPROVED PASSENGER SEATING CONFIGURATION	HAND EXTINGUISHERS REQUIRED
61 to 200 passengers	3 conveniently located in the passenger compartment
401 to 500 passengers	6 conveniently located in the passenger compartment

✓ ONBOARD FIRE-FIGHTING SOPS

- **Engine nozzle / jet-pipe fire on the ground:** carry out a **dry cranking (dry motoring)** cycle.
- **Engine fire warning:** switches on the relevant fire shut-off handle; the warning is switched off **when the fire is no longer detected**.
- **Fire in an air-conditioned cargo hold:** **turn off the cargo-hold ventilation and extinguish the fire**.
- **Belly compartment fire:** the system generally switched off is the **ventilation of the cargo compartment**.
- **Smoke in the air conditioning:** first action — **put on the mask and goggles**.
- **Fire-fighting in toilets:** use **all available extinguishers simultaneously**.
- **Burning cargo in cargo aircraft:** usually extinguished using **carbon dioxide**.
- **Wheel fire** (heated brakes): the safest extinguishant is **dry powder**; fight a brake-heat fire with a dry-powder extinguisher and a water-spray atomiser.

7

Overheated Brakes — After Aborted Take-off & Landing

The kinetic energy lost in slowing an aircraft is converted by friction into heat. After a rejected take-off or a heavy landing, that heat is concentrated in the brakes and tyres — and it bites.

⚠ CONSEQUENCES OF OVERHEATED BRAKES

Overheated brakes can result in:

- **Loss of braking performance;**
- **Fire;**
- **Tyre deflation / tyre burst.**

Brake failure — with subsequent poor directional control and deceleration — could in turn result in **runway excursion, uncommanded ground movements / taxiway excursion, and collision with objects on the ground or other aircraft.**

⚠ PRACTICAL PROBLEMS FOLLOWING BRAKE ISSUES

- **High level of stress & increased workload** — caused by directional-control and deceleration problems from brake failure during landing or a high-speed rejected take-off (RTO).
- **Lack of awareness** — the crew might not be aware of fire, tyre burst or deflation that could result from heavy braking on landing, RTO, or from smoke from the undercarriage.

✓ CREW ACTIONS

- **Request fire and rescue services** — hot-brake incidents may be considered by the crew a reason to request attendance of fire and rescue.
- **Decision for emergency evacuation** — the cockpit crew could take the decision for emergency evacuation if fire is detected following a high-energy brake application.

⚠ HOW FIREGUARDS MUST APPROACH HOT WHEELS

After a landing in overweight / overspeed conditions, with tyres and brakes extremely hot, the fireguards **should approach the landing-gear tyres ONLY from front or rear side — never from the sides**. A tyre that bursts releases its energy *sideways*; standing fore or aft keeps personnel out of the burst line. (Likewise: release the parking brake and approach the wheels either from aft or fore.)

★ EXAM HOOK

Following a **heavy-mass landing on a short runway**, the first thing you should check is the **temperature of the brakes**.

8

Decompression of a Pressurised Cabin

Pressurisation keeps a survivable atmosphere around the cabin at cruising altitude. Losing it is one of the most time-critical emergencies in aviation — because the real enemy is hypoxia.

① DEFINITION

Cabin pressurisation is the pumping of compressed air into an aircraft cabin to maintain a safe and comfortable environment for crew and passengers when flying at altitude. **Loss of pressurisation is a serious emergency** in an aircraft flying at the high cruising altitudes typical of passenger aircraft.

8.1 Causes of Decompression

⚠ THREE CAUSES

- **Structural Failure** — failure of a window, door or pressure bulkhead, or an in-flight explosion (which may be due to a system failure, dangerous cargo, or a malicious act such as an explosive device carried on board by a terrorist).
- **Pressurisation system failure** — failure of some part of the pressurisation system, such as an outflow valve.
- **Deliberate Act** — a drastic measure an aircraft captain might consider, for example as a way of clearing the cabin of smoke.

8.2 Rapid / Explosive vs. Slow Decompression

⚠ RAPID / EXPLOSIVE DECOMPRESSION

Decompression occurring rapidly — at a rate **greater than the rate the lungs can decompress** — will cause **lung damage**. The likelihood of reaching a lung-damaging level, for any given pressure-hull breach size, is **increased by the size of the pressure hull overall**.

A decompression taking **less than 0.5 seconds** is considered by most authorities to be **"explosive."** The cabin air may fill with **dust and debris**, and **fog** forms from the associated drop in temperature and change in relative humidity. The crew may be momentarily dazed or shocked — especially if unexpected — and may therefore be slow to fit oxygen masks.

① SLOW DECOMPRESSION

Slow decompression is **similar to rapid decompression**. The only difference is in **severity and availability of reaction time**. In **both cases the actions by the crew remain the same**. A slow decompression may be caused by a **cracked window**, a **bad-functioning pressurisation system**, or a **minor leak in the fuselage** — not by the loss of a whole door or window.

★ RECOGNITION CUES

Fast decompression is recognised by: mist in the cabin, a blast towards the exterior of the aircraft, and expansion of body gases. "**Mist in the cabin, pressure and temperature drop**" characterise a **fast depressurisation**. During a slow depressurisation at cruise, the cabin rate-of-climb indicator shows **a rate of climb**.

8.3 Crew & Passenger Incapacitation

⚠ THE REAL DANGER — HYPOXIA

The great danger of depressurisation is **crew incapacitation due to hypoxia**. Depending on aircraft altitude when depressurisation occurs, loss of pressurisation can **very quickly incapacitate** crew and passengers unless they receive supplementary oxygen. The **Time of Useful Consciousness is reduced by the explosive nature** of the decompression.

8.4 Cabin Altitude Trigger Points

Table 8.1 — Decompression Warning & Oxygen Mask Deployment

EVENT	CABIN ALTITUDE TRIGGER
Depressurization warning is required	When cabin altitude exceeds 10,000 ft
Passenger oxygen masks drop	When cabin altitude rises to between 13,200 ft and 14,000 ft — but no higher than 15,000 ft
Supplemental oxygen for pilots after emergency descent	Available for the entire flight time the cabin pressure altitude exceeds a minimum of 13,000 ft

8.5 Crew Actions

✓ ACTIONS ON LOSS OF PRESSURISATION

- **Oxygen** — the crew must don oxygen equipment **as soon as possible**. In the case of a **deliberate de-pressurisation**, the crew should be **on oxygen before the de-pressurisation commences**.
- **Emergency Descent** — in an emergency depressurisation the crew will want to **descend immediately** to an altitude at which they and the passengers can breathe without supplementary oxygen — conventionally **10,000 ft**.

⚠ STRUCTURAL-FAILURE HAZARD

If the decompression is caused by structural failure (e.g. failure of a window), there is a risk of crew or passengers being **buffeted by strong winds, hit by debris, exposed to extreme cold**, or even **being sucked out of the aircraft** — another reason for **wearing a seat belt or harness when seated**.

FLOWCHART — CREW RESPONSE TO EXPLOSIVE DECOMPRESSION

```
flowchart TD
    A["Explosive decompression detected  
(e.g. at 31,000 ft)"]:::ev
    B["1. Don oxygen masks  
(crew oxygen FIRST)"]:::act
    C["2. Initiate immediate  
EMERGENCY DESCENT"]:::act
    D["Descend to an altitude where  
breathing without supplemental O2  
is possible – approx 10,000 ft"]:::act
    E["Pilots remain on O2 while cabin  
pressure altitude exceeds 13,000 ft"]:::note
    A --> B --> C --> D --> E

    classDef ev fill:#fdecea,stroke:#d9534f,color:#7d211d;
    classDef act fill:#eaf6ee,stroke:#3c9a5a,color:#1f5232;
    classDef note fill:#e8f0fb,stroke:#2f6db0,color:#16365c;
```

★ EXAM HOOK

On an **explosive decompression at 31,000 ft**, the **initial action** of the operating crew is **to put on oxygen masks** — before seatbelt signs and before the MAYDAY call. Note also: using the **passenger oxygen system in severe cabin smoke is useless**, because the drop-down masks are not sealed — the **toxic cabin smoke mixes with the breathing oxygen**.

Supplemental oxygen's defined purpose is to **provide people on board with oxygen during a cabin depressurisation**.

9 Wind Shear & Microburst

Wind shear is a sudden change in wind — and because lift depends on airspeed, a sudden change in wind is a sudden change in performance. Close to the ground, in the approach, landing or take-off phase, that is a hazard with very little margin to recover.

9.1 Wind Shear & Crew Reporting

① DEFINITION

Wind shear may be described as a **change in wind direction and/or speed in space**, including up-draughts and down-draughts. Intense down-draughts — typically associated with **thunderstorms** — produce strong vertical and horizontal wind-shear components hazardous to aircraft in the approach, landing or take-off phase. One of its main characteristics is that it **can occur at any altitude, in both the vertical and horizontal planes**.

✓ HOW TO REPORT WIND SHEAR

- Aircrew capable of reporting wind and altitude **above and below the shear layer** from the **Flight Management System (FMS)** are to do so.
- Pilots **without this equipment** should report wind shear by stating the **loss or gain of airspeed and the altitude** at which it was encountered.
- Pilots **unable to report in these specific terms** should report it in terms of its **general effect on the aircraft**.

9.2 Significant Non-Convective Wind Shear — Thresholds

Table 9.1 — Guidelines To Establish Significant Non-Convective Wind Shear

CRITERION	THRESHOLD
Vector magnitude	Exceeding 25 kts within 500 ft AGL
Vector magnitude	Exceeding 40 kts within 1 000 ft AGL
Vector magnitude	Exceeding 50 kts within 1 500 ft AGL
Pilot report of IAS loss or gain	20 kts or more within 1 500 ft AGL

9.3 Microburst

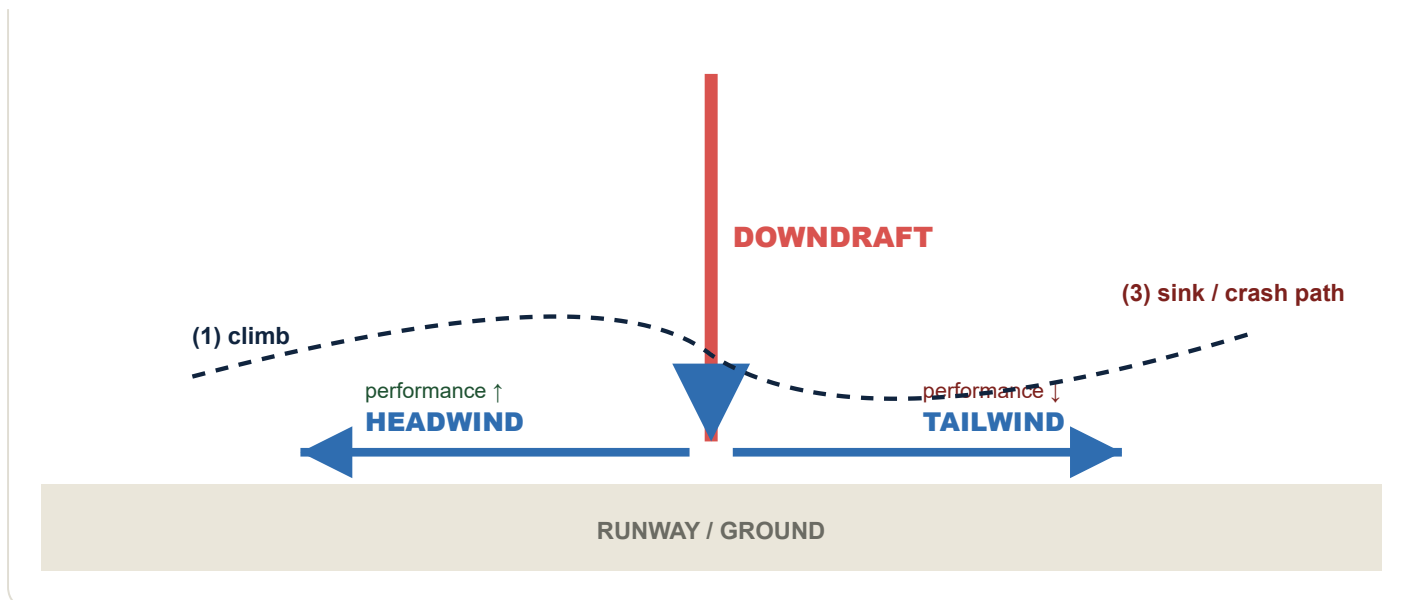
① DEFINITION

A microburst is a **small-scale, intense downdraft** which, on reaching the surface, **spreads outward from the down-flow centre**. This causes both vertical and horizontal wind shear that can be **extremely hazardous to all types and categories of aircraft**, particularly within **1 000 ft AGL** during approach to landing and in the take-off phases.

⚠ THE TAKE-OFF TRAP

On take-off through a microburst, the aircraft first encounters a **headwind (performance increasing)**, followed by a **downdraft**, then a **tailwind (both performance decreasing)**. The initial headwind can fool the crew into a false sense of climb performance — moments before the tailwind/downdraft robs it.

MICROBURST ENCOUNTER — HEADWIND, DOWNDRAFT, TAILWIND



9.4 Characteristics of Microbursts

~1 NM DIAMETER AT 2 000 FT AGL (2–2½ NM AT SURFACE)	6 000 ft/min VERTICAL WINDS; HORIZONTAL UP TO 45 KT (90 KT SHEAR)	< 15 min LIFE-CYCLE; PEAK WINDS LAST ~2–4 MIN	Up to 1 hr IF CONCENTRATED INTO A LINE STRUCTURE
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Table 9.2 — Microburst Characteristics

CHARACTERISTIC	DETAIL
Size	Approximately 1 NM in diameter at 2 000 ft AGL , with a horizontal extent at the surface of approximately 2 to 2½ NM .
Intensity	Vertical winds as high as 6 000 ft/min . Horizontal winds giving as much as 45 KT at the surface (i.e. 90 KT shear).
Types	Normally accompanied by heavy rain in humid areas. In drier areas, falling raindrops may evaporate before reaching the ground — this is known as VIRGA .
Duration	Life-cycle seldom longer than 15 minutes ; maximum-intensity winds last approximately 2–4 minutes . Concentrated into a line structure, activity may continue for as long as 1 hour .

⚠ MULTIPLE MICROBURSTS

Once microburst activity starts, **multiple microbursts in the same general area are common and should be expected**. An aircraft entering the centre with a **40 kt headwind** may, on crossing through, face a windshear of **80 kt** (the headwind reverses into an equal tailwind).

9.5 Actions To Counter Wind Shear

✓ RECOVERY PROCEDURE

The **best defence against wind shear is to avoid it altogether** — it could be beyond your or your aircraft's capabilities. However, should you recognise a wind-shear encounter, **prompt action is required**. In all aircraft the recovery could require:

- **Full power** (set maximum take-off thrust);
- A **pitch attitude consistent with the maximum angle of attack** for your aircraft — increase pitch-up to the limit, actuating the stick shaker;
- **Keep the aeroplane's current configuration** (do not change gear/flap);
- **Warn others as soon as possible**.

★ EXAM HOOKS

When **penetrating wind shear**, the first magnitude to change value is **Indicated Airspeed (IAS)**. During a landing approach with an **increasing tailwind** and no pilot action, the aircraft **flies below the glide path** and has a **decreasing true airspeed**. The amount of control action required to counter wind shear is **substantial**.

10 Wake Turbulence

Every wing that produces lift also produces a wake. Behind a large aircraft, that wake is a pair of powerful, invisible "horizontal tornadoes" — and the separation tables exist to keep you out of them.

10.1 How Wake Turbulence Forms

① CONCEPT

All airfoils produce a wake when producing lift. The **higher-pressure air under the wing flows around the wingtip** and tries to displace the **lower-pressure (lower-energy) air on top**. The greater the pressure differential, the stronger the flow around the wingtip. The air curling up around the wingtip forms a **horizontal tornado** that trails behind the airplane and tends to **sink somewhat below the producing aircraft's flight path** (in level flight).

① VORTEX BEHAVIOUR

- The vortex from the **left wing rotates clockwise**; the one from the **right wing rotates counterclockwise** (seen from behind).
- **Larger airplanes produce stronger vortices** — the wings produce more lift to support more weight.
- The vortices settle behind the aircraft to an altitude about **1 000 ft** below the flight path, where they tend to remain.
- Vortices spread laterally from the rear of the aircraft and can persist **up to 5 miles** behind, sinking **500–900 feet**.

⚠ WAKE TURBULENCE IS GREATEST WHEN...

Wake turbulence is created **only when an airplane develops lift**. It is **greatest when the generating airplane is HEAVY, CLEAN and SLOW**. In wake turbulence, the circulation of the vortex is **outward, upward and around each wingtip**.

★ MEMORY HOOK

"Heavy, Clean, Slow" — the three words that mean maximum wake. The most dangerous wind while landing or taking off behind a large aircraft is a **light quartering tailwind**.

10.2 Aircraft Wake Turbulence Categories

Table 10.1 — Wake Turbulence Categories by MCTOW

CATEGORY	MCTOW CRITERION	EXAMPLES
Super Heavy (S)	Separate designation — currently only the Airbus A380-800 , MCTOW 5,60,000 kg .	A380-800
Heavy (H)	136,000 kg MCTOW or more.	B777, B767, B747, B787, A300, A310, A330, A340, A350, DC-8, DC-10, MD-11, IL-86, IL-96, AN-225, L-1011
Medium (M)	More than 7,000 kg and less than 136,000 kg MCTOW.	B727, B737, B757, A320, A321, Global Express, Challenger, CRJ, Fokker Friendship, Metro 4, BAe-146, Dash 8, ATR-72, Hercules, DC-3, Saab 340
Light (L)	Less than 7,000 kg MCTOW.	Bandeirante, Metro 3, Cessna 402 & 421, Islander, Nomad, Piper Navajo, King Air Beech 99

★ FLIGHT PLAN BOX

The letter "L" is written in the wake-turbulence box of a flight-plan form when MCTOW is **less than or equal to 7,000 kg**.

10.3 Time-Based Longitudinal Separation Minima

Table 10.2 — ARRIVING Aircraft (Time-Based)

S.NO.	LEADING AIRCRAFT	FOLLOWING AIRCRAFT	SEPARATION MINIMA
1	A380-800	MEDIUM	3 Minutes
2	A380-800	LIGHT	4 Minutes
3	HEAVY	MEDIUM	2 Minutes
4	HEAVY or MEDIUM	LIGHT	3 Minutes

Table 10.3 — DEPARTING Aircraft (same runway / parallel < 760 m / specified crossing runways)

S.NO.	LEADING AIRCRAFT	FOLLOWING AIRCRAFT	SEPARATION MINIMA
1	A380-800	Non A380-800 HEAVY	2 Minutes
2	A380-800	MEDIUM or LIGHT	3 Minutes
3	HEAVY	LIGHT or MEDIUM	2 Minutes
4	MEDIUM	LIGHT	2 Minutes

Departing-aircraft minima apply when aircraft use: (a) the same runway; (b) parallel runways separated by less than **760 m (2500 ft)** ; (c) crossing runways if the projected flight path of the second aircraft will cross that of the first at the same altitude or less than **1000 ft** below; (d) parallel runways separated by **760 m (2500 ft)** or more, if the second aircraft's projected flight path will cross the first's at the same altitude or less than 1000 ft below.

Table 10.4 — DEPARTING from an INTERMEDIATE part of the same runway / parallel < 760 m

S.NO.	LEADING AIRCRAFT	FOLLOWING AIRCRAFT	SEPARATION MINIMA
1	A380-800	MEDIUM or LIGHT	4 Minutes
2	HEAVY	MEDIUM or LIGHT	3 Minutes
3	MEDIUM	LIGHT	3 Minutes

10.4 Displaced Landing Threshold Separation

Table 10.5 — Separation on a Runway With a Displaced Landing Threshold

S.NO.	LEADING AIRCRAFT	FOLLOWING AIRCRAFT	SEPARATION MINIMA
1	A380-800 Arrival	LIGHT or MEDIUM	3 Minutes
2	A380-800 Departure	LIGHT or MEDIUM	3 Minutes
3	HEAVY Arrival	LIGHT or MEDIUM Departure	2 Minutes
4	MEDIUM Arrival	LIGHT Departure	2 Minutes
5	HEAVY Departure	LIGHT or MEDIUM Arrival	2 Minutes
6	MEDIUM Departure	LIGHT Arrival	2 Minutes

10.5 Distance-Based Wake Turbulence Separation Minima

Distance-based minima apply to aircraft provided with an ATS surveillance service in the approach and departure phases, where: (i) an aircraft is operating directly behind another at the same altitude or less than 1000 ft below; (ii) both use the same runway, or parallel runways separated by less than 760 m; or (iii) an aircraft is crossing behind another at the same altitude or less than 1000 ft below.

Table 10.6 — Distance-Based Wake Turbulence Separation Minima

PRECEDING AIRCRAFT	SUCCEEDING AIRCRAFT	DISTANCE-BASED SEPARATION MINIMA
A380-800 / Non A380-800 HEAVY	A380-800	Not required +
A380-800	Non A380-800 HEAVY	6 NM *
	MEDIUM	7 NM *
	LIGHT	8 NM *
HEAVY	HEAVY	5 NM *
	MEDIUM	5 NM *
	LIGHT	6 NM *
MEDIUM	HEAVY	Not required +
	MEDIUM	Not required +
	LIGHT	5 NM *
LIGHT	HEAVY	Not required +
	MEDIUM	Not required +
	LIGHT	Not required +

① READING THE SYMBOLS

+ — When a wake-turbulence restriction is not required, separation **reverts to the prescribed radar separation minimum**.

* — Where the prescribed radar separation minimum is **more than** the applicable wake-turbulence minimum, the **prescribed radar separation minimum has precedence**.

★ EXAM HOOKS — SEPARATION

- Shortest distance for a **HEAVY preceding a LIGHT** (landing sequence): **6 NM** .
- MEDIUM taking off behind a HEAVY, same runway, wake criteria: **2 minutes** .
- LIGHT taking off behind a MEDIUM, same runway: **2 minutes** .
- Arriving aircraft, timed approaches — MEDIUM behind HEAVY: **2 minutes** ; MEDIUM behind MEDIUM: **2 minutes** .

10.6 Opposite-Direction Runway Separation

✓ LOW / MISSED APPROACH CASES

A separation minimum applies between a LIGHT or MEDIUM and a HEAVY aircraft, and between a LIGHT and a MEDIUM aircraft, when the heavier aircraft is making a **low or missed approach** and the lighter aircraft is landing on the same runway in the opposite direction (or on a parallel opposite-direction runway) separated by **less than 760 m** .

Where the lighter aircraft is instead **utilising an opposite-direction runway for take-off**, this minimum is **2 minutes** .

GHOST AVIATOR

10.7 Dealing With Wake Turbulence

✓ HANDLING WAKE TURBULENCE — PRACTICAL RULES

- **Fly upwind** rather than downwind of the flight path of a large aircraft.
- The most dangerous wind while landing/taking off behind a large aircraft is a **light quartering tailwind**.
- When **taking off behind a larger aircraft**, lift off **before the larger aircraft's lift-off point** and climb **above its climb path**.
- When **landing behind a larger aircraft**, touch down **past its touchdown point**.
- Vortices stay on the runway longer in **light or calm winds**.
- In **light crosswinds**, the upwind vortex tends to drift onto and remain on the runway.
- Vortices from a large aircraft landing on a **parallel runway** can be blown onto your runway by a strong crosswind.
- When flying or crossing behind a larger aircraft, maintain your flight path **above** the large aircraft's path rather than below.
- When approaching behind a larger aircraft on an **ILS**, stay **at or above the glide slope** to avoid wake encounters.

★ WHEN IS WAKE TURBULENCE RISK HIGHEST?

Risk is highest when a **heavy aircraft has just performed a take-off at a closely situated parallel runway with a light crosswind** — the crosswind drifts the heavy's vortices onto your path.

11 Security — Acts of Unlawful Interference

✓ REPORTING UNLAWFUL INTERFERENCE

Following an act of unlawful interference on board an aeroplane, the **commander** — or in his absence the **operator** — shall submit, **without delay**, a report of such an act to the **designated local authority** AND the **Authority in the State of the operator**.

① NOTIFICATION AFTER LANDING

In addition to informing each State whose citizens are known to be on board, the State of the country in which an aircraft has landed after an act of unlawful interference must **immediately notify**: the **State of Registry of the aircraft, the State of the operator, and ICAO**.

✓ RESPONSIBILITY FOR PASSENGER & CREW SAFETY

The **Contracting State in which the unlawful interference occurs** has the responsibility to take adequate measures for the safety of passengers and crew of an aircraft subjected to an act of unlawful interference, until their journey can be continued.

11.1 Flight Deck Door

⚠ FLIGHT CREW COMPARTMENT DOOR

When a commercial transport passenger airplane is equipped with a flight-crew compartment door, that door **must include a locking system to prevent any unauthorized access**. The flight-deck door should be capable of being **locked from within the compartment**.

★ CRITICAL CODE

In case of a **hi-jack**, the transponder squawk code is **7500**. When flight crew members are at their duty stations, they must **keep the seat belts fastened**.

12 Emergency & Precautionary Landings, Ditching

Table 12.1 — Types of Non-Routine Landing

TERM	DEFINITION
Forced Landing	An immediate landing , on or off an airport, necessitated by the inability to continue further flight . Typical example — an airplane forced to land due to engine failure.
Precautionary Landing	A premeditated landing , on or off the airport, when further flight is possible but inadvisable . Examples — deteriorating weather, being lost, fuel shortage, gradually developing engine trouble.
Ditching	A forced or precautionary landing on water .

✓ RESPONSIBILITY & DITCHING CONDUCT

- In the event of a **precautionary landing** (a premeditated landing with time in hand), **ATC** is responsible for alerting the emergency services.
- **If ditching is inevitable:** the use of life jackets is to be **reiterated before the ditching**.
- **In case of ditching, cabin attendants will:** have the passengers **embark directly into the life rafts; prevent passenger movements** which may impede the airplane's flotation ability; and **ensure complete evacuation** of the airplane.

⚠ LIFE JACKETS

Life jackets should **NOT be inflated inside the aircraft** — an inflated jacket can trap an occupant against the ceiling of a flooding cabin and block escape. They are inflated only on leaving the aeroplane.

13 Fuel Jettisoning

An aircraft that must land far heavier than its maximum landing weight may dump fuel to get down to a safe landing mass. It is a controlled, coordinated procedure — not a panic action.

① GENERAL & PURPOSE

An aircraft in an **emergency or other urgent situation** may need to **dump fuel so as to reduce to maximum landing weight**, in order to effect a safe landing.

✓ ATC COORDINATION

When an aircraft within controlled airspace requires to dump fuel, the flight crew **shall advise ATC**. The ATC unit should then coordinate with the flight crew:

- (a) The **route to be flown** — if possible clear of cities and towns, preferably over water, and away from areas where thunderstorms have been reported or are expected;
- (b) The **level to be used** — which should be **not less than 1800 m (6000 ft)** ;
- (c) The **duration** of the fuel dumping.

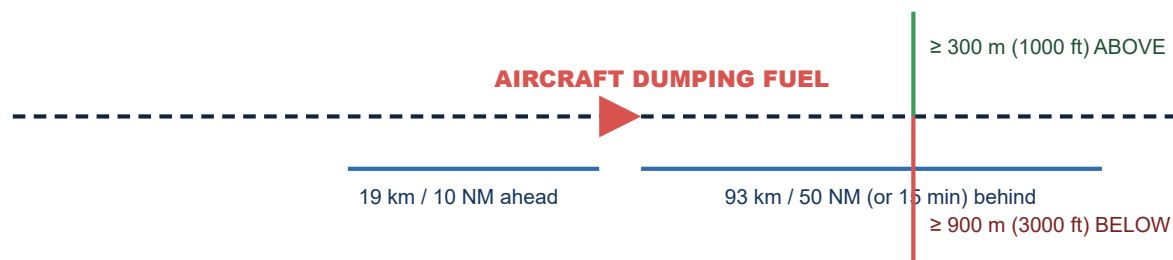
13.1 Separation From Other Traffic

⚠ SEPARATION FROM AN AIRCRAFT DUMPING FUEL

Other known traffic should be separated from the aircraft dumping fuel by:

- (a) At least **19 km (10 NM)** horizontally — but **not behind** the aircraft dumping fuel;
- (b) **Vertical separation** if behind the aircraft dumping fuel within **15 minutes** flying time or a distance of **93 km (50 NM)** by:
 - (i) at least **300 m (1000 ft)** if **above** the aircraft dumping fuel; and
 - (ii) at least **900 m (3000 ft)** if **below** the aircraft dumping fuel.

FUEL JETTISON PROTECTED AREA & VERTICAL SEPARATION



Horizontal protected boundary extends 19 km (10 NM) either side of the track flown.

✓ COMMUNICATIONS & TEST REQUIREMENTS

If the aircraft will maintain **radio silence** during fuel dumping, the frequency to be monitored and the time when radio silence will terminate should be **agreed**.

Requirements that must be shown to exist during fuel-jettisoning tests:

- The fuel-jettisoning system and its operation are **free from fire hazard**;
- The **fuel discharges clear of any part of the aeroplane**;
- **Fuel fumes do not enter any part of the aeroplane**;
- The jettison operation **does not adversely affect the controllability of the aeroplane**.

★ EXAM HOOK

Fuel jettison should normally be carried out **above** 6,000 ft AGL — but it may be done **anywhere if unavoidable**.

14 Transport of Dangerous Goods

① CONTEXT

More than half of the cargo carried by all modes of transport in the world is **dangerous cargo** — explosive, corrosive, flammable, toxic and even radioactive. These goods are essential for industrial, commercial, medical and research processes, and a great deal is carried by aircraft.

⚠ **GOODS FORBIDDEN FOR AIR TRANSPORT (UNLESS EXEMPTED)**

The following shall be **forbidden on aircraft unless exempted** by the States concerned:

- (a) Articles and substances **identified in the Technical Instructions as forbidden for transport in normal circumstances**; and
- (b) **Infected live animals.**

✓ **DOCUMENTS & DEFINITIONS**

- A list of dangerous goods which may not be transported by air is found in the **Technical Instructions for the Safe Transport of Dangerous Goods by Air.**
- Products/materials are considered dangerous goods if defined as such by the **ICAO document "Technical Instructions for the safe transportation of dangerous goods by air."**
- **ICAO Annex / Appendix 18** deals with the **safety of the air transport of hazardous materials.**
- To carry hazardous materials on board a public transport airplane (per CAR-OPS), they must be accompanied by a **transport document for hazardous materials**, which — if required — shall be **drawn up by the shipper.**
- General information, instructions and recommendations on transporting hazardous materials are specified in the **Operation Manual.**
- Dangerous goods **may be carried in the passenger cabin or on the flight deck — but only goods specified in the Technical Instructions.**

15

Contaminated Runways & Hydroplaning

When the runway is wet or contaminated, the friction available to stop the aircraft drops — and so does your safety margin. Knowing the exact definitions and the landing-distance factor is essential.

15.1 Braking Action & Brake Coefficient

① CONCEPT

Runway surface friction is **directly relevant to the braking action** available to an aircraft decelerating after touchdown or after a decision to reject a take-off. Aircraft braking coefficient depends on the surface friction between the runway and the aircraft tyres — **less friction means less braking coefficient and less braking**.

For most multi-crew aircraft, **anti-skid braking systems** are fitted — these prevent wheel locking and allow more aggressive brake input on wet/slippery runways **without inducing dynamic or viscous aquaplaning**.

✓ REPORTING BRAKING EFFICIENCY

Braking efficiency is information presented as a **combination of the terms: poor, medium, good**.

15.2 Runway Surface State — Exact Definitions

Table 15.1 — Runway Surface Conditions

CONDITION	DEFINITION
Damp	The surface is not dry , and surface moisture does not give a shiny appearance .
Wet	Covered with water (or loose/slushy snow) less than or equal to the equivalent of 3 mm of water ; OR surface moisture is sufficient to make it reflective but does not create large stagnant sheets of water .
Contaminated	A runway covered with 4 mm thick water is said to be contaminated .

⚠ WET RUNWAY LANDING DISTANCE

An operator shall ensure that when weather reports/forecasts indicate the runway may be **wet** at the estimated time of arrival, the **landing distance available is at least 115% of the required landing distance**. Equivalently — if the flight manual gives no specific wet-runway data, the required landing distance on a dry runway must be **increased by 15%**.

15.3 Dynamic Hydroplaning (Aquaplaning)

① DEFINITION

Aquaplaning (also known as **hydroplaning**) is a condition that exists when landing on a surface with **standing water deeper than the tread depth of the tyres**. When the brakes are applied, the brake may lock up and the tyre rides on the surface of the water, much like a water ski.

⚠ WHY HYDROPLANING IS DANGEROUS

When the tyres are hydroplaning, **directional control and braking action are virtually impossible**. An effective **anti-skid system can minimize the effects** of hydroplaning.

Table 15.2 — Types of Hydroplaning

TYPE	PRIMARY CAUSE
Dynamic hydroplaning	Depends primarily on the depth of the standing water on the runway (and aeroplane speed along the runway lifting the tyre).
Viscous hydroplaning	Caused by a smooth and dirty runway surface .

★ EXAM HOOK

The effect whereby a tyre is **lifted from the runway due to aeroplane speed** along the runway is known as **hydroplaning**.

16 Practice Question Bank — 109 MCQs

① HOW TO USE THIS BANK

All **109 questions** from the chapter are reproduced below. The **correct option is highlighted green and marked ✓**, with a one-line rationale. Cover the green boxes with a card to self-test, then reveal. A consolidated **answer key grid** follows at the very end.

A Equipment Lists, Flight Manual & Icing (Q1–7)

1 MMEL is drawn up by:

- A The operator and approved by the certification authority
- B The manufacturer and approved by the DGCA ✓ Correct**
- C The operator from a main list drawn up by the manufacturer

Why: The manufacturer drafts the Master MEL; the DGCA approves it.

2 The Minimum Equipment List (MEL) is established by:

- A The airline operator ✓ Correct**
- B The aeronautical authority the airline operator depends on
- C The manufacturer

Why: The operator tailors the MMEL into its own MEL (DGCA-approved).

3 A piece of equipment fails while still parked. The reference document used first to decide the procedure is:

- A The minimum equipment list ✓ Correct**
- B The flight manual
- C The operation manual's chapter "Abnormal and Emergency Procedures"

Why: The MEL gives the go/no-go despatch decision for unserviceable items.

4 The minimum equipment list of a public transport airplane is to be found in the:

- A Flight manual
- B Operation manual ✓ Correct**
- C CAR OPS

Why: The operator includes the MEL in the Operations Manual.

5 In public transport, prior to take-off in icing conditions, the captain must check that:

A External surfaces are free from any ice accretion which may impede performance and manoeuvrability, except within the limits specified by the flight manual ✓ **Correct**

B External surfaces are free from any ice accretion greater than 5 mm

C Possible ice accretions do not cause weight and balance limits to be exceeded

Why: Surfaces must be clean except for amounts the AFM specifically permits.

6 Accumulation of snow or ice on an aircraft in flight induces an increase in the:

A Value of the stall angle of attack

B Roll rate

C Stalling speed ✓ **Correct**

Why: Contamination destroys lift, so the wing stalls at a higher speed.

7 Which requirement should be met when planning a flight with icing conditions:

A Flight planned so a change of cruising level can be initiated rapidly

B The aircraft shall be sprayed with anti-icing fluid before flight

C The aircraft shall be equipped with approved ice-protection systems ✓ **Correct**

Why: The aircraft must be certificated and equipped for icing conditions.

B Bird Strike & Noise Abatement (Q8–17)

8 As captain, after take-off you notice a flock of birds which may present a bird strike hazard. You must:

A Immediately inform the appropriate ground station ✓ **Correct**

B Draft a bird strike hazard report upon arrival within at most 48 hours

C Inform the appropriate ground station within a reasonable period of time

Why: *Warning following traffic immediately is the only effective defence.*

9 What is the most effective method for scaring birds?

A Land rover with loudspeaker

B Shell crackers ✓ **Correct**

C Making movement

Why: *Shell crackers are stated as the most effective scaring method.*

10 90% of bird strikes occur:

A Under 500 m ✓ **Correct**

B Between 500 and 1 500 m

C Above 1 000 m

Why: *The vast majority of strikes happen low, near the airfield.*

11 Birds on the ground ahead of an aircraft that has reached an average speed of 135 kt fly away:

A From the beginning of the takeoff roll

B About ten seconds beforehand

C About two seconds beforehand ✓ **Correct**

Why: *Studies show birds clear roughly two seconds before the aircraft.*

12 Who is responsible for establishing operating procedures for noise abatement during instrument flight in compliance with ICAO PANS-OPS?

A Operator ✓ **Correct**

B State in which the aeroplane is operating

C Commander

Why: *The operator specifies the noise-abatement procedure for each aeroplane type.*

13 About procedures for noise attenuation during landing:

A Such procedures will not involve the prohibition of using reverse thrust ✓ **Correct**

B Such procedures do not exist

C They prohibit the use of reverse thrust

Why: *Only reverse thrust above reverse idle may be restricted — idle reverse is never fully prohibited.*

14 Noise abatement shall not be the determining factor in runway designation when: (1) crosswind incl. gust >15 kt; (2) tailwind incl. gust >5 kt; (3) runway not clear or dry. Correct combination:

A 1, 3

B 2, 3

C 1, 2, 3 ✓ **Correct**

Why: *Any one of the three conditions removes noise abatement's say.*

15 In establishing noise preferential routes:

A No turns should be required coincident with a reduction of power associated with a noise-abatement procedure ✓ **Correct**

B Turns during take-off/climb not required unless bank angle limited to 28° (climbing at $V_2 + 10$ to 20 kt)

C Turns during take-off/climb not required unless the aeroplane has reached and can maintain a height of no less than 100 m above terrain and obstacles

Why: Turning while reducing power compounds workload — it is avoided.

16 What precludes a runway being used for noise abatement procedures if landing in VMC?

A Tailwind up to 3 kts

B No ILS or visual guidance ✓ **Correct**

C Crosswind including gusts of 10 kts

Why: Absence of ILS/visual guidance rules a runway out for VMC noise abatement.

17 During a noise-abatement approach, the aeroplane is to be in the final landing configuration after passing the ___ or at a point ___ from the threshold, whichever is earlier:

A Final marker, 6 NM

B Middle marker, 5 NM

C Outer marker, 5 NM ✓ **Correct**

Why: Stabilised by the outer marker or 5 NM — whichever comes first.

C Fire, Smoke & Brakes (Q18–53)

18 In case of an engine nozzle fire while on ground you:

A Pull the fire shut-off handle and trigger the engine's fire-extinguisher

B Carry out a dry cranking ✓ **Correct**

C Carry out a damp cranking

Why: Dry motoring blows out a residual fuel/nozzle fire on the ground.

19 To extinguish a fire in the cockpit you use: (1) water; (2) powder/chemical; (3) halon; (4) CO₂.

Correct combination:

A 2, 3, 4

B 1, 2

C 3, 4 ✓ **Correct**

Why: Halon and CO₂ are non-conducting and clean — safe around electrics.

20 You will use a CO₂ fire-extinguisher for: (1) paper; (2) plastic; (3) hydrocarbon; (4) electrical.

Correct combination:

A 3, 4

B 1, 2, 3

C 1, 2, 3, 4 ✓ **Correct**

Why: Per the bank, CO₂ is credited against all four fire types listed.

21 You will use a dry chemical powder fire-extinguisher for: (1) paper; (2) plastic; (3) hydrocarbon; (4) electrical. Correct combination:

A 1, 4

B 1, 2, 3

C 1, 2, 3, 4 ✓ **Correct**

Why: Dry chemicals cover Class A, B and C fires.

22 CO₂ type extinguishers are fit to fight: (1) Class A; (2) Class B; (3) electrical source; (4) special fires (metals, gas, chemical). Correct combination:

A 1, 2, 3 ✓ **Correct**

B 1, 3, 4

C 2, 3, 4

Why: CO₂ is unsuitable for special metal/chemical (Class D) fires.

23 To fight a fire in an air-conditioned cargo hold:

A You turn off the cargo-hold ventilation and extinguish the fire ✓ **Correct**

B Extinguish fire only

C Fire-fighting is not necessary, since combustible goods in an air-conditioned hold are forbidden

Why: Killing ventilation starves the fire of oxygen.

24 In case of a fire due to heating of the brakes, you fight the fire using: (1) dry powder; (2) water spray atomizer; (3) water extinguisher; (4) CO₂ to the maximum. Correct combination:

A 1, 2 ✓ **Correct**

B 1, 4

C 3, 4

Why: Dry powder plus a water-spray atomizer cool a brake fire safely.

25 A Class A fire is a fire of:

A Electrical origin

B Solid material, generally of organic nature ✓ Correct

C Liquid or liquefiable solid

Why: Class A = wood, paper, cloth, plastic — ordinary solids.

26 After landing, in case of high temperature of the brakes you:

A Release the parking brake and approach the wheels sideways

B Release the parking brake and approach the wheels either from aft or fore ✓ Correct

C Apply the parking brake and approach the wheels sideways

Why: A bursting tyre throws energy sideways — stay fore/aft.

27 H₂O extinguishers are fit to fight:

A Class A fires ✓ Correct

B Electrical source fires

C Class B fires

Why: Water cools Class A fires; it is dangerous on B and C.

28 Fire-extinguisher types which may be used on Class B fires: (1) H₂O; (2) CO₂; (3) Dry-chemical; (4) Halogen. Correct combination:

A 3, 4

B 1, 2, 3, 4

C 2, 3, 4 ✓ Correct

Why: Class B (flammable liquid) cannot be fought with water.

29 Fire-extinguisher types which may be used on Class A fires: (1) H₂O; (2) CO₂; (3) Dry-chemical; (4) Halogen. Correct combination:

A 3, 4

B 1, 2, 3, 4 ✓ **Correct**

C 2, 3, 4

Why: All four agents are credited against Class A fires.

30 A dry-chemical type fire extinguisher is fit to fight: (1) Class A; (2) Class B; (3) electrical source; (4) special fires (metals, gas, chemicals). Correct combination:

A 1, 2, 3, 4 ✓ **Correct**

B 3, 4

C 1, 2, 3

Why: Per the bank, dry chemical is credited against all four.

31 A fire occurs in a wheel and immediate action is required. The safest extinguishant to use is:

A CO₂ (carbon dioxide)

B Foam

C Dry powder ✓ **Correct**

Why: Dry powder avoids thermal shock to the hot wheel/brake assembly.

32 To use passengers' oxygen in case of severe cabin smoke is:

A Useless because breathing oxygen would explode under smoke conditions

B Useless because the toxic cabin smoke is mixed with the breathing oxygen ✓ **Correct**

C Possible and recommended

Why: Drop-down passenger masks are not sealed — they draw in cabin smoke.

33 Following a heavy-mass landing on a short runway, you should check the:

A Temperature of the brakes ✓ **Correct**

B Pressure of the hydraulic fluid

C Pressure of the pneumatic tyres

Why: A heavy stop dumps huge kinetic energy as heat into the brakes.

34 The correct statement about extinguishing agents on board aeroplanes is:

A Water may only be used for minor fires

B Burning cargo in cargo-aeroplanes is usually extinguished by carbon dioxide

C Halon is an effective extinguishing agent for use in aeroplanes ✓ **Correct**

Why: Halon is highly effective — three times CO₂ for the same quantity.

35 If smoke appears in the air conditioning, the first action to take is to:

A Determine which system is causing the smoke

B Begin an emergency descent

C Put on the mask and goggles ✓ **Correct**

Why: Protect the crew first — then diagnose and act.

36 Beneath fire extinguishers, the following equipment for fire fighting is on board:

A A hydraulic winch and a big box of tools

B A big bunch of fire-extinguishing blankets

C Crash axes or crowbars ✓ **Correct**

Why: Crash axes/crowbars allow access to hidden fires behind panels.

37 A Class B fire is a fire of:

A Liquid or liquefiable solid ✓ **Correct**

B Solid material usually of organic nature

C Special fire: metal, gas, chemical product

Why: Class B = flammable liquids, oil, fuel, hydraulic fluid.

38 Fire fighting in the toilets must be performed with:

A All available extinguishers simultaneously ✓ **Correct**

B All available extinguishers in sequence

C All available liquids

Why: A concealed lavatory fire demands maximum, immediate suppression.

39 The system which must be switched off in case of a belly compartment fire is generally the:

A Ventilation of the cargo compartment ✓ **Correct**

B Trim air

C Pressurization

Why: Cutting ventilation deprives the cargo fire of oxygen.

40 You will use a water fire-extinguisher (straight jet) on a fire of: (1) solid (fabric, carpet); (2) liquids (ether, gasoline); (3) gas; (4) metals (sodium). Correct combination:

A 3

B 1 ✓ **Correct**

C 2

Why: A straight water jet suits only Class A solids.

41 You will use a halon extinguisher for a fire of: (1) solids; (2) liquids; (3) gas; (4) metals.

Correct combination:

A 1, 2, 4

B 1, 2, 3, 4

C 1, 2, 3 ✓ **Correct**

Why: Halon covers A, B and C — never use it on metals (Class D).

42 An engine fire warning will switch on the relevant fire shut-off handle. The fire shut-off handle will be switched off when:

A Fire is no longer detected ✓ **Correct**

B The fire-extinguisher has been triggered

C The fire shut-off handle has been pulled

Why: The warning extinguishes only once the fire detection clears.

43 A 1211 halon fire-extinguisher can be used for: (1) paper; (2) fabric; (3) electric; (4) wood; (5) hydrocarbon. Correct combination:

A 2, 4, 5

B 2, 3, 4

C 1, 2, 3, 4, 5 ✓ **Correct**

Why: BCF/Halon 1211 is effective across Class A, B and C.

44 A CO₂ fire extinguisher can be used for: (1) paper; (2) hydrocarbon; (3) fabric; (4) electrical; (5) wood. Correct combination:

A 2, 4, 5

B 1, 2, 3, 4, 5 ✓ **Correct**

C 1, 3, 5

Why: Per the bank, CO₂ is credited against all five listed items.

45 A water fire-extinguisher can be used without restriction for: (1) paper; (2) hydrocarbon; (3) fabric; (4) electrical; (5) wood. Correct combination:

A 2, 3, 4

B 1, 2, 3, 4, 5

C 1, 3, 5 ✓ **Correct**

Why: Paper, fabric and wood are Class A — water's safe domain.

46 After a landing with overweight and over-speed conditions, the fireguards should approach the landing-gear tyres:

A Only from left or right sides

B From any side

C Only from front or rear side ✓ **Correct**

Why: A tyre burst releases energy sideways — approach fore/aft.

47 For a flight deck fire, which do you use? (1) BCF; (2) Halon; (3) Dry Powder; (4) Water.

A 1, 2 & 3

B 1, 2, 3 & 4

C 1 & 2 ✓ **Correct**

Why: BCF/Halon are clean, non-conducting agents safe on the flight deck.

48 An aircraft is configured for seating 61 to 200 passengers. The requirement for hand-held fire extinguishers is:

A 4 conveniently located in the passenger compartment

B 2 conveniently located in the passenger compartment

C 3 conveniently located in the passenger compartment ✓ **Correct**

Why: 61–200 seats requires three conveniently located extinguishers.

49 The number of hand fire extinguishers in the passenger compartment when seating configuration is between 401 and 500 is:

A 3

B 6 ✓ **Correct**

C 5

Why: 401–500 seats requires six conveniently located extinguishers.

50 A water fire extinguisher with a directed spray can be used on which fires?

A Gas fires

B Liquid fires

C Solid fires ✓ **Correct**

Why: Water targets Class A solids only.

51 You will use a Halon extinguisher for a fire of: (1) solids; (2) liquids; (3) gas; (4) metals.
Correct combination:

A 2, 3, 4

B 1, 2, 4

C 1, 2, 3 ✓ **Correct**

Why: Halon = Class A, B, C — never on metals (Class D).

52 Fire extinguishers should be located in the pilots' compartment and...

A At each passenger compartment that is separate from the pilots' compartment and not readily accessible to the flight crew ✓ **Correct**

B In the passenger cabin

C At each door

Why: Each separate passenger compartment needs its own extinguisher.

53 In case of an engine jet-pipe fire while on the ground you:

A Carry out a wet motoring cycle

B Carry out a dry motoring cycle ✓ **Correct**

C Pull the fire shut-off handle and trigger the engine fire extinguishers

Why: Dry motoring blows the fire out without introducing more fuel.

D Decompression & Oxygen (Q54–62)

54 If cabin altitude increases during level flight, the differential pressure:

A Decreases ✓ **Correct**

B Remains constant

C Increases

Why: Higher cabin altitude = lower cabin pressure = smaller differential.

55 Minimum requirements for supplemental oxygen during/following an emergency descent: for pilots it shall be available for the entire flight time the cabin pressure altitude exceeds a minimum of X feet. X is:

A 13000 ft ✓ **Correct**

B 14000 ft

C 15000 ft

Why: Pilots remain on oxygen whenever cabin altitude exceeds 13,000 ft.

56 A slow decompression may be caused by:

A Loss of a cabin window

B A leak in a door seal during normal pressurised flight ✓ **Correct**

C Loss of a door

Why: A small seal leak bleeds pressure slowly; a lost door is sudden.

57 At FL290 in straight & level flight, a small leak causes a slow depressurisation. The cabin rate-of-climb indicator will show:

A A rate of climb ✓ **Correct**

B Zero

C A rate of descent of approximately 300 fpm

Why: Falling cabin pressure reads as a rising (climbing) cabin altitude.

58 An aeroplane suffers explosive decompression at 31000 ft. The initial action by the operating crew is:

A Place the seat belt signs to ON

B To put on oxygen masks ✓ **Correct**

C Transmit a MAYDAY message

Why: Crew oxygen first — hypoxia incapacitates within seconds at altitude.

59 A slow decompression may be caused by: (1) cracked window; (2) bad functioning of pressurization; (3) minor leak in fuselage; (4) loss of a door. Correct combination:

A 1, 2

B 3, 4

C 1, 2, 3 ✓ **Correct**

Why: Loss of a door is rapid/explosive, not slow.

60 A fast decompression is recognizable by: (1) mist in the cabin; (2) blast towards the exterior; (3) expansion of body gases; (4) blast of air released violently from the lungs. Correct combination:

A 1, 4

B 1, 2, 3, 4 ✓ **Correct**

C 1, 2, 3

Why: All four are recognised signatures of a fast decompression.

61 Supplemental oxygen is used to:

A Provide people on board with oxygen during a cabin depressurisation ✓ **Correct**

B Protect a crew who fights a fire

C Assist a passenger with breathing disorders

Why: Its purpose is preventing hypoxia during loss of pressurisation.

62 Oxygen should be used after rapid decompression in an emergency descent until what altitude?

A 14000 ft

B 13000 ft

C 10000 ft ✓ **Correct**

Why: 10,000 ft is the altitude at which oxygen is no longer required.

E Wind Shear & Microburst (Q63–70)

63 In case of an unexpected encounter with windshear, you will: (1) set maximum take-off thrust; (2) increase pitch-up to the limit actuating the stick shaker; (3) pull in the drag devices (gear/flaps); (4) keep the airplane's current configuration; (5) reach maximum lift-to-drag ratio. Correct combination:

A 1, 2, 4 ✓ **Correct**

B 1, 3, 5

C 3, 5

Why: Full power, max safe pitch, configuration unchanged — do not retract gear/flap.

64 If you encounter a microburst just after taking off, at the beginning you will have: (1) head wind; (2) strong rear wind; (3) better climb performance; (4) diminution of climb gradient; (5) important thrust drop. Correct combination:

A 1, 4

B 1, 3 ✓ **Correct**

C 4, 5

Why: The initial headwind momentarily improves climb performance.

65 During a landing approach, the aircraft is subjected to windshear with an increasing tailwind. In the absence of pilot action, the aircraft: (1) flies above glide path; (2) flies below glide path; (3) increasing TAS; (4) decreasing TAS. Correct combination:

A 2, 3

B 1, 4

C 2, 4 ✓ **Correct**

Why: Increasing tailwind robs airspeed — aircraft sinks below the glide path.

66 To counter the effects of windshear, the amount of control action required is:

A Substantial ✓ Correct

B Medium

C Null

Why: Recovery may need full power and a near-stall pitch attitude.

67 While approaching the outer marker, the tower informs you of a microburst. You will expect to encounter:

A Convection motion of air mass

B Supercooled water

C Windshear (vertical and horizontal) ✓ Correct

Why: A microburst produces both vertical and horizontal wind shear.

68 One of the main characteristics of windshear is that it:

A Occurs only at low altitude (2000 ft) and never in the horizontal plane

B Can occur at any altitude in both the vertical and horizontal planes ✓ Correct

C Can occur at any altitude and only in the horizontal plane

Why: Wind shear is not altitude- or plane-restricted.

69 Which magnitude will be the first to change its value when penetrating a wind shear?

A Indicated airspeed ✓ Correct

B Groundspeed

C Vertical speed

Why: A sudden wind change is felt first as an IAS change.

70 An aircraft with a 40 kt headwind heading towards the centre of a microburst may expect, on crossing it, a windshear of:

A 40 kt

B 80 kt ✓ **Correct**

C 20 kt

Why: A 40 kt headwind reverses into a 40 kt tailwind — an 80 kt shear.

F Security & Unlawful Interference (Q71–78)

71 When a commercial transport passenger airplane is equipped with a door in the flight-crew compartment area, this door must include:

A A locking system to prevent any unauthorized access ✓ **Correct**

B A sealing system allowing maintenance of cockpit pressure during a depressurization

C Distinctive red or yellow coloured markings indicating the access area

Why: The flight-deck door must lock out unauthorised access.

72 The State in which an aircraft has landed after an act of unlawful interference must immediately notify the:

A State of Registry of the aircraft, the State of the operator and ICAO ✓ **Correct**

B State of Registry of the aircraft and the State of the operator only

C State of Registry of the aircraft and the DGCA

Why: Registry State, operator State and ICAO must all be informed.

73 In case of a hi-jack, the squawk code is:

A 2000

B 7500 ✓ **Correct**

C 7700

Why: 7500 = unlawful interference; 7700 = general emergency; 7600 = radio failure.

74 The flight deck door should be capable of being:

A Remotely locked from either inside or outside the compartment

B Remotely locked by cabin crew operation from outside the compartment

C Locked from within the compartment ✓ **Correct**

Why: Control of the lock stays with the flight crew, from inside.

75 Who is responsible for adequate measures for the safety of passengers and crew of an aircraft subjected to unlawful interference until the journey can be continued?

A Contracting State in which the unlawful interference occurs ✓ **Correct**

B Commander of the aircraft

C DGCA

Why: The State where the act occurs carries this responsibility.

76 Following an act of unlawful interference, to whom should the commander submit a report?

A Both the local authority and the Authority of the State of the operator ✓ **Correct**

B The local Authority only

C The Authority of the State within which the aeroplane is operating at the time

Why: Report goes to the local authority AND the operator's State authority.

77 When flight crew members are at their duty stations they must:

A Wear a communications head set

B Keep the seat belts fastened ✓ **Correct**

C Fully raise the seat

Why: *Seat belts must stay fastened at the duty station.*

78 The State where an aircraft has landed after an act of unlawful interference must immediately notify the:

A State of Registry of the aircraft, the State of the operator and ICAO ✓ **Correct**

B State of Registry of the aircraft and the State of the operator only

C State of the operator, the J.A.A. and ICAO

Why: *Registry State, operator State and ICAO — the same trio as Q72.*

G Emergency Landings, Ditching & Fuel Jettison (Q79–85)

79 In case of ditching, the cabin attendants will: (1) evacuate women and children first; (2) have the passengers embark directly into the life rafts; (3) prevent passenger movements which may impede flotation; (4) ensure complete evacuation. Correct combination:

A 1, 4

B 2, 3, 4 ✓ **Correct**

C 2, 3

Why: *Direct raft embarkation, controlled movement, and full evacuation.*

80 Mist in the cabin, pressure and temperature drop characterize:

A A fast depressurization ✓ **Correct**

B A plastic fire

C A slow depressurization

Why: Sudden fog plus temperature drop are fast-decompression signatures.

81 In the event of a precautionary landing, who is responsible for alerting the emergency services?

A The operations dispatcher

B The commander

C ATC ✓ **Correct**

Why: A precautionary landing is premeditated — ATC alerts the emergency services.

82 If ditching is inevitable:

A Passengers should be briefed that even if they evacuate, some will inevitably drown

B The use of life jackets is to be reiterated before the ditching ✓ **Correct**

C Life jackets are to be inflated before leaving the aeroplane

Why: Brief life-jacket use beforehand; never inflate them inside the cabin.

83 Requirements that must be shown to exist during fuel-jettisoning tests: (1) system free from fire hazard; (2) fuel discharges clear of any part of the aeroplane; (3) fuel fumes do not enter any part; (4) the jettison operation does not adversely affect controllability. Correct combination:

A 1, 4

B 1, 2, 3, 4 ✓ **Correct**

C 2, 3

Why: All four conditions must be demonstrated during jettison tests.

84 Fuel jettison should be carried out:

- A** Anywhere if unavoidable
- B** Above 6,000 ft AGL

C All answers are correct ✓ Correct

Why: Normally above 6,000 ft AGL — but anywhere if genuinely unavoidable.

85 Fuel Jettison:

- A** May be ordered by ATC to reduce aeroplane mass in an emergency situation

B Is a procedure to reduce mass in an emergency only ✓ Correct

- C** Is a procedure that may be employed to reduce mass where an overweight landing may damage the aeroplane

Why: Per the bank, fuel jettison is treated as an emergency-only mass reduction.

H Transport of Dangerous Goods (Q86–92)

86 A list of dangerous goods which may not be transported by air can be found in:

- A** The shipper's declaration for dangerous goods

B The Technical Instructions for the Safe Transport of Dangerous Goods by Air ✓ Correct

- C** Annex 18 to the Chicago convention

Why: The Technical Instructions list goods forbidden in normal circumstances.

87 To carry hazardous materials on board a public transport airplane (per CAR-OPS), they must be accompanied with a:

- A Representative of the company owning the materials
- B Specialized handling employee

C Transport document for hazardous materials ✓ Correct

Why: A hazardous-materials transport document must accompany the cargo.

88 General information, instructions and recommendations on transport of hazardous materials are specified in the:

- A AIP (Aeronautical Information Publication)

B Operation manual ✓ Correct

- C Flight manual

Why: The Operations Manual carries these instructions for the crew.

89 Products are considered dangerous goods if defined as such by:

- A The IATA document "Regulations governing the transportation of dangerous goods by air"
- B The directive of the Community Union

C The ICAO document "Technical Instructions for the safe transportation of dangerous goods by air" ✓ Correct

Why: The ICAO Technical Instructions are the defining reference.

90 ICAO Appendix 18 is a document dealing with:

- A The air transport of live animals

B The safety of the air transport of hazardous materials ✓ Correct

- C The noise pollution of aircraft

Why: Annex/Appendix 18 governs the safe transport of dangerous goods.

91 The dangerous goods transport document, if required, shall be drawn up by:

A The shipper ✓ **Correct**

B The handling agent

C The captain

Why: The shipper is responsible for the transport document.

92 Can dangerous goods be carried in the passenger cabin or on the flight deck?

A Yes, provided they are non toxic

B Yes, if authorised by the authority

C Yes, but only goods specified in the Technical Instructions ✓ **Correct**

Why: Only goods the Technical Instructions specifically permit.

I Contaminated Runways & Hydroplaning (Q93–101)

93 The flight manual has no specific wet-runway data and reports indicate the runway may be wet. The required landing distance on a dry runway must be increased by:

A 15% ✓ **Correct**

B 18%

C 17.6%

Why: A wet runway requires at least 115% of the dry landing distance.

94 A runway is considered damp when:

A Its surface is not dry, and surface moisture does not give a shiny appearance ✓ **Correct**

B It is covered with a film of water of less than 3 mm

C Surface moisture gives it a shiny appearance

Why: Damp = not dry but no shine.

95 A runway is considered wet when: (1) covered with water/loose-slushy snow ≤ 3 mm equivalent; (2) moisture modifies colour but not shiny; (3) moisture makes it reflective but no large stagnant sheets; (4) bears stagnant sheets of water. Correct combination:

A 1, 2

B 1, 2, 3

C 1, 3 ✓ **Correct**

Why: Wet = up to 3 mm or reflective — stagnant sheets mean flooded/contaminated.

96 The presence of dynamic hydroplaning depends primarily on the:

A Strength of the headwind

B Aircraft's weight

C Depth of the standing water of the runway ✓ **Correct**

Why: Standing water deeper than tread depth triggers dynamic hydroplaning.

97 The braking efficiency is a piece of information presenting itself in the form of a:

A Letter falling between A and E

B Combination of the terms: poor, medium, good ✓ **Correct**

C Zero followed by two decimals

Why: Braking action is reported as poor / medium / good.

98 A runway covered with 4 mm thick water is said to be:

A Contaminated ✓ **Correct**

B Flooded

C Damp

Why: More than 3 mm of water makes the runway contaminated.

99 A runway is considered damp when:

A It is covered with a film of water of less than 1 mm

B Its surface is not dry, and surface moisture does not give it a shiny appearance ✓ **Correct**

C It is covered with a film of water of less than 3 mm

Why: *Damp is defined by the absence of shine, not a water depth.*

100 The effect whereby a tyre is lifted from the runway due to aeroplane speed along the runway is known as:

A Surface tension

B Hydroplaning ✓ **Correct**

C Aqua-skimming

Why: *Hydroplaning lifts the tyre onto a film of water.*

101 Viscous hydroplaning is caused by:

A A smooth and dirty runway surface ✓ **Correct**

B Bald tyres

C A rough runway surface

Why: *A thin film on a smooth, dirty surface causes viscous hydroplaning.*

J Wake Turbulence Separation (Q102–109)

102 What is the shortest distance in a sequence for landing between a "Heavy" aircraft preceding a "Light" aircraft?

A 3 NM

B 6 NM ✓ **Correct**

C 2 km

Why: Distance-based minimum for Heavy followed by Light is 6 NM.

103 A separation minimum applies between a LIGHT/MEDIUM and a HEAVY (and between LIGHT and MEDIUM) when the heavier aircraft makes a low/missed approach and the lighter lands opposite-direction on the same or a parallel runway separated by:

A Less than 730 m

B Less than 760 m ✓ **Correct**

C 730 m

Why: The trigger spacing is parallel runways less than 760 m apart.

104 Same scenario, but the lighter aircraft is utilising an opposite-direction runway for take-off. This minimum is:

A 2 minutes ✓ **Correct**

B 3 minutes

C 1 minute

Why: A 2-minute minimum applies for the opposite-direction take-off case.

105 To meet wake turbulence criteria, what minimum separation applies when a MEDIUM aircraft takes off behind a HEAVY aircraft, both using the same runway?

- A 1 minute
- B 3 minutes

C 2 minutes ✓ Correct

Why: Heavy leading, Medium following, same runway = 2 minutes.

106 For arriving aircraft using timed approaches, what minima apply to an aircraft landing behind a heavy or medium aircraft?

- A Medium behind other medium — 2 minutes
- B Medium behind heavy — 3 minutes

C Medium behind heavy — 2 minutes ✓ Correct

Why: Arriving Heavy followed by Medium is 2 minutes (time-based table).

107 What is the minimum wake turbulence separation when a LIGHT aircraft takes off behind a MEDIUM aircraft, both using the same runway?

- A 1 minute
- B 3 minutes

C 2 minutes ✓ Correct

Why: Medium leading, Light following, same runway = 2 minutes.

108 The letter "L" is written in the wake-turbulence box of a flight-plan form when the MCTOW of an aircraft is less than or equal to:

- A 14000 kg
- B 20000 kg

C 7000 kg ✓ Correct

Why: Light category = MCTOW of 7,000 kg or less.

109 Wake turbulence risk is highest:

A If, just before landing, a much lighter aircraft has landed on the same runway with heavy crosswind

B When a heavy aircraft has just performed a take-off at a closely situated parallel runway with a light crosswind ✓ **Correct**

C When a preceding aircraft has briefly applied take-off thrust just prior to take off

Why: *A light crosswind drifts a heavy aircraft's vortices onto the parallel runway.*

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Consolidated Answer Key — All 109 Questions

Quick-Reference Answer Grid

Q	A	Q	A	Q	A	Q	A	Q	A	Q	A	Q	A
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2	A	18	B	34	C	50	C	66	A	82	B	98	A
3	A	19	C	35	C	51	C	67	C	83	B	99	B
4	B	20	C	36	C	52	A	68	B	84	C	100	B
5	A	21	C	37	A	53	B	69	A	85	B	101	A
6	C	22	A	38	A	54	A	70	B	86	B	102	B
7	C	23	A	39	A	55	A	71	A	87	C	103	B
8	A	24	A	40	B	56	B	72	A	88	B	104	A
9	B	25	B	41	C	57	A	73	B	89	C	105	C
10	A	26	B	42	A	58	B	74	C	90	B	106	C
11	C	27	A	43	C	59	C	75	A	91	A	107	C
12	A	28	C	44	B	60	B	76	A	92	C	108	C
13	A	29	B	45	C	61	A	77	B	93	A	109	B
14	C	30	A	46	C	62	C	78	A	94	A	—	—
15	A	31	C	47	C	63	A	79	B	95	C	—	—
16	B	32	B	48	C	64	B	80	A	96	C	—	—

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