

CPL · ATPL · Human Performance & Limitations Aviation Physiology & Human Factors

Part 12 — DGCA QUESTION BANK (Q1 – Q50) | Worked solutions with full DGCA-style explanations & cross-reference to the relevant theory section

INSTRUCTOR

Ghost Aviator

EXAM

DGCA CPL / ATPL — HPL

Q-RANGE

1 – 50 (of 105 total)

How to use this Q&A bank

For every question you will see: **(1)** the exact question stem as printed in the source, **(2)** the three options A/B/C with the correct one highlighted in green, **(3)** a "WHY THIS IS CORRECT" explanation with the underlying DGCA-quoted fact, and **(4)** a back-reference to the Part / Section where that fact was taught in detail. The back-references use the form §N (Part X) — letting you jump straight back to the right page if you got it wrong.



The DGCA examiner deliberately repeats themes — once you have nailed every fact in Parts 1–11, the question bank is largely re-statement. The worked solutions below show *which sentence in which part* answers each question.

Question Clusters in this part

- Q1 – Q9 · Aviation Medicine Specialist · Illusions · Hypoxia · Atmosphere & Pressure
- Q10 – Q21 · Ear & Eustachian Tube · Gases · Gas Laws · CO₂ · ICAO Atmosphere · Barotrauma · Dalton's & Henry's Laws
- Q22 – Q33 · Illusions · Gas in Gut · Hypoxia · DCS · Bends · Cabin Pressure · Circulation · Hi-Alt Cause · Diffusion · Creeps · O₂/CO₂ exchange · Diving 24-hr
- Q34 – Q50 · BP · DCS symptoms · Baroreceptor · Pressure curve · TUC · Hypoxia signs · DCS treatment · Definition · Blood components · Cardiac output · Haemoglobin · Coronary · Bends · DCS exclusion · 24-hr alcohol after RD

Cluster A Q1 – Q9 · Aviation Medicine, Illusions, Hypoxia & the Atmosphere

Q 1

A flight crew has completed a two-day stay at a hospital. What must he/she do before flying as a crew member?

- A) Do his class I medical from an authorized agency.
- B) Take clearance from DGCA before flying.
- C) Seek advice from the authority and Aviation Medicine Specialist. ✓

ANS · C

§76 (Part 11)

DGCA-quoted: "*pilots do not fly as part of the operating crew of an aircraft when taking drugs or medication, unless they have been cleared to do so by an **Aviation Medicine Specialist**.*" A hospital stay implies the pilot was either ill or under medication — both require specialist clearance. (A) is excessive (no need to re-do an entire Class-I medical for a two-day stay); (B) is too vague — clearance from DGCA is routed through the Aviation Medicine Specialist, not the agency directly.

Q 2

Linear deceleration:

A) Causes sensory illusions on the pitch axis. ✓

B) Can create the illusion of being in a nose up attitude.

C) Application of full power during a missed instrument approach can lead to this illusion.

ANS • A

§54 (Part 9) Head-Down Illusion

Linear **DECELERATION** (e.g. lowering flaps, air-brakes, throttle-back) deflects the otoliths in such a way that the pilot perceives a pitch-down attitude — i.e. a sensory illusion on the pitch axis. (B) is the wrong direction — linear *acceleration* (not deceleration) creates the nose-up illusion. (C) describes application of **FULL POWER** → linear *acceleration*, again the wrong direction (this is the Head-Up illusion / take-off somatogravic). The distractors are flipped on purpose; deceleration affects the pitch axis but produces a "nose-down" illusion.

Q 3

High blood pressure or hypertension is:

A) A major cause of unfitness in pilots. ✓

B) Responsible for reduced tolerance to G forces.

C) May cause chokes during flight.

ANS • A

§15 (Part 4)

Hypertension is the leading **chronic cardiovascular cause of pilot medical unfitness** worldwide. While it does also contribute to other problems, the question asks what hypertension *is* — and the headline answer is the unfitness it causes at the Class-1 medical. (B) "reduced G-tolerance" is not specifically listed against hypertension (the 6 G-tolerance reducers in §64 are alcohol, smoking, fatigue, heat, obesity, sickness — not hypertension explicitly). (C) "chokes" is a DCS bubble symptom (§20.2) — unrelated to BP.

Q 4

Unusual fatigue and a loss of consciousness are symptoms of:

- A) Leans
- B) Presbyopia

C) Hypoxia ✓

ANS • C

§10 (Part 3)

Unusual fatigue and ultimately loss of consciousness are classic late-stage **hypoxia** symptoms. Hypoxia symptoms cascade: euphoria → impaired judgement → tingling/numbness → cyanosis → unusual fatigue → unconsciousness → death. (A) The "leans" is a vestibular illusion (Part 9), not a metabolic state. (B) Presbyopia is age-related loss of accommodation (§33 Part 7) — visual, not systemic.

Q 5

Total Space Equivalent Zone extends outwards from 120 nm. To survive in this zone:

- A) Good quality pressure suit is adequate.
- B) Adequate food and water is enough.

C) Adequate oxygen, pressure and heat is a must. ✓

ANS • C

§5 (Part 1) Physiological Zones

The **Total Space-Equivalent Zone** (> 120 nm above Earth) is a vacuum environment — there is essentially no atmospheric pressure, no oxygen, and extreme temperature swings between sunlit and shaded sides. Survival requires **all three**: oxygen (no atmospheric O₂), pressure (vacuum would cause body fluids to boil — Armstrong's Line, 63,000 ft), and heat (extreme cold in shadow). A pressure suit alone (option A) addresses pressure and provides O₂, but heat must also be managed — that's why astronauts use full life-support suits, not just pressure suits.

Q 6

At 8,000 ft, the standard barometric pressure is 77 kPa (574 mmHg). This means that there is:

- A) 57% of the oxygen available at sea level.
- B) 65% of the oxygen available at sea level.

C) 76% of the oxygen available at sea level. ✓

ANS • C

§4 (Part 1) pO₂ vs altitude

Although the *percentage* of oxygen in air remains ~21 % at all altitudes (Q9), the *partial pressure* of O₂ falls with total pressure (Dalton's Law). At 8,000 ft barometric pressure is ~77 kPa vs 101.3 kPa at sea level → ratio $\approx 77/101.3 \approx 76 \%$. The amount of usable oxygen reaching the alveoli is therefore about 76 % of sea-level value — which is why 8,000 ft is the DGCA maximum cabin altitude (§19.4) — borderline but tolerable.

Q 7

The atmospheric gas pressure:

- A) Decreases slower at lower altitudes compared with higher levels and equivalent altitude changes.
- B) Rises with altitude.

C) Drops faster at lower altitudes in comparison to the same altitude changes at higher altitudes. ✓

ANS • C

§3 (Part 1) ISA & pressure curve

Atmospheric pressure falls **exponentially** with altitude — most of the air is in the lowest few kilometres. From SL to 18,000 ft pressure halves (~50 % drop in just 18,000 ft); from 18,000 to 36,000 ft it halves *again* (a further 25 %); from 36,000 to 54,000 ft another halving. So the absolute pressure drop per unit altitude is **larger near the surface** than at altitude. (B) is wrong — pressure decreases, doesn't rise.

Q 8

The chemical composition of the earth's atmosphere approximately is:

- A) 78% nitrogen, 21% oxygen, 0.9% argon, 0.03% carbon dioxide. ✓
- B) 70% nitrogen, 28% oxygen, 1.9% argon, 0.03% carbon dioxide.
- C) 78% nitrogen, 20% oxygen, 0.9% carbon dioxide, 1.03% argon.

ANS · A**§1 (Part 1) Atmosphere composition**

Standard atmospheric composition (by volume): $N_2 \approx 78\%$, $O_2 \approx 21\%$, $Ar \approx 0.93\%$, $CO_2 \approx 0.03\text{--}0.04\%$. Option A matches exactly. (B) has too much O_2 . (C) swaps Ar and CO_2 values — note that CO_2 is the tiny trace, not Ar.

Q 9

The volume percentage of oxygen in the atmosphere is 21% which:

- A) Is constant for all altitudes in troposphere. ✓
- B) Decreases with increasing altitude.
- C) Increases with increasing altitude.

ANS · A**§1 (Part 1)**

The **percentage composition** of atmospheric gases is essentially **constant throughout the troposphere** (sea level to $\sim 36,090$ ft / tropopause) due to atmospheric mixing. What changes with altitude is the **partial pressure** of O_2 (and total pressure), *not* the volume percentage. This is the classic exam trap — students confuse "less oxygen" (true in terms of partial pressure) with "lower percentage" (false). Hypoxia at altitude is caused by reduced pO_2 , not reduced O_2 percentage.

Q 10

Pain in the middle ear during descent may be eased by:

- A) Increasing the rate of descent.
- B) Sneezing deliberately with the nostrils wide open.
- C) Leveling off and possibly climbing. ✓

ANS · C

§38 (Part 8) Eustachian tube

DGCA-quoted: "If the problem is not resolved, the rate of descent should be decreased or stopped at intervals... This is also known as STEP DESCENT. Pilot may resort to even CLIMB if pressure persists."

Levelling off allows the Eustachian tube time to equalise; if that fails, a brief climb reduces external pressure and the differential. (A) increasing descent makes it worse. (B) deliberate sneezing is *not* the DGCA-listed technique — Valsalva (blow with nostrils *pinched closed*) is.

Q 11

Gases of physiological importance to man are:

- A) Oxygen and carbon dioxide. ✓
- B) Ozone and carbon dioxide.
- C) Oxygen and Ozone.

ANS · A

§8 (Part 2) Respiratory System

The two gases the body actively *exchanges* are **oxygen** (taken in for cellular respiration) and **carbon dioxide** (expelled as metabolic waste). Ozone (O₃) is toxic to humans and exists at high concentrations in the stratosphere; it is a hazard to high-altitude pilots, but not a "physiologically important" gas in normal metabolism.

Q 12

Oxygen, combined with hemoglobin in blood is transported by:

- A) Platelets.
- B) Blood plasma.

C) Red blood cells. ✓

ANS • C

§9 (Part 2) Circulatory System • RBC & Hb

Haemoglobin is contained **within Red Blood Cells (RBCs/erythrocytes)** — approximately 280 million Hb molecules per RBC. Each Hb binds up to 4 O₂ molecules. (A) Platelets are for clotting. (B) Plasma carries dissolved gases too but in vastly smaller quantities than Hb in RBCs — over 98 % of O₂ in blood is carried by Hb in RBCs.

Q 13

An increase in the amount of carbon dioxide in the blood leads to:

- A) Hyperventilation.
- B) Over breathing.

C) Shortness of breath. ✓

ANS • C

§8 / §12 (Part 2 / Part 3)

The brain's respiratory centre is primarily sensitive to **CO₂ levels in the blood** (not O₂ — this is the key concept). Rising CO₂ stimulates an urge to breathe more deeply / faster → subjectively felt as **shortness of breath** ("air hunger"). (A) Hyperventilation is the *opposite* — over-breathing that *removes* CO₂, leading to low CO₂. (B) "Over breathing" = same as hyperventilation. The trap: hyperventilation is over-breathing, and over-breathing reduces (not increases) CO₂.

Q 14

According to the ICAO standard atmosphere, the temperature lapse rate of the troposphere is approximately:

- A) **-2°C every 1,000 feet. ✓**
- B) -10°C every 10,000 feet.
- C) -1°C every 190 meters.

ANS • A

§3 (Part 1) ISA

The DGCA-quoted ISA lapse rate is **1.98 °C per 1,000 ft** — which rounds to roughly **2 °C/1,000 ft**. So option A is the closest match. (B) -10°C per 10,000 ft = 1°C per 1,000 ft — too low. (C) -1°C per 190 m $\rightarrow \approx 1^{\circ}\text{C}/623 \text{ ft} \rightarrow \approx 1.6^{\circ}\text{C}$ per 1,000 ft — close but not the standard expression. The DGCA-preferred answer in this exam is (A) $-2^{\circ}\text{C}/1,000 \text{ ft}$.

Q 15

The barometric pressure drops to 1/2 of the pressure at sea level at:

- A) 30,000 feet.
- B) **18,000 feet. ✓**
- C) 10,000 feet.

ANS • B

§19.2 (Part 5)

DGCA-quoted: "**By 18,000 ft ASL (5,486 m) atmospheric pressure is HALVED.**" This is also the threshold above which DCS symptoms may begin to develop. (A) 30,000 ft is roughly quarter-SL pressure (a second halving from 18,000 ft to $\sim 36,000 \text{ ft}$). (C) 10,000 ft pressure is $\sim 70 \%$ of SL — not halved.

Q 16

The total pressure of a mixture of gases is equal to the sum of the partial pressures of the gases which compose the mixture corresponds to:

- A) Charle's law.
- B) Dalton's law. ✓**
- C) Henry's law

ANS • B

§2 (Part 1) Five Gas Laws

Dalton's Law of Partial Pressures: the total pressure of a gas mixture equals the sum of the partial pressures of each component gas. This is the basis of pO_2 calculations at altitude. (A) Charles's Law: $V \propto T$ at constant P. (C) Henry's Law: gas dissolved in a fluid is proportional to its partial pressure — explains DCS.

Q 17

Boyle's law is directly applicable in case of:

- A) The transfer of gas between the alveoli and the blood.
- B) The expansion of trapped gases in the human body with increasing altitude. ✓**
- C) Pressure of a mixture of gases at high altitude.

ANS • B

§2 (Part 1) Boyle's Law

Boyle's Law: $P \cdot V = \text{constant}$ (at constant T). Direct in-flight application: as cabin altitude rises, ambient pressure falls → **trapped gases in the body (gut, sinuses, middle ear, dental cavities) EXPAND**. This drives sinus block (§71), barodontalgia (§72), and gastric distress at altitude (§70.2). (A) gas exchange across alveoli is by partial-pressure diffusion (Dalton's/Henry's domain). (C) gas-mixture pressure is Dalton's Law.

Q 18

Which data compose the ICAO standard atmosphere?

- A) Pressure, Temperature, Humidity and positive lapse rate.
- B) Density, Pressure, Temperature and lapse rate. ✓**
- C) Density, Pressure, dryness and negative lapse rate.

ANS · B

§3 (Part 1) ISA

ICAO Standard Atmosphere defines: **SL pressure 1013.25 hPa, SL temperature 15°C, SL density 1.225 kg/m³, and lapse rate 1.98°C/1,000 ft.** Humidity is NOT part of ISA (ISA assumes dry air). The lapse rate is decreasing (temperature falls with altitude) — but the standard refers to it as "the lapse rate," not "negative" or "positive." Option (B) gives the four ISA parameters correctly.

Q 19

Otis Barotraumas is:

- A) Stretching of the ear drum caused by the expansion and contraction of gases trapped in the inner ear by a blocked Eustachian tube. ✓**
- B) Stretching of the ear drum caused by the expansion and contraction of gases trapped in the outer ear by the blocked Tympanum.
- C) Damage to the ear drum caused by the expansion and contraction of gases trapped in the middle ear by infected Ossicles.

ANS · A

§38.3 (Part 8)

DGCA-quoted definition verbatim. *(Strictly, the trapped gas is in the **middle ear**, not the inner ear — the source text says "inner ear" in option A; this is the wording used by DGCA and is the marked-correct answer in the official key.)* The cause is a blocked Eustachian tube. (B) "outer ear / Tympanum" is wrong — the tympanum IS the eardrum, not a location. (C) "infected ossicles" is not the mechanism.

Q 20

Dalton's law explains the occurrence of:

- A) Ischemic hypoxia.
- B) Histotoxic hypoxia.

C) Hypoxic hypoxia. ✓

ANS · C

§2 (Part 1) Dalton · §10 (Part 3) Hypoxia types

Dalton's Law (partial pressures) directly explains **Hypoxic Hypoxia**: at altitude, total pressure falls → pO_2 falls (Dalton) → insufficient driving pressure for O_2 to diffuse into blood. (A) Ischemic = blood flow problem (cardiac). (B) Histotoxic = cells can't use O_2 (cyanide, alcohol). (Note: anemic hypoxia = reduced Hb, not directly Dalton.)

Q 21

Henry's law explains the occurrence of:

- A) Hyperventilation.
- B) Hypoxia.

C) Decompression sickness. ✓

ANS · C

§20.1 (Part 5)

DGCA-quoted: "*Henry's Law explains the occurrence of decompression sickness.*" Henry's Law: gas dissolved in a fluid is proportional to its partial pressure at the surface. When ambient pressure drops rapidly, dissolved N_2 comes out of solution in the blood as bubbles → bends, creeps, chokes, staggers.

Q 22

In aviation any mismatch between what we sense and what we expect is:

- A) An effect of motion sickness.
- B) An illusion. ✓
- C) A symptom of Hypoxia.

ANS · B

§45 (Part 9)

DGCA-quoted verbatim: "In aviation any mismatch between what we sense and what we expect is an illusion."

Q 23

On ascent the gases in the digestive tract will:

- A) Shrink.
- B) Escape to lungs.
- C) Expand. ✓

ANS · C

§70.2 (Part 10) · Boyle's Law (Part 1)

On ascent ambient pressure falls → trapped gases expand (Boyle's Law: $P \cdot V = \text{constant}$). Gases in the gut nearly double in volume between sea level and 18,000 ft. This is why gastroenteritis grounds a pilot even on medication (§70.2), and why high-fibre / gas-producing foods are discouraged before flight.

Q 24

The most serious hypoxia:

- A) Causes headache and tingling in hands and feet.
- B) Causes fornication, flushed cheeks and cherry red lips.
- C) Interferes with reasoning, gives rise to unusual fatigue and, finally, results in a loss of consciousness/death. ✓**

ANS · C

§10 (Part 3)

Severe hypoxia is the late-stage cascade: impaired reasoning → unusual fatigue → LoC → death. (A) describes mild early-stage hypoxia. (B) describes CO poisoning, not hypoxia per se (cherry-red lips is the diagnostic CO sign — §11). The source text uses "fornication" but the intended word is "*formication*" (a sensation of ants crawling under the skin — a tactile hallucination).

Q 25

One of the symptoms of decompression sickness are:

- A) The bends. ✓**
- B) Convulsions.
- C) Impaired night vision and slow reaction time.

ANS · A

§20 (Part 5) DCS symptoms

DGCA-quoted DCS symptom list: **Bends, Chokes, Skin manifestations, Neurological symptoms, Circulatory shock.** (B) Convulsions are an obvious-incapacitation cause / epilepsy (§27/§28), not DCS proper. (C) Impaired night vision and slow reaction time are hypoxia-family symptoms (§10), not DCS.

Q 26

The tendency to develop the bends increases with:

- A) Low rates of climb, age, obesity, physical activity and high temperatures.
- B) High rates of climb, age, obesity, physical activity and low temperatures. ✓**
- C) High rates of descend age, obesity, physical activity and high temperatures.

ANS · B

§19.5 (Part 5)

DGCA-quoted FIVE factors: "*High rates of climb, age, obesity, physical activity, low temperatures.*" Option B matches exactly. (A) flips climb rate and temperature. (C) refers to "descend" instead of "climb" — and high temperature is the wrong direction.

Q 27

The cabin pressure in airline operation is:

- A) Normally not exceeding 4,000 to 5,000 feet.
- B) Normally not exceeding 2,000 to 3,000 feet.
- C) Normally not exceeding 6,000 to 8,000 feet. ✓

ANS · C

§19.4 (Part 5)

DGCA-quoted: typical airliner cabin pressure $\approx$ **6,000 ft**, maximum **8,000 ft**. So "not exceeding 6,000 to 8,000 ft" is correct. Modern aircraft (787, A350) maintain lower cabin altitudes ($\sim$ 6,000 ft cruise) for passenger comfort and reduced fatigue — but the DGCA-listed regulatory ceiling remains 8,000 ft.

Q 28

The circulation system transports:

- A) Oxygen, carbon monoxide and adrenaline.
- B) Oxygen and carbon dioxide only.
- C) Chemical messengers, oxygen and carbon dioxide. ✓

ANS · C

§9 (Part 2) Five functions of blood

DGCA-listed five functions of blood include: respiratory transport (O_2 , CO_2), **endocrine transport (hormones / "chemical messengers")**, defence, temperature regulation, waste removal. (A) Carbon monoxide is a toxin — not normally transported. (B) is incomplete — circulation transports far more than just gases.

Q 29

Physiological problems at high altitude are caused by:

- A) Increased atmospheric pressure.
- B) Reduced oxygen percentage in atmosphere.
- C) Decreased atmospheric pressure. ✓

ANS · C

§1 / §10 (Part 1 & Part 3)

The root cause of altitude-related physiological problems is the **decrease in atmospheric pressure**, which lowers the partial pressure of oxygen (Dalton), reduces gas dissolution (Henry), expands trapped body gases (Boyle), and degrades cognitive performance. (B) is the classic trap — the *percentage* of O_2 is constant; it's the partial pressure that falls. (A) is the wrong direction.

Q 30

Which gas will diffuse from the blood to the alveoli:

- A) Nitrogen.
- B) Carbon Dioxide. ✓**
- C) Oxygen.

ANS · B**§8 (Part 2) Respiratory exchange**

Gas exchange in alveoli: **O₂ moves FROM alveoli INTO blood** (high pO₂ in alveoli → lower pO₂ in venous blood); **CO₂ moves FROM blood INTO alveoli** (high pCO₂ in venous blood → lower pCO₂ in alveoli). Both exchanges happen by simple diffusion down partial-pressure gradients. (A) Nitrogen is inert and roughly in equilibrium across the membrane — no net diffusion either way in normal breathing.

Q 31

The symptoms caused by gas bubbles under the skin following a decompression are called:

- A) Leans.
- B) Creeps. ✓**
- C) Chokes.

ANS · B**§20.2 (Part 5)**

DGCA's four DCS syndromes: **Bends (joints), Creeps (skin), Chokes (lungs), Stagers (brain)**. Skin bubbles → **Creeps**. (A) Leans is a vestibular illusion in IMC — not DCS. (C) Chokes is bubbles in pulmonary capillaries.

Q 32

The Oxygen-Carbon Dioxide exchange takes place through:

- A) The walls of the capillaries. ✓**
- B) Red blood cells.
- C) Platelets.

ANS · A**§8 (Part 2) Alveolar-capillary membrane**

Gas exchange happens across the **alveolar-capillary membrane** — the thin walls separating alveolar air from blood in pulmonary capillaries. RBCs are the *carriers* of O₂ once it has crossed the membrane (Q12), but the exchange site itself is the capillary wall.

Q 33

In order to get rid of excess nitrogen following scuba diving, subsequent flights should be delayed:

- A) 36 hours.
- B) 12 hours.
- C) 24 hours. ✓

ANS · C

§21 (Part 5)

DGCA-quoted: "As a general rule, individuals should NOT fly within **24 hours** following diving and certainly not the same day." 12 hours is the post-rapid-decompression rule (§20.4) — not diving. 36 hours has no DGCA basis here.

Cluster D

Q34 – Q50 · BP · DCS · Baroreceptor · Pressure curve · TUC · Hypoxia signs · Blood & Heart · Bends · Alcohol-after-RD

Q 34

The normal arterial blood-pressure of a healthy adult is:

- A) 140/100 mm HG.
- B) 120/60 mm HG.
- C) 120/80 mm HG. ✓

ANS · C

§15 (Part 4)

DGCA-quoted normal BP: **120/80 mm Hg** (systolic/diastolic). (A) 140/100 is hypertension. (B) 120/60 — diastolic is too low.

Q 35

Decompression symptoms are:

- A) Bends, chokes, skin manifestations, neurological symptoms and circulatory shock. ✓
- B) Bends, chokes, Personality change, Impaired memory and circulatory shock.
- C) Bends, chokes, Personality change, Impaired memory and Impaired vision.

ANS · A

§20.1 (Part 5) DGCA verbatim 5-symptom list

DGCA-quoted: "Symptoms of decompression sickness are: Bends, Chokes, Skin manifestations, Neurological symptoms, Circulatory shock." Options B and C substitute hypoxia-style symptoms (personality change, memory, vision) — wrong category.

Q 36

Baroreceptor reflex is triggered by:

- A) Body's need to adjust blood pressure. ✓
- B) Body's need to adjust to extreme temperatures.
- C) Body's need to adjust to extreme cold.

ANS · A

§16 (Part 5)

DGCA-quoted: "Any change in your body's demand for blood can trigger your baroreceptor reflex." The receptors are **pressure sensors** in the carotid arteries and aortic arch — they respond to BP changes, not temperature. Temperature regulation is a separate autonomic loop.

Q 37

While climbing from sea level to 40,000 ft the difference in barometric pressure is greatest between:

- A) Sea level and 10,000 ft. ✓
- B) 10,000 and 20,000 ft.
- C) 30,000 and 40,000 ft.

ANS · A

§3 (Part 1) ISA pressure curve · Q7 above

Atmospheric pressure decreases **exponentially** with altitude — so the absolute drop per 10,000 ft is **greatest at the bottom**. From SL (1013 hPa) to ~10,000 ft (697 hPa) = drop of ~316 hPa. From 30,000 to 40,000 ft (300→187 hPa) = drop of ~113 hPa. The biggest absolute change is the SL → 10,000 ft band. This is why hypoxic risk rises steeply in the first few thousand feet.

Q 38

The blood-pressure which is measured during flight medical checks is the:

- A) Pressure in the artery of the left upper arm (representing the pressure at left arm).
- B) Pressure in the artery of the upper arm (representing the pressure at heart level). ✓**
- C) Pressure in the artery of the upper arm (representing the cardiac pressure).

ANS • B**§15 (Part 4)**

Standard clinical BP measurement is at the **brachial artery (upper arm)**, with the arm positioned at **heart level** — so the reading represents systemic arterial pressure at heart level. (A) "left arm" is artificial — either arm is used, both should agree (significant difference indicates pathology). (C) "cardiac pressure" is wrong terminology — cardiac pressures are measured inside the heart, not in an arm artery.

Q 39

What is the average Time of Useful Consciousness after a rapid decompression at 40,000 ft?

- A) About 12 seconds. ✓**
- B) More than 1 minute.
- C) About 40 seconds.

ANS • A**§18.3 (Part 5) TUC Master Table**

DGCA TUC table at **FL400 / 40,000 ft, rapid decompression: 7 – 10 seconds**. Normal-ascent TUC at FL400 is 15 – 20 s. The closest option to the rapid-decompression value (7-10s, with some sources averaging 12s) is option A. (B) ">1 min" is FL220 normal value. (C) "40 s" is closer to the FL350 normal value (30s-1min).

Q 40

What is the Time of Useful Consciousness?

A) The amount of time an individual is able to function effectively (e.g. perform flying duties) in an environment of inadequate oxygen supply. ✓

B) The time period during which there is an inability of the cells of the body to use the oxygen available.

C) The period of time when there is inadequate blood flow to body tissues.

ANS · A

§18.1 (Part 5)

DGCA-quoted definition verbatim. (B) describes histotoxic hypoxia. (C) describes ischemic / stagnant hypoxia. The hallmark of TUC is the phrase "function effectively in an environment of *inadequate oxygen supply*" — the test is functional usefulness, not consciousness alone.

Q 41

What are the signs of hypoxia during explosive decompression?

A) Initially, there is an inability to concentrate, impairment of night vision, unusual fatigue, loss of consciousness/death.

B) Initially there is cramping and spasms of the hands and feet, cold clammy skin, paleness, impaired judgement.

C) Initially there may be a feeling of wellbeing (euphoria), impairment of night vision, unusual fatigue, loss of consciousness/death. ✓

ANS · C

§10 (Part 3) Hypoxia symptom cascade

The crucial "**euphoria**" **first sign** distinguishes hypoxia from other emergencies — the pilot *feels good* before they realise something is wrong. This is why hypoxia is so dangerous (and why the master rule is "if at altitude and feeling great for no reason, suspect hypoxia"). (A) is missing the euphoria. (B) describes hyperventilation (cramping, spasms — tetany).

Q 42

Which is the procedure to be followed when symptoms of decompression sickness occur?

- A) 100% Oxygen, immediate descent, land as soon as possible, seek medical assistance immediately on landing.
- B) 100% Oxygen, immediate descent, land in case not comfortable, seek medical assistance if required. ✓**
- C) Descend below 10,000 feet, symptoms will disappear after few minutes.

ANS · B

§20.3 (Part 5) Treatment of DCS

Note on this question: The official answer key marks (B) as correct, but the strict DGCA-quoted four-step treatment is: "Keep patient warm and on 100% Oxygen · Initiate immediate descent · Land as soon as possible · Seek medical assistance immediately on landing." — which matches (A) more closely. The most clinically defensible answer is (A), but the source key indicates (B). For exam purposes mark per the official key. The DGCA-quoted theory definitively rules out (C), which is wrong — DCS does not self-resolve at 10,000 ft.

Q 43

What is decompression sickness?

- A) A rapid reduction in ambient pressure, may cause the nitrogen in our blood to come out of solution as small bubbles. ✓**
- B) A rapid increase in ambient pressure, may cause the nitrogen in our blood to come out of solution as small bubbles.
- C) A rapid reduction in ambient pressure, may cause the oxygen in our blood to come out of solution as small bubbles.

ANS · A

§20.1 (Part 5)

DGCA-quoted Henry's Law application: "A rapid REDUCTION in ambient pressure may cause the NITROGEN in our blood to come out of solution as small bubbles." Not oxygen (which is consumed metabolically and present at low dissolved levels); not an increase in pressure (which would dissolve more gas, not release it).

Q 44

The part of blood without cell is called:

- A) Serum.
- B) Lymph.
- C) Plasma. ✓

ANS · C**§9 (Part 2)**

Blood = formed elements (RBCs, WBCs, platelets — >90 % RBCs) + **plasma** (the cell-free liquid component containing water, proteins, hormones, salts, dissolved gases). (A) Serum is plasma *minus the clotting factors* — what's left after blood clots. (B) Lymph is a different fluid in the lymphatic system, not part of blood.

Q 45

At rest, with a heart rate of 72 beats per minute and a stroke volume of 70 ml the cardiac output is about:

- A) 7 liters/min.
- B) 5 liters/min. ✓
- C) 6 liters/min.

ANS · B**§9 (Part 2)**

Cardiac Output = Heart Rate × Stroke Volume = $72 \times 70 \text{ ml} = 5,040 \text{ ml/min} \approx 5 \text{ L/min}$. This is the DGCA-quoted resting cardiac output for a typical adult. At exercise it can rise to 20+ L/min.

Q 46

Hemoglobin is:

- A) In the white blood cells.
- B) Dissolved in the plasma.
- C) In the red blood cells. ✓

ANS · C**§9 (Part 2)**

Haemoglobin (Hb) lives inside **red blood cells** — ~280 million Hb molecules per RBC. WBCs (leukocytes) are immune cells, not O₂ carriers. Plasma carries only a small fraction of total blood O₂ as dissolved gas.

Q 47

The heart muscle is supplied with blood from:

A) The pulmonary veins.

B) The coronary arteries. ✓

C) Coronary capillaries.

ANS · B

§9 (Part 2) Cardiovascular anatomy

The heart muscle (myocardium) is supplied with oxygenated blood by the **coronary arteries** — branches off the aorta just above the aortic valve. (A) Pulmonary veins return oxygenated blood from lungs to the left atrium. (C) Coronary capillaries are the downstream microvessels — the supply is from the arteries.

Q 48

Bubbles in the joints cause rheumatic-like pain, called the:

A) Staggers.

B) Chokes.

C) Bends. ✓

ANS · C

§20.2 (Part 5)

DGCA-quoted verbatim: "*Joints: Bubbles in the joints cause rheumatic-like pain, called the BENDS.*" The mnemonic: Joints Bend, Skin Creeps, Lungs Choke, Brain Staggers.

Q 49

Which symptom does not belong to the Decompression Sickness:

A) Bends.

B) Creeps.

C) Convulsions. ✓

ANS · C

§20 (Part 5) vs §27/§28 (Part 6)

Bends and Creeps ARE DCS syndromes. **Convulsions** are associated with *obvious incapacitation* (§27.2) and *epilepsy / Grand Mal* (§28.1) — not with DCS. The DGCA-listed DCS symptom set is Bends · Chokes · Skin manifestations · Neurological symptoms · Circulatory shock; "convulsions" is not in that list (though severe neurological DCS could produce them, the DGCA list does not include the word).

Q 50

A few hours after a rapid decompression at FL320 you experience a feeling of wellbeing after having three pints of beer. You should:

- A) Ask for medical advice since this is a symptom of hypoxia.
- B) Ask for medical advice since this is a symptom of decompression sickness.
- C) Stop drinking and allow twenty-four hours between the last drink and take off time. ✓**

ANS · C**§14.1 (Part 4) · §20.4 (Part 5)**

A complex scenario question with **two simultaneous rules in play**:

- **Alcohol bottle-to-throttle:** **24 hr** wait between last drink and take-off (§14.1).
- **Rapid decompression:** **12 hr** wait before flying after RD (§20.4).

The longer of the two binding rules wins → **24 hours**. "Feeling of wellbeing" after 3 beers is simple intoxication / disinhibition — not hypoxia (you're on the ground) and not DCS (already past the 12-hr RD window). The correct action: stop drinking, wait 24 hr for alcohol to clear, then fly. (*Note: the answer ALSO satisfies the 12-hr post-RD rule by overlap — 24 hr > 12 hr.*)

◆ **END OF Q 1 – Q 50** ◆

Progress check at Q50

You have now completed half of the question bank (50 of 105). Of the questions covered so far:

- **Atmosphere & gas laws** (§§1–3): Q5, Q6, Q7, Q8, Q9, Q14, Q15, Q16, Q17, Q18, Q20, Q29, Q37
- **Respiratory & circulatory systems** (§§8–9): Q11, Q12, Q13, Q28, Q30, Q32, Q44, Q45, Q46, Q47
- **Hypoxia & CO** (§§10–11): Q4, Q24, Q41
- **Blood pressure & baroreceptor** (§§15–16): Q3, Q34, Q36, Q38
- **Cabin pressurisation / TUC / decompression / DCS / diving** (§§18–21): Q15, Q19, Q21, Q23, Q25, Q26, Q27, Q31, Q33, Q35, Q39, Q40, Q42, Q43, Q48, Q49, Q50
- **Illusions & somatogravic** (§§45 / §54): Q2, Q22
- **Drugs / Aviation Medicine** (§76): Q1
- **Ear & Eustachian** (§§37–38): Q10

The remaining 55 questions (Q51–Q105) cover the rest of the chapter: hypoxia clusters, smoking, alcohol, BMI, vision (eye anatomy & defects), runway illusions, ear/balance, hypothermia, BMI, vibrations, and more. They will be delivered in **Part 13**.

Next instalment (Part 13): Q51 – Q105 with the same worked-explanation format, plus the master answer-key consolidated cross-reference and a final exam-eve revision plan.

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