PRERNA AVIATION

DGCA CPL Practice Paper 17

Technical General - Principles of Flight

ANSWER KEY & EXPLAINED SOLUTIONS

2026-reviewed sectional practice. Not an official DGCA paper or a verified full-length latest-pattern mock.

01 B	02 C	03 C	04 A	05 B
06 C	07 B	08 D	09 D	10 B
11 D	12 D	13 A	14 B	15 D
16 B	17 B	18 D	19 A	20 A
21 A	22 C	23 C	24 A	25 C

01. For a given wing, air density and lift coefficient, reducing speed to 80% of its original value changes lift to:

Answer: B. 64% of the original

Lift is proportional to speed squared. The ratio is 0.8 squared = 0.64, or 64%, if the other quantities remain fixed.

Topic: Lift scaling | Study reference: AERO

02. If aircraft mass is reduced to 81% of its former value, stalling speed at the same load factor and configuration becomes:

Answer: C. 90% of its former value

Stalling speed varies with the square root of weight for fixed configuration and load factor. Square root of 0.81 is 0.9.

Topic: Weight and stall | Study reference: AERO

03. In a coordinated level turn, increasing bank angle requires:

Answer: C. An increase in total lift to maintain altitude

Only the vertical component of lift balances weight. Greater bank reduces that component for a given total lift, so total lift must increase to maintain level flight.

Topic: Lift in a turn | Study reference: AERO

04. For the same bank angle in a coordinated level turn, increasing true airspeed generally causes turn radius to:

Answer: A. Increase

Turn radius is proportional to true airspeed squared at a fixed bank angle. A faster aircraft therefore needs a wider radius under the stated conditions.

Topic: Turn radius | Study reference: AERO

05. For the same bank angle, increasing true airspeed in a coordinated level turn generally causes rate of turn to:

Answer: B. Decrease

Rate of turn is proportional to tan(bank angle) divided by true airspeed. With bank fixed, higher airspeed produces a lower angular turn rate.

Topic: Rate of turn | Study reference: AERO

06. A slip-skid ball displaced from centre in a turn indicates:

Answer: C. Unbalanced lateral acceleration relative to the instrument

The inclinometer responds to the resultant of gravity and acceleration. A centred ball is associated with a coordinated condition; it is not a heading or angle-of-attack sensor.

Topic: Turn coordination | Study reference: INST

07. The aerodynamic centre of a subsonic aerofoil is the point about which pitching moment is approximately:

Answer: B. Constant with changes in angle of attack within the relevant range

At the aerodynamic centre, pitching moment changes relatively little with angle of attack over the normal subsonic range. This differs from the centre of pressure, where the resultant force can be considered to act.

Topic: Aerodynamic centre | Study reference: AERO

08. Aspect ratio for a rectangular wing is:

Answer: D. Span divided by chord

General aspect ratio is span squared divided by wing area. For a rectangular wing, area is span × chord, so aspect ratio reduces to span/chord.

Topic: Wing geometry | Study reference: AERO

09. For comparable lift and span efficiency, a higher wing aspect ratio generally reduces:

Answer: D. Induced drag coefficient

Higher aspect ratio reduces the induced drag coefficient for a given lift coefficient and comparable efficiency. Other design consequences still need consideration.

Topic: Aspect ratio effect | Study reference: AERO

10. Winglets are used mainly to improve aerodynamic efficiency by modifying:

Answer: B. Wingtip flow and associated induced drag

Winglets influence the three-dimensional flow near the wingtip and can reduce induced drag for a given design. They do not eliminate all drag.

Topic: Wingtip devices | Study reference: AERO

11. Washout means the wing tip has a lower geometric incidence than the root. One common purpose is to:

Answer: D. Encourage the root to stall before the tip

Lower tip incidence can delay tip stall relative to the root, helping retain aileron effectiveness during the early stages of stall. Actual stall behaviour also depends on other design features.

Topic: Wing twist | Study reference: AERO

12. A boundary layer is the region near a surface where:

Answer: D. Viscous effects cause air velocity to change from the surface value towards the outer flow

Viscosity makes airflow near the surface differ from the free stream. The boundary layer's behaviour affects friction and separation.

Topic: Boundary layer | Study reference: AERO

13. A turbulent boundary layer generally has greater resistance to separation than a laminar one because it:

Answer: A. Mixes higher-momentum air towards the surface

Turbulent mixing transfers momentum towards the wall, often delaying separation, though skin-friction drag is usually higher than for laminar flow under comparable conditions.

Topic: Flow separation | Study reference: AERO

14. An adverse pressure gradient means pressure:

Answer: B. Increases in the direction of airflow

Flow moving into increasing pressure slows. Near-surface low-energy air can separate if it cannot overcome the adverse pressure gradient.

Topic: Pressure gradient | Study reference: AERO

15. Critical Mach number is the free-stream Mach number at which:

Answer: D. Local airflow first reaches Mach 1 somewhere on the aircraft

Local acceleration over parts of the aircraft can reach sonic speed while free-stream speed remains subsonic. The corresponding free-stream value is critical Mach number.

Topic: Compressibility | Study reference: AERO

16. Mach number is the ratio of true airspeed to:

Answer: B. Local speed of sound

Mach number compares aircraft speed through the air with the local speed of sound. The local speed of sound depends mainly on absolute temperature.

Topic: Mach definition | Study reference: AERO

17. At a constant true airspeed, entering colder air generally causes Mach number to:

Answer: B. Increase

The speed of sound decreases as absolute temperature falls. With true airspeed fixed, the ratio TAS/speed of sound therefore increases.

Topic: Temperature and Mach | Study reference: AERO

18. Sweeping a wing back helps delay some compressibility effects mainly by reducing:

Answer: D. The component of airflow normal to the leading edge

For a swept wing, the airflow component normal to the leading edge is smaller than the free-stream speed. This supports higher subsonic operating speeds, with design trade-offs.

Topic: Wing sweep | Study reference: AERO

19. A spin is associated with:

Answer: A. A stalled wing condition and autorotation

A spin involves stall and sustained autorotation arising from asymmetric aerodynamic forces. Prevention and recovery must follow the aircraft's approved procedures.

Topic: Spin recognition | Study reference: AERO

20. A spiral dive differs from a developed spin in that the wings in a spiral dive are generally:

Answer: A. Not stalled, with speed tending to increase

A spiral dive is a descending turning condition, commonly with increasing airspeed and load factor. A spin is a stalled autorotative condition; the distinction matters for correct response.

Topic: Spiral versus spin | Study reference: AERO

21. A forward CG shift, within limits, generally requires a conventional tail-aft aeroplane to produce:

Answer: A. More tail-down force for balance

A forward CG commonly increases the nose-down moment that must be balanced with tail-down force. The wing then supports both weight and the additional tail load, affecting performance and control forces.

Topic: CG and trim | Study reference: AERO

22. An aircraft loaded beyond the aft CG limit may have reduced:

Answer: C. Longitudinal stability and recovery margin

An excessively aft CG can reduce restoring pitch tendency and make control or stall recovery more difficult. Staying within approved loading limits is essential.

Topic: Aft loading | Study reference: AERO

23. A trim tab normally changes the control force needed by:

Answer: C. Creating an aerodynamic moment on the main control surface

A trim tab deflects airflow to produce a moment that assists in holding the desired main-surface position. Its exact movement depends on the tab arrangement.

Topic: Trim tabs | Study reference: CTRL

24. A servo tab differs in function from a simple trim tab because it is designed mainly to:

Answer: A. Aerodynamically assist movement of the main control surface

A servo tab uses aerodynamic force to help move the larger control surface, reducing the pilot or actuator effort required. A trim tab mainly relieves sustained control force.

Topic: Control assistance | Study reference: CTRL

25. Spoiler deployment on one wing can assist roll by:

Answer: C. Reducing lift on that wing

A raised spoiler disrupts airflow and reduces lift on its wing, contributing to roll towards that side. Spoilers can also increase drag and serve other functions depending on design.

Topic: Roll spoilers | Study reference: CTRL

Study references & review notes

Use these sources to revise the concepts behind your answers. Questions and explanations are newly written; they are not reproduced from an official question bank.

AERO — FAA PHAK, Chapter 5: Aerodynamics of Flight

https://www.faa.gov/sites/faa.gov/files/07_phak_ch5_0.pdf

CTRL — FAA PHAK, Chapter 6: Flight Controls

https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak

INST — FAA PHAK, Chapter 8: Flight Instruments

https://www.faa.gov/sites/faa.gov/files/10_phak_ch8.pdf

Scope: foundation-to-intermediate CPL ground-subject practice. This set does not claim complete coverage of the latest DGCA syllabus. Consult the current DGCA CAR Section 7, Series B and Pariksha notices for the applicable syllabus and examination requirements. Aircraft-type-specific Technical Specific and a complete RTR(A) course are not included.

FAA references support general theory only, not Indian regulatory requirements. CAP 413 is used for standard phrase meanings, not UK-specific operating rules. Weather reports, fuel reserves and flight scenarios in questions are illustrative. For operational use, consult current approved publications and aircraft manuals.

Reviewed and prepared: 30 October 2026. Official session instructions and syllabus pointers were checked; exact current subject-wise question counts and durations were not independently verified.