

DGCA CPL Practice Paper 19

Air Navigation - Mass, Balance & Performance

QUESTION PAPER

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

25 MCQs • 25 marks • Suggested practice time: 40 minutes

Choose one answer. Practice scoring: +1 correct; 0 incorrect or blank. Count, timing and scoring are editorial practice settings, not a verified official exam pattern. Navigation practice: an appropriate scientific calculator or navigation computer may be used. Use the stated assumptions.

Name: _____ Date: _____ Score: ____ / 25

01. An aircraft weighs 800 kg with its CG 2.0 m aft of datum. A 200 kg load is added at 3.0 m. New CG is:

- | | |
|------------------------|------------------------|
| A. 2.00 m aft of datum | B. 2.50 m aft of datum |
| C. 1.80 m aft of datum | D. 2.20 m aft of datum |

02. An aircraft's total moment is 3,360 kg m and total mass is 1,200 kg. CG arm is:

- | | |
|-----------|-----------|
| A. 0.36 m | B. 2.80 m |
| C. 4.56 m | D. 3.36 m |

03. A 50 kg item is moved 1.5 m forward in a 1,000 kg aircraft. CG movement is:

- | | |
|--------------------|----------------|
| A. 0.75 m forward | B. 0.075 m aft |
| C. 0.075 m forward | D. 0.03 m aft |

04. A 1,000 kg aircraft must move its CG 0.10 m aft. A 50 kg item is available for relocation. Required aft movement of the item is:

- | | |
|----------|----------|
| A. 0.2 m | B. 0.5 m |
| C. 2.0 m | D. 5.0 m |

05. An aircraft of 1,100 kg has its CG at 2.4 m. It burns 100 kg of fuel located at 2.4 m. Remaining CG is:

- | | |
|-----------|----------|
| A. 2.64 m | B. 2.4 m |
| C. 2.16 m | D. 2.0 m |

06. An aircraft with CG at 2.5 m burns fuel from a tank at 3.0 m aft of datum. Other things equal, CG moves:

- | | |
|--------------------|-------------------------------------|
| A. Aft | B. Neither, for every tank position |
| C. Vertically only | D. Forward |

07. A 2.0 m mean aerodynamic chord has its leading edge 1.5 m aft of datum. CG is at 2.0 m aft of datum. CG position as a percentage of MAC is:

- | | |
|------------|-------------|
| A. 75% MAC | B. 50% MAC |
| C. 25% MAC | D. 100% MAC |

08. A CG at 30% of a 2.0 m MAC whose leading edge is 1.0 m aft of datum has arm:

- | | |
|-----------------------|-----------------------|
| A. 1.6 m aft of datum | B. 1.3 m aft of datum |
| C. 3.0 m aft of datum | D. 0.6 m aft of datum |

09. Maximum permitted take-off mass for an exercise is 1,200 kg. Basic mass is 750 kg, occupants 240 kg and baggage 30 kg. Maximum fuel mass permitted by this mass limit is:

- A. 450 kg
- B. 210 kg
- C. 150 kg
- D. 180 kg

10. At a stated fuel density of 0.80 kg/L, 180 kg of fuel occupies:

- A. 200 L
- B. 180 L
- C. 144 L
- D. 225 L

11. A zero-fuel mass limit restricts:

- A. Aircraft mass excluding usable fuel
- B. Only the mass at engine shutdown
- C. Only landing-gear mass
- D. Only empty fuel-tank mass

12. An aircraft may be below maximum take-off mass but still be improperly loaded if:

- A. Its occupants use seat belts
- B. Its destination is east of departure
- C. It carries less than full fuel
- D. Its CG is outside the approved envelope

13. A performance chart gives 600 m take-off distance at one condition. A stated exercise correction adds 10%. Corrected distance is:

- A. 700 m
- B. 660 m
- C. 540 m
- D. 610 m

14. Two successive exercise factors of 1.10 and 1.20 apply to a base distance of 500 m. Final distance is:

- A. 660 m
- B. 600 m
- C. 650 m
- D. 550 m

15. An AFM performance table provides values for two bracketing temperatures. Linear interpolation should be used:

- A. Instead of reading any chart notes
- B. Beyond every published limit without restriction
- C. To override a maximum operating limit
- D. Only when permitted by the chart instructions and within the applicable range

16. For an otherwise identical take-off, a tailwind generally increases required ground distance because:

- A. Air density necessarily doubles
- B. Ground speed is higher for the same airspeed
- C. The runway becomes physically shorter
- D. Stalling airspeed becomes zero

17. High density altitude generally reduces a normally aspirated aeroplane's take-off performance through:

- A. Guaranteed increased climb gradient
- B. Increased oxygen mass per intake stroke
- C. Reduced true airspeed at a given indicated airspeed
- D. Reduced engine power and reduced aerodynamic/propeller effectiveness

18. A runway upslope generally tends to:

- A. Eliminate the need for acceleration
- B. Guarantee a shorter ground run
- C. Increase take-off ground run
- D. Increase engine rated power

19. A soft runway surface can lengthen take-off ground roll mainly because of:
- A. A guaranteed increase in thrust
 - B. A change in magnetic variation
 - C. Increased rolling resistance
 - D. A lower critical angle of attack caused only by surface softness
20. Best angle of climb speed is selected to maximise:
- A. Height gained per horizontal distance
 - B. Distance travelled per unit fuel in every case
 - C. Ground speed during descent
 - D. Height gained per unit time
21. Best rate of climb speed is selected to maximise:
- A. Time spent climbing to a given altitude
 - B. Height gained per horizontal distance only
 - C. Height gained per unit time
 - D. Forward ground speed
22. For the same airspeed and climb rate, adding a headwind changes climb gradient over the ground by:
- A. Decreasing it
 - B. Increasing it
 - C. Making it negative automatically
 - D. Leaving it unchanged in every case
23. An unpowered aircraft in still air has a lift-to-drag ratio of 10:1. Ignoring manoeuvring and other losses, 3,000 ft of height permits approximately:
- A. 30,000 ft horizontal travel
 - B. 300 ft horizontal travel
 - C. 3,000 ft horizontal travel
 - D. 60,000 ft horizontal travel
24. A headwind during a glide at unchanged airspeed generally makes the ground distance achievable from a given height:
- A. Infinite
 - B. Shorter
 - C. Unchanged regardless of wind strength
 - D. Longer
25. Published performance assumptions matter because actual runway, wind, mass and configuration differences can:
- A. Make the tabulated figure inapplicable without the prescribed adjustments
 - B. Change only the aircraft registration number
 - C. Always improve performance
 - D. Remove the need for safety margins