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If your study leads you to question an answer choice, we recommend you seek the assistance of a local instructor. We welcome your questions, recommendations or concerns:

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ASA Test Prep Layout

The sample FAA questions have been sorted into chapters according to subject matter. Within each chapter, the questions have been further classified and all similar questions grouped together with a concise discussion of the material covered in each group. This discussion material of "Chapter text" is printed in a larger font and spans the entire width of the page. Immediately following the sample FAA Question is ASA's Explanation in italics. The last line of the Explanation contains the Learning Statement Code and further reference (if applicable). See the EXAMPLE below.

Figures referenced by the Chapter text only are numbered with the appropriate chapter number, i.e., “Figure 1-1” is Chapter 1’s first chapter-text figure.

Some Questions refer to Figures or Legends immediately following the question number, i.e., “3201. (Refer to Figure 14.).” These are FAA Figures and Legends which can be found in the separate booklet: Airman Knowledge Testing Supplement (CT-8080-XX). This supplement is bundled with the Test Prep and is the exact material you will have access to when you take your computerized test. We provide it separately, so you will become accustomed to referring to the FAA Figures and Legends as you would during the test.

Figures referenced by the Explanation and pertinent to the understanding of that particular question are labeled by their corresponding Question number. For example: the caption “Questions 3245 and 3248” means the figure accompanies the Explanations for both Question 3245 and 3248.

Answers to each question are found at the bottom of each page.

---

**EXAMPLE:**

Four aerodynamic forces are considered to be basic because they act upon an aircraft during all flight maneuvers. There is the downward-acting force called WEIGHT which must be overcome by the upward-acting force called LIFT, and there is the rearward-acting force called DRAG, which must be overcome by the forward-acting force called THRUST.

| ALL, SPO 3201. (Refer to Figure 14.) The four forces acting on an airplane in flight are |
| A— lift, weight, thrust, and drag. |
| B— lift, weight, gravity, and thrust. |
| C— lift, gravity, power, and friction. |

*Lift, weight, thrust, and drag are the four basic aerodynamic forces acting on an aircraft in flight. (PLT235) — FAA-H-8083-25*

*Answer (B) is incorrect because the force of gravity is always the same number and reacts with the airplane’s mass to produce a different weight for almost every airplane. Answer (C) is incorrect because weight is the final product of gravity, thrust is the final product of power, and drag is the final product of friction. Power, gravity, and friction are only parts of the aerodynamic forces of flight.*

---

*Note: The FAA does not identify which questions are on the different ratings' tests. Unless the wording of a question is pertinent to only one rating category, it may be found on any of the tests.*

| Category rating. This question may be found on tests for these ratings. * |
| See separate book: Airman Knowledge Testing Supplement (CT-8080-XX) |
| Question and answer choices |
| Explanation |
| Code line. FAA Learning Statement Code in parentheses, followed by references for further study. |
| Incorrect answer explanation. Reasons why answer choices are incorrect explained here. |

---

*ALL = All aircraft AIP = Airplane GLI = Glider LTA = Lighter-Than-Air (applies to hot air balloon, gas balloon and airship) REC = Recreational RTC = Rotorcraft (applies to both helicopter and gyroplane) PPC = Powered Parachute WSC = Weight-Shift Control

SPO = Sport Pilot (all aircraft categories) LSA = Sport Pilot Airplane LSG = Sport Pilot Glider LSL = Sport Pilot Lighter-Than-Air LSP = Sport Pilot Powered Parachute LSR = Sport Pilot Rotorcraft LSW = Sport Pilot Weight-Shift-control
Chapter 3

**Flight Instruments**

Pitot-Static Instruments  3–3
Airspeeds and the Airspeed Indicator  3–4
The Altimeter and Altitudes  3–8
Gyrosopic Instruments  3–13
  *Attitude Indicator*  3–13
  *Turn Coordinator*  3–13
  *Heading Indicator*  3–13
Magnetic Compass (Northern Hemisphere)  3–15
**Pitot-Static Instruments**

The pressure altimeter, vertical-speed indicator, and airspeed indicator operate in response to pressures through the **pitot-static system**. See Figure 3-1.

**Static** (atmospheric) **pressure** is taken from the static vents and is provided to all three instruments. Clogging of the static vents or line will cause all three instruments to become inoperative or to display erroneous readings.

**Impact** (ram) **pressure** is taken from the pitot tube and furnished to the airspeed indicator only. Clogging of the pitot opening will not affect operation of the altimeter or vertical speed indicator.

---

**Figure 3-1.** Pitot-static system

---

**ALL 3248.** Which instrument will become inoperative if the pitot tube becomes clogged?

A — Altimeter.
B — Vertical speed.
C — Airspeed.

*The pitot tube provides input for the airspeed indicator only.* (PLT337) — FAA-H-8083-25

Answers (A) and (B) are incorrect because the altimeter and vertical speed indicator operate off the static system and are not affected by a clogged pitot tube.

---

**ALL 3249.** Which instrument(s) will become inoperative if the static vents become clogged?

A — Airspeed only.
B — Aitmeter only.
C — Airspeed, altimeter, and vertical speed.

*Airspeed, altimeter and vertical speed all receive static input and would indicate inaccurately if the static sources became plugged.* (PLT337) — FAA-H-8083-25
Chapter 3 Flight Instruments

Airspeeds and the Airspeed Indicator

A pilot must be familiar with the following airspeed terms and abbreviations:

- **Indicated Airspeed (IAS)** — the uncorrected reading obtained from the airspeed indicator.
- **Calibrated Airspeed (CAS)** — indicated airspeed corrected for installation and instrument error.
- **True Airspeed (TAS)** — calibrated airspeed corrected for temperature and pressure variations.

A number of airspeed limitations, abbreviated as “V” speeds, are indicated by color-coded marking on the airspeed indicator (see Figure 3-2):

- **V_{SO}** — stall speed or minimum steady flight speed in the landing configuration (the lower limit of the white arc).
- **V_{FE}** — maximum flap extended speed (the upper limit of the white arc). The entire white arc defines the flap operating range.
- **V_{S1}** — the stall speed or minimum steady flight speed in a specified configuration (the lower limit of the green arc). The entire green arc defines the normal operating range.
- **V_{NO}** — the maximum structural cruising speed (the upper limit of the green arc and lower limit of the yellow arc). The yellow arc defines the caution range, which should be avoided unless in smooth air.
- **V_{NE}** — never exceed speed (the upper limit of the yellow arc) marked in red.

There are other important airspeed limitations that are not color-coded on the airspeed indicator:

- **V_{LE}** — the maximum landing gear extended speed.
- **V_{A}** — the design maneuvering speed. If rough air or severe turbulence is encountered, airspeed should be reduced to maneuvering speed or less to minimize stress on the airplane structure.
- **V_{V}** — the best rate-of-climb speed (the airspeed that will result in the most altitude in a given period of time).
- **V_{X}** — the best angle-of-climb speed (the airspeed that will result in the most altitude in a given distance).

### Answers

3247 [B] 3262 [C]
AIR, GLI, RTC, WSC  
**3006.** Which V-speed represents maneuvering speed?  
A— $V_A$.  
B— $V_{LO}$.  
C— $V_{NE}$.  

$V_A$ is design maneuvering speed. *(PLT506) — 14 CFR §1.2*  
Answer (B) is incorrect because this is the maximum landing gear operating speed. Answer (C) is incorrect because this is the never exceed speed.

AIR, GLI, RTC, WSC  
**3264.** What does the red line on an airspeed indicator represent?  
A— Maneuvering speed.  
B— Turbulent or rough-air speed.  
C— Never-exceed speed.  

The upper end of the arc is marked by a red radial line which is the never-exceed speed ($V_{NE}$). *(PLT132) — FAA-H-8083-25*  
Answers (A) and (B) are incorrect because the maneuvering speed and turbulent or rough-air speed is not indicated on the airspeed indicator.

AIR, GLI, RTC, WSC  
**3268.** (Refer to Figure 4.) Which color identifies the never-exceed speed?  
A— Upper limit of the green arc.  
B— Upper limit of the white arc.  
C— The red radial line.  

The upper end of the arc is marked by a red radial line which is the never-exceed speed ($V_{NE}$). *(PLT088) — FAA-H-8083-25*  
Answer (A) is incorrect because the upper limit of the green arc is the beginning of the caution range. Answer (B) is incorrect because the upper limit of the white arc is the maximum speed at which flaps may be extended.

AIR, WSC  
**3269.** (Refer to Figure 4.) Which color identifies the power-off stalling speed in a specified configuration?  
A— Upper limit of the green arc.  
B— Upper limit of the white arc.  
C— Lower limit of the green arc.  

The green arc is the normal operating range. The lower end of the arc ($V_S$) is the stalling speed in a specified configuration. *(PLT088) — FAA-H-8083-25*  
Answer (A) is incorrect because the upper limit of the green arc indicates the maximum structural cruising speed. Answer (B) is incorrect because the upper limit of the white arc is the maximum flaps-extended speed.

AIR, WSC, PPC  
**3011.** Which would provide the greatest gain in altitude in the shortest distance during climb after takeoff?  
A— $V_Y$.  
B— $V_A$.  
C— $V_X$.  

$V_X$ (best angle) is the calibrated airspeed at which the aircraft will attain the highest altitude in a given horizontal distance. *(PLT123) — 14 CFR §1.2*  
Answer (A) is incorrect because $V_Y$ is best rate of climb. Answer (B) is incorrect because $V_A$ is design maneuvering speed.

**Answers**  

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</table>
AIR, WSC
3012-1. After takeoff, which airspeed would the pilot use to gain the most altitude in a given period of time?
A— Vy.
B— Vx.
C— Va.

Vy (best rate) is the calibrated airspeed at which the airplane will obtain the maximum increase in altitude per unit of time (feet per minute) after takeoff. (PLT123) — 14 CFR §1.2

Answer (B) is incorrect because Vx is the best angle of climb. Answer (C) is incorrect because Va is the design maneuvering speed.

AIR 3265. (Refer to Figure 4.) What is the full flap operating range for the airplane?
A— 55 to 100 knots.
B— 55 to 208 knots.
C— 55 to 165 knots.

The flap operating range is marked by the white arc. The low end is Vso (stall speed in a landing configuration), and the high end is Vfe (maximum flap extended speed). (PLT088) — FAA-H-8083-25

Answer (B) is incorrect because 55 to 208 knots is the entire operating range of this airplane, from the stall speed to the never-exceed speed. Answer (C) is incorrect because 55 to 165 knots is the normal operating range for this airplane (green arc).

AIR 3267. (Refer to Figure 4.) The maximum speed at which the airplane can be operated in smooth air is
A— 100 knots.
B— 165 knots.
C— 208 knots.

The caution range (yellow arc) includes speeds which should only be flown in smooth air; the maximum speed in the caution range is 208 knots for this airplane. (PLT088) — FAA-H-8083-25

Answer (A) is incorrect because 100 knots is the upper limit of the white arc, which is the maximum flaps-extended speed. Answer (B) is incorrect because 165 knots is the upper limit of the green arc, which is the maximum structural cruising speed.

AIR 3270. (Refer to Figure 4.) What is the maximum flaps-extended speed?
A— 65 knots.
B— 100 knots.
C— 165 knots.

The flap operating range is marked by the white arc. The high end is Vfe (maximum flap extended speed), which is 100 knots for this airplane. (PLT088) — FAA-H-8083-25
Answer (A) is incorrect because 65 knots is the lower limit of the green arc, which is the power-off stall speed, Vs1. Answer (C) is incorrect because 165 knots is the upper limit of the green arc, which is Vno.

AIR 3271. (Refer to Figure 4.) Which color identifies the normal flap operating range?
A— The yellow arc.
B— The green arc.
C— The white arc.

The flap operating range is marked by the white arc. The low end is Vso (stall speed in a landing configuration), and the high end is Vfe (maximum flap extended speed). (PLT088) — FAA-H-8083-25
Answer (A) is incorrect because the yellow arc is the caution range. Answer (B) is incorrect because the green arc indicates the normal operating range.

AIR 3272. (Refer to Figure 4.) Which color identifies the power-off stalling speed with wing flaps and landing gear in the landing configuration?
A— Upper limit of the green arc.
B— Upper limit of the white arc.
C— Lower limit of the white arc.

The flap operating range is marked by the white arc. The low end is Vso (stall speed in a landing configuration). (PLT088) — FAA-H-8083-25
Answer (A) is incorrect because the upper limit of the green arc is Vno. Answer (B) is incorrect because the upper limit of the white arc is Vfe.

Answers
AIR, WSC 3273. (Refer to Figure 4.) What is the maximum structural cruising speed?
A— 100 knots.
B— 165 knots.
C— 208 knots.

The green arc is the normal operating range. The upper end of the arc (VNO) is defined as the “maximum structural cruising speed.” (PLT088) — FAA-H-8083-25
Answer (A) is incorrect because 100 MPH is the upper limit of the white arc, which is the maximum flaps extended speed. Answer (C) is incorrect because 208 knots is the never-exceed speed.

AIR, WSC 3274. What is an important airspeed limitation that is not color coded on airspeed indicators?
A— Never-exceed speed.
B— Maximum structural cruising speed.
C— Maneuvering speed.

Maneuvering speed (VA) is not displayed on the airspeed indicator. (PLT278) — FAA-H-8083-25
Answer (A) is incorrect because the never-exceed speed is indicated by a red line on the airspeed indicator. Answer (B) is incorrect because the maximum structural cruising speed can be found on the airspeed indicator by the upper limit of the green arc.

AIR, GLI 3007. Which V-speed represents maximum flap extended speed?
A— VFE.
B— VLOF.
C— VFC.

VFE is the highest calibrated airspeed permissible with the wing flaps in a prescribed extended position. (PLT506) — 14 CFR §1.2
Answer (B) is incorrect because this is VLO. Answer (C) is incorrect because this is VFC.

AIR, GLI 3008. Which V-speed represents maximum landing gear extended speed?
A— VLE.
B— VLO.
C— VFE.

The caution range (yellow arc) includes speeds which should only be flown in smooth air, and is 165 to 208 knots for this airplane. (PLT088) — FAA-H-8083-25
Answer (A) is incorrect because 0 to 60 knots is less than stall speed. Answer (B) is incorrect because 100 to 165 knots is the normal operating airspeed range from maximum flap extension speed to maximum structural cruising speed, the upper limit of the green arc and lower limit of the yellow arc.

AIR, WSC 3266. (Refer to Figure 4.) What is the caution range of the airplane?
A— 0 to 60 knots.
B— 100 to 165 knots.
C— 165 to 208 knots.

VLE is the maximum calibrated airspeed at which the airplane can be safely flown with the landing gear extended. (PLT506) — 14 CFR §1.2
Answer (B) is incorrect because VLO is maximum landing gear operating speed. Answer (C) is incorrect because VFE is maximum flap extended speed.

AIR, GLI 3009. VNO is defined as the
A— normal operating range.
B— never-exceed speed.
C— maximum structural cruising speed.

VNO is the maximum calibrated airspeed for normal operation, or the maximum structural cruising speed. (PLT506) — 14 CFR §1.2
Answer (A) is incorrect because this is not designated a V-speed; but rather it is the green arc on the airspeed indicator. Answer (B) is incorrect because this is VNE.

AIR, GLI 3010. VS0 is defined as the
A— stalling speed or minimum steady flight speed in the landing configuration.
B— stalling speed or minimum steady flight speed in a specified configuration.
C— stalling speed or minimum takeoff safety speed.

VS0 is the calibrated power-off stalling speed or the minimum steady-flight speed at which the aircraft is controllable in the landing configuration. (PLT506) — 14 CFR §1.2
Answer (B) is incorrect because this is VS1. Answer (C) is incorrect because VS is stalling speed, and V2 is the minimum takeoff safety speed.

AIR, GLI, WSC 3007. Which V-speed represents maximum flap extended speed?
A— VFE.
B— VLOF.
C— VFC.

VFE is the highest calibrated airspeed permissible with the wing flaps in a prescribed extended position. (PLT506) — 14 CFR §1.2
Answer (B) is incorrect because this is VLO. Answer (C) is incorrect because this is VFC.

AIR, GLI, WSC 3008. Which V-speed represents maximum landing gear extended speed?
A— VLE.
B— VLO.
C— VFE.

The caution range (yellow arc) includes speeds which should only be flown in smooth air, and is 165 to 208 knots for this airplane. (PLT088) — FAA-H-8083-25
Answer (A) is incorrect because 0 to 60 knots is less than stall speed. Answer (B) is incorrect because 100 to 165 knots is the normal operating airspeed range from maximum flap extension speed to maximum structural cruising speed, the upper limit of the green arc and lower limit of the yellow arc.

Answers
3266 [C]