

LEVEL FOUR – AVIATION SUBJECTS COMBINED ASSESSMENT STUDY GUIDE

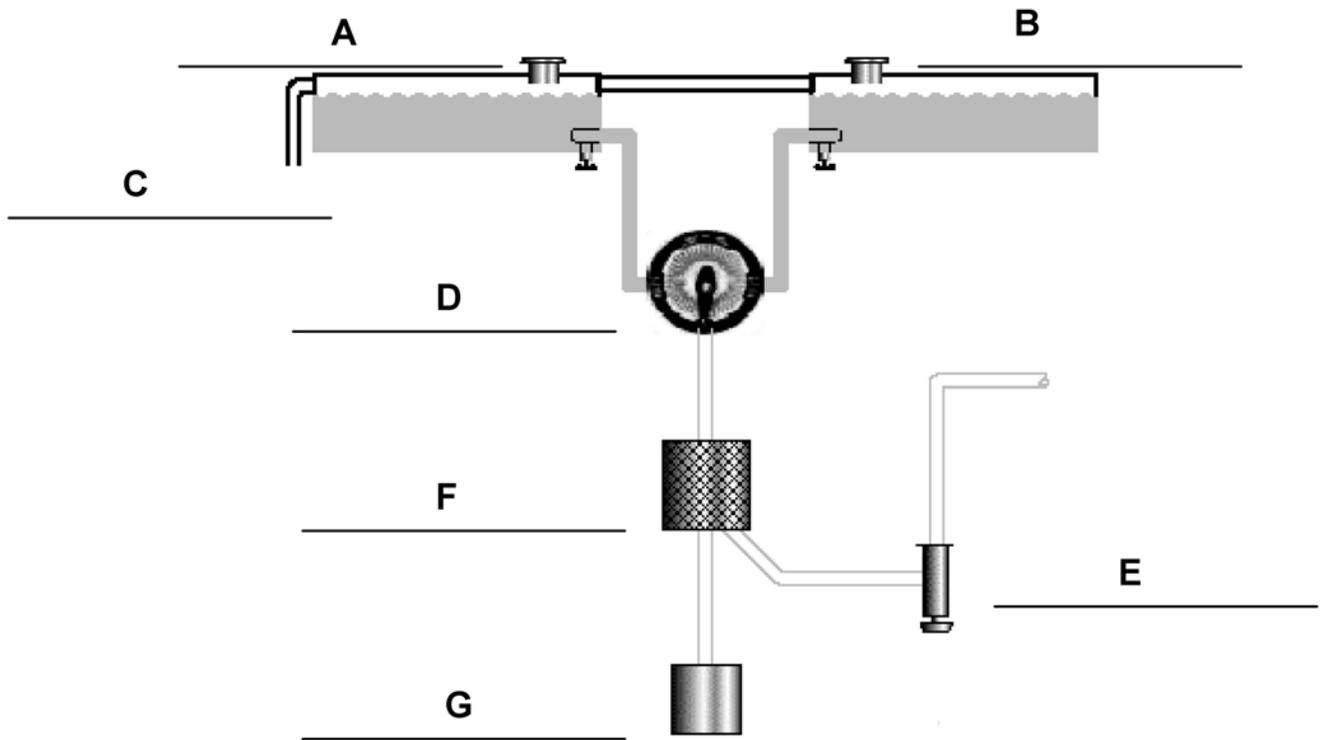
The exam consists of 43 multiple choice questions plus one of the two attached diagrams. Each cadet is allotted 60 minutes to complete the exam.

1. Auxiliary airfoils that move out in front of the leading edge at high angles of attack are called **slats**.
2. Passages built into the wing that affect the airflow in the same way as slats are called **slots**.
3. Wing tip modifications designed to increase lift and reduce drag include **wing tip fuel tanks, winglets, and drooping the wing tips**.
4. Wash-in **increases** the angle of incidence at the wing tip.
5. Camber is the **curvature of an airfoil**.
6. Divide the **wing span** by the **average chord** to calculate the aspect ratio.
7. Laminar airfoils are generally the thickest at **50%** of the chord, whereas conventional airfoils are thickest at **25%** of the chord, and reduce drag by maintaining the laminar flow of air throughout a **greater percentage** of the chord.
8. A **decrease in the density of the air** as the altitude of an aircraft increases can cause **density errors in the ASI**
9. The **ASI** is connected to both the pitot pressure source and the static pressure port. **All other instruments are only connected to the static port.**
10. **VSI** measures the rate of change of the static pressure and **indicates if the altitude is increasing or decreasing**
11. Pitot pressure is affected by both turbulence and motion.
12. *Precession is the tendency of a rotating body, when a force is applied perpendicular to its plane of rotation, to turn in the direction of its rotation 90 degrees to its axis and take up a new plane of rotation parallel to the force applied.*
13. **Density altitude** is the pressure altitude **corrected for temperature**.
14. When flying into an area with a relatively **higher pressure, the altimeter will read lower** than the actual altitude if the altimeter setting is not corrected. (*From high to low, watch out below. From low to high, look for the sky*)
15. The **boundary layer** is the thin section of **air closest to the wing**
16. Pushing the throttle away from you (**forwards movement**) of the throttle **opens** the throttle valve, which **increases** the fuel/air mixture, and **increases** the power being produced by the engine
17. Properties of the engine oil are measured by the **oil pressure and oil temperature gauges**.
18. The distance a propeller travels forward in one revolution is known as **pitch**.
19. **Thrust** is maintained throughout most of the diameter of the propeller by means of the **variation in airfoil sections and the angle of attack**.
20. **Power decreases** in the engine as the altitude increases and the air becomes less dense
21. When the engine is not running the manifold pressure gauge will register **atmospheric pressure**.
22. **Red, yellow, and green** arcs are found on the **tachometer**.

23. **Surface friction** causes lower wind speeds than would be expected from the pressure gradient.
24. The three main **factors** that determine the weather in an **air mass** are the moisture content, the stability of the air, and the cooling process.
25. In *stable air, stratus clouds and poor visibility* are common, whereas....
26. In unstable air, cumulus cloud and good visibility are common.
27. A **gust** is a rapid and irregular change of wind speed.
28. An **anabatic wind** is the term for **up-slope winds** flowing from valleys to high elevations above, whereas....
29. **Down-slope winds** flowing from high elevations down the slopes to valleys below are known as **katabatic winds.**
30. Air speed errors are as follows: IAS corrected for Position → **CAS corrected for Compressibility** → **EAS corrected for Density** → **TAS**
31. **Mach Speed** =
$$\frac{\text{airspeed}}{\text{speed of sound}}$$
32. An **air mass** is a large section of the troposphere with **uniform properties of temperature and moisture in the horizontal.**
33. **Parallels of latitude** are circles on the Earth's surface that lie parallel to the equator. They are measured from 0-90 degrees north and south of the equator, in degrees, minutes, and seconds.
34. Meridians of longitude are **semi-great circles** that join the geographic poles of the Earth.
35. The advantage of a **great circle** route is that it is the **shortest distance between two points** on the surface of the Earth.
36. The advantage of a **rhumb line** route is that it has a **constant direction** (same heading for the entire route).
37. On east and west headings, deceleration causes the compass to register a turn towards the south (*ANDS: Accelerate/North, Decelerate/South*).
38. Compass heading is the magnetic heading with the deviation. West deviation is **added** while east deviation is **subtracted** (*West is Best, East is Least*)
39. **Variation** is the angle between true heading and magnetic heading.
40. Lines drawn on a chart joining places having the same variation are **isogonic lines.**
41. Lines joining places of zero magnetic deviation are **agonic lines.**
42. The fuel selector valve **selects** or **shuts off** different fuel tanks
43. A **cold** air mass is more dense and therefore **sinks**, undercutting a **warm** air mass which will **rise**

Part B—Diagrams (7 points)

1. Label the following parts on the diagram below.
 - a. Left tank
 - b. Right tank
 - c. Vent
 - d. Selector valve
 - e. Primer
 - f. Strainer
 - g. Carburetor



Part B—Matching (5 points)

1. Label the following parts on the propeller diagram below.

- a. Thrust
- b. Relative airflow
- c. Resultant
- d. Axis of rotation
- e. Torque force

