Status	Finished
Started	Tuesday, 9 September 2025, 1:26 PM
Completed	Tuesday, 9 September 2025, 2:56 PM
Duration	1 hour 29 mins
Marks	38.00/40.00
Grade	**95.00** out of 100.00
Feedback	You have successfully passed this test.

Question 1

Incorrect

Mark 0.00 out of 1.00

The dividing line between the upper and lower flows is known as the _____ .

- stagnation point ✗ Not quite. Please review the lesson contents.
- stagnation line
- compressibility line

The correct answer is: stagnation line

Question 2

Correct

Mark 1.00 out of 1.00

In 2D flow, the 2 physical phenomena which create drag are:

- [ ] Induced drag.
- [ ] Inference drag.
- [x] Skin friction drag. ✓
- [ ] Momentum drag.
- [x] Form drag. ✓

The correct answers are: Form drag., Skin friction drag.

Question 3

Correct

Mark 1.00 out of 1.00

An aircraft with a mass of 2050 lb exerts how much weight?

- 20 500 N
- 9141 N ✓ Great job!
- 45 100 N
- 914 kg

The correct answer is: 9141 N

Question 4

Correct

Mark 1.00 out of 1.00

Assuming no flow separation, which of these statements about the flow around an aerofoil as the angle of attack decreases are correct or incorrect?
I. The stagnation point moves down.
II. The point of lowest static pressure moves forward.

- I is correct, II is correct.
- I is correct, II is incorrect.
- I is incorrect, II is correct.
- I is incorrect, II is incorrect. ✓ Great job!

The correct answer is: I is incorrect, II is incorrect.

Question 5

Correct

Mark 1.00 out of 1.00

A turbulent boundary layer _____ separation.

- provokes early.
- prevents
- has no impact.
- delays. ✓ Great job!

The correct answer is: delays.

Question 6

Correct

Mark 1.00 out of 1.00

Which component of the aircraft replaces the energy lost to drag?

- The lift.
- The propeller.
- The engine. ✓ Great job!
- Gravity.

The correct answer is: The engine.

Question 7

Incorrect

Mark 0.00 out of 1.00

Aircraft with electronic air data units show _____ air speed.

- corrected
- CAS/mach ✗ Not quite. Please review the lesson contents.
- EAS/mach
- mach

The correct answer is: corrected

Question 8

Correct

Mark 1.00 out of 1.00

The critical angle of a thin aerofoil is _____ compared to that for a thick aerofoil.

- smaller. ✓ Great job!
- the same.
- larger.

The correct answer is: smaller.

Question 9

Correct

Mark 1.00 out of 1.00

The distance between the leading and trailing edge of an aerofoil. This is a description of:

- Chord. ✓ Great job!
- Aerofoil elements.
- Aerofoil section.
- Thickness.
- Leading-edge radius.

The correct answer is: Chord.

Question 10

Correct

Mark 1.00 out of 1.00

A Diamond DA-42 has a wing area of 16.5 square metres. The wing's coefficient of lift is 0.6. Calculate the lift produced by the wing when the aircraft is flying level at a speed of 120 kt at sea level in ISA conditions. Use 1 kt = 0.514 m/s.

- 22 990 kg
- 23 069 N ✓ Great job!
- 2299 kg
- 23 900 N

The question does not provide all the data needed to answer it.

1. You need to recall the lift formula.

2. You need to recall that ISA sea level density is 1.225 kg per metre cubed.

With this data, set in SI units, you can use the lift equation:

$L = ½ \rho V^2 S CL$

$L = (½ \times 1.225) \times 61.68^2 \times 16.5 \times 0.6$

$L = 0.61 \times 3804.4 \times 16.5 \times 0.6$

L = 23 069 Newtons

The correct answer is: 23 069 N

Question 11

Correct

Mark 1.00 out of 1.00

As angle of attack (alpha) increases, the velocity of the flow over the upper surface _____.

- decreases.
- increases. ✓ Great job!
- stays the same.

The correct answer is: increases.

Question 12

Correct

Mark 1.00 out of 1.00

Flow reversal occurs _____ of the separation point.

- at position.
- upstream.
- downstream. ✓ Great job!

The correct answer is: downstream.

Question 13

Correct

Mark 1.00 out of 1.00

Form drag _____ with increasing angle of attack.

- increases. ✓ Great job!
- decreases.
- doesn't change.

The correct answer is: increases.

Question 14

Correct

Mark 1.00 out of 1.00

The stagnation point is the point:

- where the velocity of the relative airflow is reduced to zero. ✓ Great job!
- of the intersection of the total aerodynamic force and the chord line.
- relative to which the sum of all moments is independent of angle of attack.
- of the intersection of the thrust vector and the chord line.

The correct answer is: where the velocity of the relative airflow is reduced to zero.

Question 15

Correct

Mark 1.00 out of 1.00

Camber describes the distance between:

- The point of maximum thickness and the lower surface.
- The mean camber line and the chord line. ✓ Great job!
- The upper and lower surfaces.
- The distance between the leading edge and the trailing edge.

The correct answer is: The mean camber line and the chord line.

Question 16

Correct

Mark 1.00 out of 1.00

The unit of density is the:

- kg/m
- kg/m²
- m/kg³
- kg/m³ ✓ Great job!

The correct answer is: kg/m³

Question 17

Correct

Mark 1.00 out of 1.00

The relative thickness of an aerofoil is expressed in:

- metres.
- degrees cross section tail angle.
- % chord. ✓ Great job!
- camber.

The correct answer is: % chord.

Question 18

Correct

Mark 1.00 out of 1.00

The distance between the upper and lower surfaces of an aerofoil. This is a description of:

- Chord.
- Leading-edge radius.
- Aerofoil elements.
- Aerofoil section.
- Thickness. ✓ Great job!

The correct answer is: Thickness.

Question 19

Correct

Mark 1.00 out of 1.00

An aerofoil designed for high speed flight tends to have _____ camber compared to a general purpose low-speed aerofoil.

- more.
- the same.
- less. ✓ Great job!

The correct answer is: less.

Question 20

Correct

Mark 1.00 out of 1.00

To each and every action there is an equal and opposite reaction' is a statement of Newton's _____ law.

- Second.
- First.
- Third. ✓ Great job!

The correct answer is: Third.

Question 21

Correct

Mark 1.00 out of 1.00

Which of these statements about boundary layers is correct?

- A laminar boundary layer is thicker than a turbulent one.
- A turbulent boundary layer produces less friction drag than a laminar one.
- A turbulent boundary layer becomes laminar at the transition point.
- Compared with a laminar boundary layer, a turbulent boundary layer is better able to resist a positive pressure gradient before it separates. ✓ Great job!

The correct answer is: Compared with a laminar boundary layer, a turbulent boundary layer is better able to resist a positive pressure gradient before it separates.

Question 22

Correct

Mark 1.00 out of 1.00

Mark all correct answers: 2-dimensional airflow:

- [x] Takes no account of lateral flow. ✓
- [ ] Takes account of tip vortices.
- [x] Is useful for visualising airflow over an aerofoil. ✓

The correct answers are: Takes no account of lateral flow., Is useful for visualising airflow over an aerofoil.

Question 23

Correct

Mark 1.00 out of 1.00

The actual speed that the aircraft is moving through the air is called _____.

- CAS
- TAS ✓ Great job!
- EAS
- IAS

The correct answer is: TAS

Question 24

Correct

Mark 1.00 out of 1.00

The position where the kinetic energy of the boundary layer can no longer overcome the adverse pressure gradient is called the _____ _____.

- separation point ✓ Great job!
- stagnation point
- transition level

The correct answer is: separation point

Question 25

Correct

Mark 1.00 out of 1.00

Air density ∝ _____

- p/T ✓ Great job!
- T/p

The correct answer is: p/T

Question 26

Correct

Mark 1.00 out of 1.00

The component of the total reaction which is parallel to the free stream flow, acting in the same direction, is called:

- thrust
- drag ✓ Great job!
- lift

The correct answer is: drag

Question 27

Correct

Mark 1.00 out of 1.00

Select the correct choice for each statement: The axis known as the 'Normal' axis.

- Roll
- Yaw ✓ Great job!
- Pitch
- Drag

The correct answer is: Yaw

Question 28

Correct

Mark 1.00 out of 1.00

Air density is _____ to the absolute temperature of the air. Absolute temperature is measured in Kelvin.

- inversely proportional. ✓ Great job!
- proportional

The correct answer is: inversely proportional.

Question 29

Correct

Mark 1.00 out of 1.00

Select the correct choice for each statement: The axis passing along the centreline of the aircraft.

- Roll ✓ Great job!
- Yaw
- Pitch
- Lateral

The correct answer is: Roll

Question 30

Correct

Mark 1.00 out of 1.00

Increasing an aerofoil's angle of attack produces _____ in static pressure over the upper surface and _____ in dynamic pressure over the upper surface.

- a decrease; a decrease.
- a decrease; an increase. ✓ Great job!
- an increase; a decrease.
- an increase; an increase.

The correct answer is: a decrease; an increase.

Question 31

Correct

Mark 1.00 out of 1.00

The units of wing loading (I) W /S and (II) dynamic pressure q are:

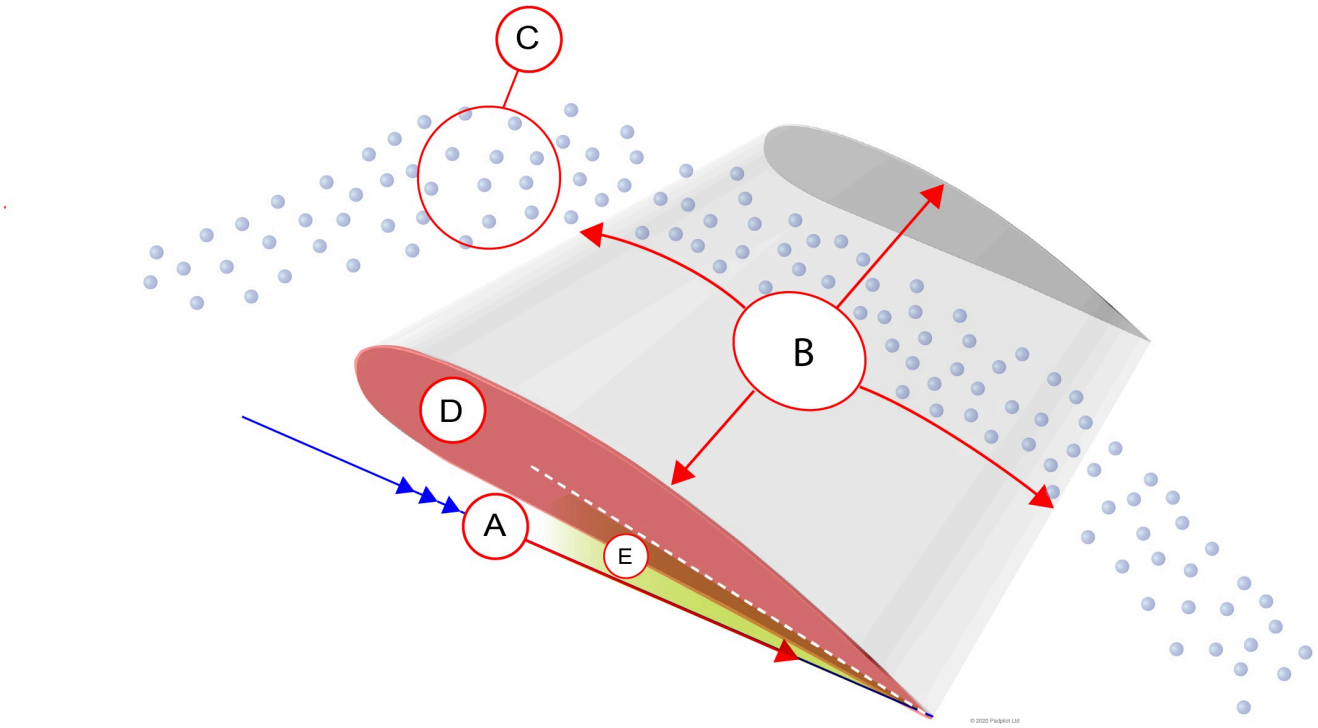
- (I) N / m^3 (II) kg / m^2
- (I) kg / m (II) N / m^2
- (I) N / m (II) kg
- (I) N / m^2 (II) N / m^2 ✓ Great job!

The correct answer is: (I) N / m^2 (II) N / m^2

Question 32

Correct

Mark 1.00 out of 1.00



The Lift formula is: L = ½ ρ V² S CL Study the diagram carefully. Identify which 4 of the following statements about the lift formula are correct.

- [ ] CL is represented by the angle E.
- [x] S is represented by the area identified by the letter B. ✓
- [x] CL is represented by the combination of the shape of D and the angle E. ✓
- [ ] CL is represented by the shape of the area labelled D.
- [x] (½ ρ) is represented by property labelled C. ✓
- [x] V² is represented by the length of the vector labelled A. ✓

The correct answers are: (½ ρ) is represented by property labelled C., V² is represented by the length of the vector labelled A., S is represented by the area identified by the letter B., CL is represented by the combination of the shape of D and the angle E.

Question 33

Correct

Mark 1.00 out of 1.00

The symbol for density is:

- ϕ
- ρ ✓ Great job!
- σ

The correct answer is: ρ

Question 34

Correct

Mark 1.00 out of 1.00

The unit of energy is the:

- joule. Great job!
- newton.
- kilogram.
- watt.

The correct answer is: joule.

Question 35

Correct

Mark 1.00 out of 1.00

In relation to the flow of an ideal fluid through a venturi, the equation of continuity requires that the mass flow through the venturi_____.

- remains constant at all points. Great job!
- decreases in the inlet to the venturi.
- increases in the throat.

The correct answer is: remains constant at all points.

Question 36

Correct

Mark 1.00 out of 1.00

The point of origin of the total reaction is called the _____ _____ _____.

- centre of action
- centre of pressure Great job!
- centre of gravity

The correct answer is: centre of pressure

Question 37

Correct

Mark 1.00 out of 1.00

The mean camber line (or camber line) is an imaginary line half-way (equidistant) between:

- The angle of attack and the chord line.
- The point of maximum thickness.
- The upper and lower surfaces. ✓ Great job!
- The leading and trailing edges.

The correct answer is: The upper and lower surfaces.

Question 38

Correct

Mark 1.00 out of 1.00

The ratio of the aerofoil's maximum thickness to the length of its chord is called the _____ - _____ ratio.

- chord; thickness.
- oblique; chord.
- angle; chord.
- thickness; chord. ✓ Great job!

The correct answer is: thickness; chord.

Question 39

Correct

Mark 1.00 out of 1.00

The rate of doing work is a description of:

- Newton's Third law.
- power. ✓ Great job!
- force.
- energy.

The correct answer is: power.

Question 40

Correct

Mark 1.00 out of 1.00

A Diamond DA-42 is gliding at 80 kt. Its current altitude is 5000 ft where the density today is 0.9 kg/m³. Its wing area is 16.5m². At glide speed, the CD is 0.02. Calculate the drag produced by the wings.

- Approximately 200 newtons
- Approximately 350 newtons
- Approximately 250 newtons ✓ Great job!
- Approximately 300 newtons

This question doesn't give you all the details you need to answer it.

1. You must memorise the fomula for drag.

2. You must memorise the conversion factor for kt into metres per second. (Divide knots by 1.944) = 41 m/sec

Using the drag formula:

$D = ½ \rho V^2 S CD$

$D = (0.5 \times 0.9) \times 41^2 \times 16.5 \times 0.02$

$D = 0.45 \times 1681 \times 16.5 \times 0.02$

D = 249 Newtons

The correct answer is: Approximately 250 newtons