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|---|---|
| **Question Paper Name:** | Aerospace Engineering 30th May 2019 Shift 2 |
| **Subject Name:** | Aerospace Engineering |
| **Creation Date:** | 2019-05-29 13:37:18 |
| **Duration:** | 120 |
| **Total Marks:** | 120 |
| **Display Marks:** | No |
| **Share Answer Key With Delivery Engine:** | Yes |
| **Actual Answer Key:** | Yes |

Aerospace Engineering

| | |
|---|---|
| **Group Number :** | 1 |
| **Group Id :** | 39090047 |
| **Group Maximum Duration :** | 0 |
| **Group Minimum Duration :** | 120 |
| **Revisit allowed for view? :** | No |
| **Revisit allowed for edit? :** | No |
| **Break time:** | 0 |
| **Group Marks:** | 120 |

Mathematics

| | |
|---|---|
| **Section Id :** | 39090087 |
| **Section Number :** | 1 |
| **Section type :** | Online |
| **Mandatory or Optional:** | Mandatory |
| **Number of Questions:** | 10 |
| **Number of Questions to be attempted:** | 10 |
| **Section Marks:** | 10 |
| **Display Number Panel:** | Yes |
| **Group All Questions:** | No |

| | |
|---|---|
| **Sub-Section Number:** | 1 |
| **Sub-Section Id:** | 39090087 |
| **Question Shuffling Allowed :** | Yes |

**Question Number : 1 Question Id : 3909005521 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**


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Rank of the matrix $\begin{bmatrix} -1 & 2 & 3 & 2 \\ 4 & 0 & -1 & -1 \\ -6 & -2 & -2 & -1 \\ 2 & 2 & 3 & 2 \end{bmatrix}$ is

**Options :**

1. 1

2. 2

3. 3

4. 4

**Question Number : 2 Question Id : 3909005522 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The number of solutions of the system

$x + 2y + z = 2$

$2x + y + z = 0$

$x - y = 2$

**Options :**

1. 0

2. 1

3. 2

4. 3

**Question Number : 3 Question Id : 3909005523 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

$A$ is a square matrix of order 3, with eigen value 1, -1, 2 and $A = PBP^{-1}$ for some matrices $B, P$, then the sum of eigen values of $B^2$ is

**Options :**

1. 3

2. 4

3. 5

4. 6

**Question Number : 4 Question Id : 3909005524 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Global maximum of $f(x) = x - \sin 2x$ in $\left[0, \frac{\pi}{2}\right]$ is attained at $x =$

**Options :**

1. $\pi/3$

2. $\pi/4$

3. $\pi/5$

4. $\pi/6$

**Question Number : 5 Question Id : 3909005525 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Domain of the real function $f(x, y) = \ln(x - y) + xy$ is

**Options :**

1. $\{(x, y): x > y\}$

2. $\{(x, y): x < y\}$

3. $\{(x, y): |x| > |y|\}$

4. $\{(x, y): xy > 0\}$

**Question Number : 6 Question Id : 3909005526 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The function $f(x) = \begin{cases} \frac{3x^2y}{x^2+y^2} & \text{if } (x, y) \neq (0,0) \\ 0 & \text{if } (x, y) = (0,0) \end{cases}$ is continuous on

**Options :**

1. $R^2$

2. $R^2 - (0,0)$

3. $\{(0,0)\}$

4. $R^2 - (1,1)$

**Question Number : 7 Question Id : 3909005527 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

If $z = 3xy^4 + x^2y$, where $x = \sin 2t$, $y = \cos t$, then $\left.\frac{dz}{dt}\right|_{t=0} =$

**Options :**

1. 3

2. 4

3. 5

4. 6

**Question Number : 8 Question Id : 3909005528 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Inverse Laplace transform of $\left(\frac{2}{s^2-2s+5}\right) =$

**Options :**

1. $e^{2t}\cos t$

2. $e^{t}\sin 2t$

3. $e^{t}\cos 2t$

4. $e^{2t}\sin t$

**Question Number : 9 Question Id : 3909005529 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

If $y = y(x)$ is the solution of $y'' + y = 0, y(0) = 1, y'(0) = 1$. then $y^2(x) - 1 =$

**Options :**

1. $\sin 2x$

2. $\cos 2x$

3. $\sec 2x$

4. $\operatorname{cosec} 2x$

**Question Number : 10 Question Id : 3909005530 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

$$\frac{1}{D^2+1}(1+x^2) =$$

**Options :**

1. $x - 1$

2. $x^2 + 1$

3. $x + 1$

4. $x^2 - 1$

Aerospace Engineering

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|---|---|
| **Section Id :** | 39090088 |
| **Section Number :** | 2 |
| **Section type :** | Online |
| **Mandatory or Optional:** | Mandatory |
| **Number of Questions:** | 110 |
| **Number of Questions to be attempted:** | 110 |
| **Section Marks:** | 110 |
| **Display Number Panel:** | Yes |
| **Group All Questions:** | No |

**Sub-Section Number:** 1

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**Sub-Section Id:** 39090088
**Question Shuffling Allowed :** Yes

**Question Number : 11 Question Id : 3909005531 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**
**Correct Marks : 1 Wrong Marks : 0**

Under the standard atmospheric conditions, the temperature _____ in the troposphere.

**Options :**

1. decreases with increase in altitude

2. increases with increase in altitude

3. remains constant with altitude

4. varies exponentially with altitude

**Question Number : 12 Question Id : 3909005532 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**
**Correct Marks : 1 Wrong Marks : 0**

In the Ionosphere, the temperature gradient with altitude is

**Options :**

1. positive.

2. negative.

3. zero.

4. complex.

**Question Number : 13 Question Id : 3909005533 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**
**Correct Marks : 1 Wrong Marks : 0**

In the stratosphere, pressure

**Options :**

1. varies linearly with increase in altitude.

2. varies parabolically with increase in altitude.


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3. remains constant with altitude.

4. varies exponentially with altitude.

**Question Number : 14 Question Id : 3909005534 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

A barometric altimeter is a

**Options :**

1. pressure gauge which translates pressure reading into altitude.

2. temperature gauge which translates temperature reading into altitude.

3. density gauge which translates density reading into altitude.

4. gauge which translates altitude reading into pressure.

**Question Number : 15 Question Id : 3909005535 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The cruise Mach number of SR-71 Blackbird is

**Options :**

1. 0.5

2. 1.0

3. 2.0

4. 3.0

**Question Number : 16 Question Id : 3909005536 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The pressure measured using a sounding rocket at a specific altitude is 5.4 X $10^4$ $N/m^2$. The temperature measured at the same location is -18$^0$C. The density at the same location is

**Options :**

1. $2.737\ kg/m^3$

2. $1.225\ kg/m^3$

3. $1.737\ kg/m^3$

4. $0.737\ kg/m^3$

**Question Number : 17 Question Id : 3909005537 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Under standard atmospheric conditions, pressure at 5 km altitude is

**Options :**

1. $1.013\ N/m^2$

2. 1.013 bar

3. $5.4\ X\ 10^4\ N/m^2$

4. 5.4 bar

**Question Number : 18 Question Id : 3909005538 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Under standard atmospheric conditions, temperature at 12 km altitude is

**Options :**

1. 273 K

2. $273^0C$

3. $216^0C$

4. 216 K

**Question Number : 19 Question Id : 3909005539 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Under standard atmospheric conditions, the density at 20 km altitude is

**Options :**

1. $0.0889\ kg/m^3$
2. $1.225\ kg/m^3$
3. $1.013\ kg/m^3$
4. $2\ kg/m^3$

**Question Number : 20 Question Id : 3909005540 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

In a low speed wind tunnel, the area of cross section of the inlet is 24 cm × 24 cm. The area of the test section is 8 cm × 8 cm. The ratio of the average speed at the test section to that at the inlet is

**Options :**

1. 9
2. 3
3. 1/9
4. 1/3

**Question Number : 21 Question Id : 3909005541 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Isentropic relation between pressure and density is

**Options :**

1. $\frac{p}{\rho^{\gamma-1}} = \text{constant}$
2. $\frac{p}{\rho^{\gamma}} = \text{constant}$
3. $\frac{p}{\rho^{1-\gamma}} = \text{constant}$

4. $\frac{p}{\rho^{\gamma+1}} = \text{constant}$

**Question Number : 22 Question Id : 3909005542 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Mach number is defined as

**Options :**

1. True air speed / Speed of sound

2. Speed of sound / True air speed

3. True air speed X Speed of sound

4. (Speed of sound X True air speed)$^2$

**Question Number : 23 Question Id : 3909005543 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

For steady, isentropic compressible flow, the relation between pressure, density and velocity is

**Options :**

1. $\frac{\gamma}{\gamma-1}\frac{p}{\rho} + \frac{V^2}{2} = \text{constant}$

2. $\frac{\gamma}{\gamma+1}\frac{p}{\rho} + \frac{V^2}{2} = \text{constant}$

3. $\frac{p}{\rho} + \frac{V^2}{2} = \text{constant}$

4. $\frac{p}{\rho} + \frac{\gamma}{\gamma-1}\frac{V^2}{2} = \text{constant}$

**Question Number : 24 Question Id : 3909005544 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The speed of sound in air at $0^0$C is

**Options :**

1. 0 m/s

2. 331 m/s

3. 340 m/s

4. 1000 m/s

**Question Number : 25 Question Id : 3909005545 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Pitot tube measures the

**Options :**

1. stagnation pressure only

2. stagnation temperature only

3. static pressure only

4. stagnation and static pressure

**Question Number : 26 Question Id : 3909005546 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Equivalent airspeed is calculated based on

**Options :**

1. Density of air at sea-level standard conditions

2. Density of water at sea-level standard conditions

3. Density of air at the flight altitude

4. Density of air at the service ceiling

**Question Number : 27 Question Id : 3909005547 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Which of the following relations between true air speed (TAS) and equivalent air speed (EAS) is true?

**Options :**

1. TAS > EAS

2. TAS < EAS

3. TAS = EAS

4. TAS = EAS/2

**Question Number : 28 Question Id : 3909005548 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Corrected airspeed indicator reading is

**Options :**

1. Corrected for position error but not for instrument error

2. Corrected for position error and instrument error

3. Corrected for neither position error nor instrument error

4. Corrected for instrument error but not for position error

**Question Number : 29 Question Id : 3909005549 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Airplane lift coefficient during steady, level flight is calculated using

**Options :**

1. $\frac{T}{\frac{1}{2}\rho V^2 S}$

2. $\frac{D}{\frac{1}{2}\rho V^2 S}$

3. $\frac{T-D}{\frac{1}{2}\rho V^2 S}$

4. $\frac{W}{\frac{1}{2}\rho V^2 S}$

**Question Number : 30 Question Id : 3909005550 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The aspect ratio of a rectangular wing of span 4 m and chord length 1 m is

**Options :**

1. 16

2. 4

3. 1/16

4. ¼

**Question Number : 31 Question Id : 3909005551 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The Kutta-Joukowski theorem relates the lift to circulation as

**Options :**

1. $L = \Gamma$

2. $L = \rho V \Gamma$

3. $L = \rho V / \Gamma$

4. $L = V \Gamma$

**Question Number : 32 Question Id : 3909005552 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

For air at sea level conditions, the coefficient of viscosity

**Options :**

1. increases with increase in temperature

2. decreases with increase in temperature

3. remains constant with increase in temperature

4. depends on velocity only

**Question Number : 33 Question Id : 3909005553 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The Reynolds number based on the diameter for a sphere of radius 0.5 cm in a fluid having a freestream velocity of 1 m/s and kinematic viscosity $10^{-5}$ $m^2/s$ is

**Options :**

1. $10^5$

2. $10^3$

3. $0.5 \times 10^5$

4. $0.5 \times 10^3$

**Question Number : 34 Question Id : 3909005554 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The laminar boundary layer thickness over a flat plate with no pressure gradient

**Options :**

1. grows linearly in the downstream direction

2. grows exponentially in the downstream direction

3. grows parabolically in the downstream direction

4. remains constant

**Question Number : 35 Question Id : 3909005555 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The skin friction drag coefficient due to a laminar boundary layer over a flat plate with no pressure gradient is

**Options :**

1. independent of the Reynolds number

2. directly proportional to Reynolds number

3. inversely proportional to square root of Reynolds number

4. directly proportional to square root of Reynolds number

**Question Number : 36 Question Id : 3909005556 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

At the flow separation, the shear stress due to the flow is

**Options :**

1. positive

2. negative

3. zero

4. infinite

**Question Number : 37 Question Id : 3909005557 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Camber is defined as

**Options :**

1. Maximum distance of mean line from the chord line

2. Minimum distance of mean line from the chord line

3. Curvature of the mean line

4. Curvature of the chord line

**Question Number : 38 Question Id : 3909005558 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Drag polar relates

**Options :**

1. $c_m$ and $c_d$

2. $c_l$ and $c_d$

3. $c_l$ and $c_m$

4. $c_l$ and $\alpha$

**Question Number : 39 Question Id : 3909005559 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The pitching moment is related to the pitching moment coefficient as

**Options :**

1. $m = c_m q c$

2. $m = c_m q c^2$

3. $m = c_m q c^3$

4. $m = c_m q$

**Question Number : 40 Question Id : 3909005560 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The aerodynamic center is defined as the point

**Options :**

1. About which the variation of pitching moment with angle of attack is zero

2. At which the aerodynamic forces are acting

3. About which pitching moment is zero

4. Which is the center of the aerofoil

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**Question Number : 41 Question Id : 3909005561 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

For an airfoil at low subsonic speeds, the aerodynamic center is at the

**Options :**

1. Leading edge

2. Trailing edge

3. Center

4. Quarter-chord point

**Question Number : 42 Question Id : 3909005562 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

At low speeds, the coefficient of pressure is related to velocity as

**Options :**

1. $c_p = 1 - (\frac{V}{V_\infty})$

2. $c_p = 1 - (\frac{V}{V_\infty})^2$

3. $c_p = 1 - (\frac{V}{V_\infty})^3$

4. $c_p = 1 - (\frac{V}{V_\infty})^{-2}$

**Question Number : 43 Question Id : 3909005563 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The Prandtl-Glauret transformation factor for a Mach number 0.86 is

**Options :**

1. 0.25

2. 0.5


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3. 1.0

4. 2.0

**Question Number : 44 Question Id : 3909005564 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Drag divergence is

**Options :**

1. The increase in zero-lift drag coefficient at high subsonic Mach number

2. Divergence of wing due to aero-elastic effect

3. Due to the flow transitioning to turbulent flow

4. Flow becoming supersonic on the windward side of airfoil

**Question Number : 45 Question Id : 3909005565 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Supercritical airfoils are

**Options :**

1. Characterized by thick trailing edges

2. Characterized by sharp leading and trailing edges

3. Having higher drag-divergence Mach number compared to conventional airfoil

4. Designed for operation in supersonic mean flow conditions

**Question Number : 46 Question Id : 3909005566 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The maximum thickness of NACA 23015 airfoil is

**Options :**

1. 0.23 c

2. 0.30 c

3. 0.15 c

4. 3.0 c

**Question Number : 47 Question Id : 3909005567 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Which of the following statement is correct under low-subsonic speed?

**Options :**

1. A thick airfoil has a steep stall

2. A thick airfoil doesn't have stall

3. A thick airfoil has a gradual stall

4. A thin airfoil doesn't have stall

**Question Number : 48 Question Id : 3909005568 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Stall occurs in airfoil because of

**Options :**

1. Flow separation

2. Laminar to turbulent transition

3. Flow becoming supersonic

4. Flow reattachment

**Question Number : 49 Question Id : 3909005569 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Using a plain flap on an airfoil will

**Options :**

1. Increase the slope of the lift curve

2. Reduce the drag of the airfoil

3. Increase the maximum lift coefficient

4. Increase the stall angle

**Question Number : 50 Question Id : 3909005570 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The induced drag coefficient is related to the lift coefficient as

**Options :**

1. $C_{D_i} = \frac{C_L}{\pi e\, AR}$

2. $C_{D_i} = \frac{C_L^2}{\pi e\, AR}$

3. $C_{D_i} = \frac{C_L^{3/2}}{\pi e\, AR}$

4. $C_{D_i} = Constant$

**Question Number : 51 Question Id : 3909005571 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The propulsive efficiency of a jet flying at 800 kmph with a jet exhaust velocity of 1600 kmph

**Options :**

1. 50 %

2. 67 %

3. 75 %

4. 100 %

**Question Number : 52 Question Id : 3909005572 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The bypass ratio of a turbofan engine where 20 % of the mass flows through the turbine is

**Options :**

1. 2

2. 4

3. 6

4. 8

**Question Number : 53 Question Id : 3909005573 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

During steady un-powered flight, the angle a glider makes with the horizon is given by

**Options :**

1. $\sin\gamma = \frac{C_D}{C_L}$

2. $\cos\gamma = \frac{C_D}{C_L}$

3. $\tan\gamma = \frac{C_D}{C_L}$

4. $\sin\gamma = \frac{C_L}{C_D}$

**Question Number : 54 Question Id : 3909005574 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The maximum possible ratio of lift to drag, $\left(\frac{C_L}{C_D}\right)_{max}$ is

**Options :**

1. $\frac{1}{2}\sqrt{\frac{\pi ARe}{C_{D_0}}}$

2. $\sqrt{\frac{\pi ARe}{C_{D_0}}}$

3. $\frac{1}{2}\sqrt{\frac{\pi}{C_{D_0}}}$

4. $2\sqrt{\frac{\pi ARe}{C_{D_0}}}$

**Question Number : 55 Question Id : 3909005575 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The $\left(\frac{C_L}{C_D}\right)_{max}$ for a glider is 15. The minimum possible flight path angle is

**Options :**

1. $1.77^0$

2. $2.77^0$

3. $3.77^0$

4. $4.77^0$

**Question Number : 56 Question Id : 3909005576 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Which of the following conditions can be used to achieve low-stall speed?

**Options :**

1. high wing loading

2. high $C_{Lmax}$

3. high $C_L/C_D$

4. reducing $C_D$

**Question Number : 57 Question Id : 3909005577 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

During steady climb, the thrust required is related to weight and drag as

**Options :**

1. $T = D + W \sin \gamma$

2. $T = W \sin \gamma$

3. $T = D$

4. $T = D + W$

**Question Number : 58 Question Id : 3909005578 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

During the steady, level, powered flight of an aircraft with turbojet engine, the velocity for minimum thrust condition is

**Options :**

1. $\sqrt{\frac{\frac{2W}{\rho S}}{\sqrt{\pi A Re C_{D_0}}}}$

2. $\sqrt{\frac{\frac{2W}{\rho S}}{\pi A Re C_{D_0}}}$

3. $\frac{\frac{2W}{\rho S}}{\sqrt{\pi A Re C_{D_0}}}$

4. $\sqrt{\frac{\frac{W}{\rho S}}{\sqrt{\pi A Re C_{D_0}}}}$

**Question Number : 59 Question Id : 3909005579 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

During the steady, level, powered flight of an aircraft with turbojet engine, the ratio of induced drag to total drag is

**Options :**

1. 0.25

2. 0.33

3. 0.5

4. 0.67

**Question Number : 60 Question Id : 3909005580 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

For propeller driven airplane, the ratio of speed for minimum drag to minimum power is

**Options :**

1. 1

2. 1.12

3. 1.22

4. 1.32

**Question Number : 61 Question Id : 3909005581 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

For a propeller driven airplane, the rate of climb is given by

**Options :**

1. Power available/Weight

2. Power required/Weight

3. (Power available – Power required)/Weight

4. (Power available + Power required)/Weight

**Question Number : 62 Question Id : 3909005582 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Absolute ceiling is the altitude at which

**Options :**

1. The rate of climb is maximum

2. The rate of climb is zero

3. The power available is zero

4. The thrust available is zero

**Question Number : 63 Question Id : 3909005583 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The service ceiling of a jet-powered commercial airplane is defined as the altitude at which the rate of climb is

**Options :**

1. 0 feet /min

2. 500 feet /min

3. 1000 feet/min

4. 2000 feet/min

**Question Number : 64 Question Id : 3909005584 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

For a jet-powered aircraft, maximum range occurs when aircraft is flying at a velocity such that _____ is maximum

**Options :**

1. $C_L/C_D$

2. $1/C_D$

3. $\sqrt{C_L}/C_D$

4. $C_L$

**Question Number : 65 Question Id : 3909005585 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The load factor is defined by

**Options :**

1. L/W

2. W/L

3. T/D

4. W/S

**Question Number : 66 Question Id : 3909005586 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Which of the following is not an example of buffeting?

**Options :**

1. Flow separation over the wing exciting the wing structure

2. Wake from the wing exciting the horizontal tail

3. Separated flow from spoilers hitting the horizontal tail

4. Aerodynamic forces overcoming wing strength and resulting in divergence

**Question Number : 67 Question Id : 3909005587 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The static longitudinal stability criterion is satisfied when

**Options :**

1. Aerodynamic center is ahead of center of gravity

2. Aerodynamic center is behind center of gravity

3. Aerodynamic center and center of gravity coincide

4. Center of pressure is ahead of center of gravity

**Question Number : 68 Question Id : 3909005588 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

An aircraft in flight has _____ degrees of freedom

**Options :**

1. two

2. four

3. six

4. eight

**Question Number : 69 Question Id : 3909005589 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

About trimmed equilibrium of an aircraft, which of the following statement is false?

**Options :**

1. The aircraft is in equilibrium

2. The net force on the aircraft is zero

3. The net moment acting on the aircraft is zero

4. The aircraft is accelerating

**Question Number : 70 Question Id : 3909005590 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

For an aircraft having wing area $S$, standard mean chord $c$, area of tail plane $S_T$ and tail moment arm $l_T$, the tail volume ratio is defined as

**Options :**

1. $\frac{S*C}{S_T*l_T}$

2. $\frac{S_T*l_T}{S*C}$

3. $\frac{S*l_T}{S_T*C}$

4. $\frac{S_T*C}{S*l_T}$

**Question Number : 71 Question Id : 3909005591 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

For a conventional aircraft, positive right push on the stick leads to

**Options :**

1. nose up pitch response

2. nose to the right response

3. left wing down response

4. right wing down response

**Question Number : 72 Question Id : 3909005592 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The tendency of an aircraft to converge to the initial equilibrium condition following a small disturbance from equilibrium is referred to as

**Options :**

1. Static stability

2. Dynamic stability

3. Trim

4. Controls free motion

**Question Number : 73 Question Id : 3909005593 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

_____ contributes significantly to lateral static stability of an aircraft

**Options :**

1. Wing sweep

2. Aspect ratio

3. Wing dihedral

4. Fins

**Question Number : 74 Question Id : 3909005594 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

A lightly damped, low frequency oscillation in speed which couples with pitch attitude and height of the aircraft is known as

**Options :**

1. Dutch roll

2. Phugoid

3. Roll subsidence mode

4. Spiral mode

**Question Number : 75 Question Id : 3909005595 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The Lanchester's model predicts the phugoid frequency as

**Options :**

1. $\frac{g\sqrt{2}}{V_0}$

2. $\frac{g}{V_0}$

3. $\frac{V_0}{g\sqrt{2}}$

4. $\frac{V_0}{g}$

**Question Number : 76 Question Id : 3909005596 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The damping ratio of the phugoid mode is approximately proportional to

**Options :**

1. $\frac{C_L}{C_D}$

2. $\frac{C_D}{C_L}$

3. $\frac{C_M}{C_D}$

4. $\frac{C_L}{C_M}$

**Question Number : 77 Question Id : 3909005597 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Expand the abbreviation: STOL

**Options :**

1. Short Take-Off and Landing

2. Steady Take-Off and Landing

3. Smooth Take-Off and Landing

4. Supersonic Take-Off and Landing

**Question Number : 78 Question Id : 3909005598 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

An aircraft with VSTOL capability is

**Options :**

1. F-15

2. Harrier

3. Mig-29

4. Su 30

**Question Number : 79 Question Id : 3909005599 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

For aircrafts capable of thrust vectoring, for maximizing the instantaneous turn rate, the thrust should be aligned at ____ to flight direction

**Options :**

1. $0^0$

2. $30^0$

3. $60^0$

4. $90^0$

**Question Number : 80 Question Id : 3909005600 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Which of the following is not a flight instrument found on an aircraft?

**Options :**

1. Densitymeter

2. Machmeter

3. Accelerometer

4. Altitude indicator

**Question Number : 81 Question Id : 3909005601 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The space program in which people and equipment were sent to moon was

**Options :**

1. Gemini

2. Mercury

3. Apollo

4. Saturn

**Question Number : 82 Question Id : 3909005602 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

An artificial satellite is moving around earth with $r_a$ being the distance between the center of the earth and the satellite at apogee and $r_p$ being the distance between the center of the earth and the satellite at perigee. The satellite is moving in an elliptical orbit with 'a' being the semi-major axis and 'b' being the semi-minor axis. Then the relation between $r_a$, $r_b$ and a is

**Options :**

1. $r_a + r_p = 2a$

2. $r_a + r_p = a$

3. $r_a - r_p = 2a$

4. $r_p - r_a = 2a$

**Question Number : 83 Question Id : 3909005603 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Kepler's law states that the time period of a planet around the sun is related to the semi-major axis of its elliptical orbit as

**Options :**

1. $T \propto a$

2. $T^3 \propto a^2$

3. $T^2 \propto a^3$

4. $T \propto \sqrt{a}$

**Question Number : 84 Question Id : 3909005604 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The orbital velocity of a satellite in a circular orbit about the earth at an altitude of h above the equator is

**Options :**

1. $\sqrt{\frac{GM_e}{R_e+h}}$

2. $\sqrt{\frac{2GM_e}{R_e+h}}$

3. $\sqrt{\frac{GM_e}{2(R_e+h)}}$

4. $\sqrt{\frac{GM_e}{R_e+2h}}$

**Question Number : 85 Question Id : 3909005605 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The radius of the earth is approximately

**Options :**

1. 3370 km

2. 4720 km

3. 5720 km

4. 6370 km

**Question Number : 86 Question Id : 3909005606 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

A geostationary satellite is placed at a height of _____ kms above earth's equator.

**Options :**

1. 35, 786

2. 25, 786

3. 15, 786

4. 5, 786

**Question Number : 87 Question Id : 3909005607 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The Mach angle is defined as

**Options :**

1. $\tan^{-1}(M)$

2. $\sin^{-1}(M)$

3. $\tan^{-1}\left(\frac{1}{M}\right)$

4. $\sin^{-1}\left(\frac{1}{M}\right)$

**Question Number : 88 Question Id : 3909005608 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Which of the following statement is true for an oblique shock wave?

**Options :**

1. The tangential component of flow velocity decreases across an oblique shock wave

2. The tangential component of flow velocity remains constant across an oblique shock wave

3. The tangential component of flow velocity increases across an oblique shock wave

4. The tangential component of flow velocity becomes zero across an oblique shock wave

**Question Number : 89 Question Id : 3909005609 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

When a supersonic flow is turned away from itself, _____ is formed

**Options :**

1. a shock wave

2. an expansion wave

3. a slip line

4. a vortex sheet

**Question Number : 90 Question Id : 3909005610 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

For quasi one-dimensional flow, which of the following statement is true?

**Options :**

1. In subsonic flow, an increase in area is associated with increase in velocity

2. In subsonic flow, an increase in area does not affect velocity

3. In supersonic flow, an increase in area is associated with increase in velocity

4. In supersonic flow, an increase in area is associated with decrease in velocity

**Question Number : 91 Question Id : 3909005611 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

In a convergent-divergent nozzle, when the flow goes sonic at the throat, it is called

**Options :**

1. Choked flow

2. Stagnation flow

3. Stokes flow

4. Fanno flow

**Question Number : 92 Question Id : 3909005612 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

When the flow through a convergent-divergent nozzle is over expanded, then

**Options :**

1. Expansion waves are formed at the nozzle exit

2. A normal shock stands at the nozzle exit

3. Oblique shock waves are formed at the exit

4. Flow becomes stagnant at the exit

**Question Number : 93 Question Id : 3909005613 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The purpose of a diffuser is to

**Options :**

1. Decrease the pressure of flow

2. Increase the pressure of flow

3. Increase the velocity of the flow

4. Increase the stagnation temperature of the flow

**Question Number : 94 Question Id : 3909005614 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The $C_p$ distribution for compressible flow can be found from the $C_{p,0}$ for incompressible flow using the Prandtl-Glauret compressibility correction as

**Options :**

1. $C_P = \frac{C_{p,0}}{\beta^2}$

2. $C_P = \frac{C_{p,0}}{\beta}$

3. $C_P = \beta C_{p,0}$

4. $C_P = \frac{C_{p,0}}{2\beta}$

**Question Number : 95 Question Id : 3909005615 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The area rule for reducing the drag at transonic Mach numbers was proposed by

**Options :**

1. Richard Whitcomb

2. Ludwig Prandtl

3. Ernst Mach

4. Theodore von Karman

**Question Number : 96 Question Id : 3909005616 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Prandtl number is an index which is proportional to the ratio of

**Options :**

1. Energy dissipated by friction to the energy transported by thermal convection

2. Energy transported by thermal convection to the energy transported by thermal conduction

3. Energy transported by thermal conduction to the energy dissipated by friction

4. Energy dissipated by friction to the energy transported by thermal conduction

**Question Number : 97 Question Id : 3909005617 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

For a simply supported plate (a X a X t) subjected to uniform pressure ($q$), the maximum deflection is proportional to

**Options :**

1. $\frac{qa^4}{Et^2}$

2. $\frac{qt^4}{Ea^3}$

3. $\frac{qa^3}{Et^3}$

4. $\frac{qa^4}{Et^3}$

**Question Number : 98 Question Id : 3909005618 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The critical buckling load of a simply supported column of length $l$, second moment of area $I_0$ and Young's modulus E is given by

**Options :**

1. $\frac{\pi^3 E I_0}{l^2}$

2. $\frac{\pi^2 E}{l^2}$

3. $\frac{\pi^2 E}{l^2 I_0}$

4. $\frac{\pi^2 E I_0}{l^2}$

**Question Number : 99 Question Id : 3909005619 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The critical buckling load of a column with one end fixed and the other end free is ____ that of a similar column with hinged boundary conditions.

**Options :**

1. four times

2. twice

3. one -fourth

4. one – half

**Question Number : 100 Question Id : 3909005620 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The main structural elements of the wing of an aircraft are

**Options :**

1. Ribs

2. Spars

3. Stringers

4. Bulkhead

**Question Number : 101 Question Id : 3909005621 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Which of the following is a structural member that takes bending load in a fuselage?

**Options :**

1. Spar

2. Rib

3. Bulkhead

4. Longerons

**Question Number : 102 Question Id : 3909005622 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Which of the following is not true about ribs?

**Options :**

1. They give shape to the wing

2. They transfer load to the spars

3. The spacing between the ribs determine the buckling strength of stringers

4. They take the bending loads acting on the wing

**Question Number : 103 Question Id : 3909005623 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

For an aircraft in steady flight, which statement is false?

**Options :**

1. Compression stresses are created on the upper surface of the wing

2. tension stresses are created on the lower surface of the wing

3. The top portion of spar is subjected to tension

4. The wing is subjected to bending

**Question Number : 104 Question Id : 3909005624 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Which characteristic mentioned about aluminum is false?

**Options :**

1. High strength to weight ratio

2. Easily available

3. Cost effective

4. High density

**Question Number : 105 Question Id : 3909005625 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Major alloying element in 2XXX series aluminum alloy is

**Options :**

1. Copper

2. Silicon

3. Magnesium

4. Zinc

**Question Number : 106 Question Id : 3909005626 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The instantaneous slope of the stress-strain curve at any value of strain is called

**Options :**

1. Young's modulus

2. Modulus of rigidity

3. Tangent Modulus

4. Secant Modulus

**Question Number : 107 Question Id : 3909005627 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Twist per unit length of a uniform beam subjected to torsion T is

**Options :**

1. T/EI

2. T/GJ

3. T/EJ

4. EI/T

**Question Number : 108 Question Id : 3909005628 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The time dependent deformation of a material under an applied load is defined as

**Options :**

1. Fatigue

2. Stress

3. Strain

4. Creep

**Question Number : 109 Question Id : 3909005629 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The planes of maximum shear stress is oriented at ___ to the principal planes of stress

**Options :**

1. $30^0$

2. $45^0$

3. $60^0$

4. $90^0$

**Question Number : 110 Question Id : 3909005630 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Using the Airy's stress function in the equilibrium equation for a two-dimensional stress problem results in

**Options :**

1. Laplace equation

2. Poisson equation

3. Biharmonic equation

4. A first order differential equation

**Question Number : 111 Question Id : 3909005631 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The principle of superposition method for analysis of structures is limited to

**Options :**

1. Linear systems

2. Nonlinear systems

3. Viscoelastic materials

4. Structures undergoing plastic deformation

**Question Number : 112 Question Id : 3909005632 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The turbojet as a means of aircraft propulsion was first used by

**Options :**

1. Wright brothers

2. Otto Lilienthal

3. Von Ohain and Whittle

4. Von Karman

**Question Number : 113 Question Id : 3909005633 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

In a turbojet engine, the order in which air passes through different stages of the engine is as follows

**Options :**

1. Inlet----low pressure compressor--- high pressure compressor---combustor--- low pressure turbine---high pressure turbine---nozzle

2. Inlet----high pressure compressor--- low pressure compressor---combustor--- low pressure turbine---high pressure turbine---nozzle

3. Inlet----low pressure compressor--- high pressure compressor---combustor--- high pressure turbine---low pressure turbine---nozzle

4. Inlet----high pressure compressor--- low pressure compressor---combustor--- high pressure turbine---low pressure turbine---nozzle

**Question Number : 114 Question Id : 3909005634 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Across an axial compressor in a turbojet engine,

**Options :**

1. Pressure and temperature decrease

2. Pressure increases and temperature decreases

3. Pressure decreases and temperature increases

4. Pressure and temperature increase

**Question Number : 115 Question Id : 3909005635 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Typical helicopter engines are of the following type

**Options :**

1. Turbojet

2. Turbofan

3. Turboshaft

4. Ramjet

**Question Number : 116 Question Id : 3909005636 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The specific impulse for a rocket is defined as

**Options :**

1. the thrust per unit of propellant weight flow

2. the power per unit of propellant weight flow

3. the thrust times the velocity of the rocket

4. the thrust developed per unit time

**Question Number : 117 Question Id : 3909005637 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The specific impulse of a typical solid propellant rocket engine is

**Options :**

1. 50s

2. 250s

3. 450 s

4. 1000s

**Question Number : 118 Question Id : 3909005638 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Air initially at $20^0$ C and 1 atm is compressed reversibly and adiabatically to a final pressure of 15 atm. Find the final temperature.

**Options :**

1. $362^0$ C

2. $412^0$ C

3. $462^0$ C

4. $512^0$ C

**Question Number : 119 Question Id : 3909005639 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

The ratio of static to stagnation pressure $P/P_t$ is a

**Options :**

1. Monotonously increasing function of Mach number

2. Monotonously decreasing function of Mach number

3. Increases till sonic conditions and then decreases

4. Decreases till sonic conditions and then increases

**Question Number : 120 Question Id : 3909005640 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

**Correct Marks : 1 Wrong Marks : 0**

Heating a gas in a constant area flow which drives the flow towards

**Options :**

1. Subsonic conditions

2. Sonic condition

3. Transonic condition

4. Supersonic condition