Telangana State Council Higher Education

Notations :

1.Options shown in green color and with ✔ icon are correct.

2.Options shown in red color and with ✖ icon are incorrect.

Question Paper Name :	Aerospace Engineering 11th Aug 2021 Shift 2
Subject Name :	Aerospace Engineering
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Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
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Aerospace Engineering

Group Number :	1
Group Id :	12984020
Group Maximum Duration :	0
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Show Attended Group? :	No

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Edit Attended Group? :	No
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Group Marks :	120
Is this Group for Examiner? :	No

Mathematics

Section Id :	12984034
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	10
Section Marks :	10
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	12984034
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 1298402281 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $M=\begin{bmatrix}\cos\theta & \sin\theta \\ -\sin\theta & \cos\theta\end{bmatrix}$, then $\lim\limits_{n\to\infty}\frac{M^n}{n}=$

Options :

1. ✔ $\begin{pmatrix}0 & 0\\ 0 & 0\end{pmatrix}$

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2. ✖ $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

3. ✖ $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

4. ✖ $\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$

Question Number : 2 Question Id : 1298402282 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The product of Eigen values of $A=\begin{pmatrix} -2 & 2 & 2 \\ 1 & -1 & 1 \\ 3 & 3 & -3 \end{pmatrix}$ is

Options :

1. ✖ -12

2. ✖ -24

3. ✔ 24

4. ✖ 12

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Question Number : 3 Question Id : 1298402283 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If rank (A) = k, then

Options :

1. ✖ All sub determinants of A of order < k vanish

2. ✔ All sub determinants of A of order > k vanish

3. ✖ No sub determinants of A of order < k vanish

4. ✖ No sub determinants of A of order > k vanish

Question Number : 4 Question Id : 1298402284 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$\log\left(\frac{4}{3}\right)$ lies in the interval

Options :

1. ✖ $\left(\frac{1}{3},\frac{1}{2}\right)$

2. ✖ $\left(\frac{1}{5},\frac{1}{4}\right)$

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3. ✖ $\left(0,\frac{1}{4}\right)$

4. ✔ $\left(\frac{1}{4},\frac{1}{3}\right)$

Question Number : 5 Question Id : 1298402285 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $z=\tan\frac{x^2-y^2}{x^2+y^2}$, then $x\frac{\partial z}{\partial x}+y\frac{\partial z}{\partial y}=$

Options :

1. ✖ z

2. ✖ $2z$

3. ✔ 0

4. ✖ $-z$

Question Number : 6 Question Id : 1298402286 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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The directional derivative of $\phi = x^3 - 3x^2y + 3xy^2 + z^3$ at the point (1, 0, 1) in the direction of the line $\frac{x-1}{1} = \frac{y+1}{-1} = \frac{z-1}{0}$ is

Options :

1. ✔ $3\sqrt{2}$

2. ✖ $6\sqrt{2}$

3. ✖ 3

4. ✖ 6

Question Number : 7 Question Id : 1298402287 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If A is the area enclosed by a plane curve C, then $\int_C xdy - ydx =$

Options :

1. ✖ A

2. ✔ 2A

3. ✖ 4A

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4. ✖ $\frac{A}{2}$

Question Number : 8 Question Id : 1298402288 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $\frac{d^2y}{dx^2} = y+1,\ y'(0) = 1,\ y(0) = 0$ then $y =$

Options :

1. ✖ $3e^x - 2$

2. ✖ e^x

3. ✖ $2e^{2x} - 1$

4. ✔ $e^x - 1$

Question Number : 9 Question Id : 1298402289 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Out of the following methods, the convergence rate is high for

Options :

1. ✖ Bisection method

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2. ✖ Regula-Falsi method

3. ✔ Newton Raphson method

4. ✖ Muller's method

Question Number : 10 Question Id : 1298402290 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The particular integral of $\frac{\partial^2 z}{\partial x^2} - 2\frac{\partial^2 z}{\partial x \partial y} + \frac{\partial^2 z}{\partial y^2} = e^{x+2y}$ is

Options :

1. ✔ e^{x+2y}

2. ✖ $\frac{1}{2} e^{x+2y}$

3. ✖ $\frac{1}{4} e^{x+2y}$

4. ✖ $-e^{x+2y}$

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Aerospace Engineering

Section Id :	12984035
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	110
Number of Questions to be attempted :	110
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Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	12984035
Question Shuffling Allowed :	Yes

Question Number : 11 Question Id : 1298402291 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statement about center of pressure for an airfoil is correct

Options :

1. ✖ The resultant aerodynamic force about the center of pressure is zero

2. ✔ The resultant aerodynamic moment about the center of pressure is zero

3. ✖ Center of pressure coincides with the aerodynamic center

4. ✖ Center of pressure lies at the leading edge of the airfoil

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Question Number : 12 Question Id : 1298402292 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The flow fields around two bodies are dynamically similar if

Options :

1. ✖ The aerodynamic force on both bodies are equal in magnitude

2. ✔ The aerodynamic force coefficients are equal

3. ✖ The aerodynamic force coefficient is proportional to the size of the body

4. ✖ The aerodynamic center of both bodies coincide

Question Number : 13 Question Id : 1298402293 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

High-lift devices on a wing helps

Options :

1. ✔ To increase $C_{L,max}$

2. ✖ To decrease $C_{L,max}$

3. ✖ To increase $C_{D,min}$

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4. ✖ To decrease $C_{D,min}$

Question Number : 14 Question Id : 1298402294 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Lift of an aircraft when it is flying straight and level is

Options :

1. ✔ Equal to the weight

2. ✖ Slightly higher than the weight

3. ✖ Slightly lower than the weight

4. ✖ Double the weight

Question Number : 15 Question Id : 1298402295 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

For an aircraft which is heavier than air,

Options :

1. ✖ Buoyancy is significant during take-off

2. ✖ Buoyancy is significant during landing

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3. ✖ Buoyancy is significant during cruise

4. ✔ Buoyancy is insignificant during its flight

Question Number : 16 Question Id : 1298402296 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the external flow around a body, the thin layer of fluid near the body within which viscous effects are dominant is called

Options :

1. ✖ Shock layer

2. ✖ Separated flow region

3. ✔ Boundary layer

4. ✖ Inviscid region

Question Number : 17 Question Id : 1298402297 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements about hypersonic flow is correct

Options :

1. ✖ Flow is always laminar

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2. ✖ Flow is in chemical and thermal equilibrium

3. ✔ The shock layer is thin and close to the body

4. ✖ The viscous effects are negligible

Question Number : 18 Question Id : 1298402298 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Wave drag is observed in

Options :

1. ✖ Subsonic flow

2. ✖ Laminar flow

3. ✖ Incompressible flow

4. ✔ Supersonic flow

Question Number : 19 Question Id : 1298402299 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statement about transonic flow is correct

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Options :

1. ✖ Shock waves are not observed in transonic flow

2. ✖ Flow is incompressible in transonic flow

3. ✖ Flow is always laminar in transonic flow

4. ✔ There are pockets of subsonic and supersonic regions in transonic flow

Question Number : 20 Question Id : 1298402300 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the external flow around a body, at the point of flow separation

Options :

1. ✔ Shear stress is zero

2. ✖ Velocity gradient is positive

3. ✖ Velocity gradient is negative

4. ✖ Pressure is zero

Question Number : 21 Question Id : 1298402301 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

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Correct Marks : 1 Wrong Marks : 0

For the separated flow past a circular cylinder at Reynolds number 10^5,

Options :

1. ✖ Pressure drag is zero

2. ✖ Pressure drag is smaller in magnitude compared to skin friction drag

3. ✖ Pressure drag is equal in magnitude compared to skin friction drag

4. ✔ Pressure drag is larger in magnitude compared to skin friction drag

Question Number : 22 Question Id : 1298402302 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

At a point on the wing of an aircraft, the pressure and temperature of air are 1.9×10^4 N/m^2 and 203 K, respectively. The density at that point is

Options :

1. ✔ 0.326 kg/m^3

2. ✖ 3.26 kg/m^3

3. ✖ 0.011 kg/m^3

4. ✖ 1.225 kg/m^3

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Question Number : 23 Question Id : 1298402303 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A U-tube mercury manometer is used to measure pressure at a point on a wind tunnel model. One side of the manometer is connected to the model and the other side to atmosphere. When the displacement of the two columns of mercury is 10 cm, with the high column on the model side, what is the pressure on the wing. (Density of mercury 13.6 X 10^3 kg/m^3)

Options :

1. ✖ 1.01 X 10^5 N/m^2

2. ✖ 1.146 X 10^5 N/m^2

3. ✔ 0.874 X 10^5 N/m^2

4. ✖ 1.246 X 10^5 N/m^2

Question Number : 24 Question Id : 1298402304 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements about a streamline is true

Options :

1. ✖ At any point on the streamline, velocity vector is perpendicular to the streamline

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2. ✔ At any point on the streamline, velocity vector is tangential to the streamline

3. ✖ At any point on the streamline, magnitude of velocity vector is zero

4. ✖ At any point on the streamline, curl of velocity vector is zero

Question Number : 25 Question Id : 1298402305 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The locus of all the fluid elements that have passed through a fixed point in the flow field in a given time interval is a

Options :

1. ✖ Streamline

2. ✔ Streakline

3. ✖ Pathline

4. ✖ Vortexline

Question Number : 26 Question Id : 1298402306 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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Vorticity vector (ξ) is related to velocity vector (V) as

Options :

1. ✖ $\xi = \nabla . V^2$

2. ✔ $\xi = \nabla \times V$

3. ✖ $\xi = V$

4. ✖ $\xi = \nabla^2 V$

Question Number : 27 Question Id : 1298402307 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The resistance generated by air to the movement of the vehicle with N speed is proportional to

Options :

1. ✖ N^4

2. ✖ N^{-1}

3. ✔ N^2

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4. ✖ N^3

Question Number : 28 Question Id : 1298402308 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Which of the following statement about irrotational flow is false

Options :

1. ✖ Vorticity is zero

2. ✖ Curl of velocity field is zero

3. ✖ It is possible to define a velocity potential the gradient of which is the velocity vector

4. ✔ Velocity potential does not exist for irrotational flow

Question Number : 29 Question Id : 1298402309 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

For 2D irrotational flow, the streamlines and equipotential lines

Options :

1. ✖ Are parallel to each other

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2. ✖ Cross each other at 45^0

3. ✔ Are perpendicular to each other

4. ✖ Do not intersect

Question Number : 30 Question Id : 1298402310 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If the pressure distribution over the surface of a body of arbitrary shape is constant, then the resultant force due to pressure is

Options :

1. ✖ Infinity

2. ✖ Cannot be determined from the given data

3. ✔ Zero

4. ✖ Dependent on the area of cross section

Question Number : 31 Question Id : 1298402311 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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The Bernoulli's equation which states that $p + \frac{1}{2}\rho V^2 = \text{constant}$, is applicable for

Options :

1. ✔ Steady, inviscid, incompressible flows

2. ✖ Unsteady, inviscid, incompressible flows

3. ✖ Steady, inviscid, compressible flows

4. ✖ Steady, viscous, incompressible flows

Question Number : 32 Question Id : 1298402312 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the incompressible flow through a venturi,

Options :

1. ✖ Pressure is maximum at the throat

2. ✖ Pressure remains constant along the duct

3. ✔ Pressure is minimum at the throat

4. ✖ Pressure increases along the length of the duct

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Question Number : 33 Question Id : 1298402313 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The pressure coefficient is defined as

Options :

1. ✖ $C_p = \frac{V-V_\infty}{V_\infty}$

2. ✖ $C_p = \frac{P-P_\infty}{V_\infty}$

3. ✖ $C_p = \frac{V-V_\infty}{P_\infty}$

4. ✔ $C_p = \frac{P-P_\infty}{q_\infty}$

Question Number : 34 Question Id : 1298402314 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The efficiency of a jet engine as compared to propeller is higher at

Options :

1. ✖ Equal speeds

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2. ✖ Low altitudes

3. ✔ High altitudes

4. ✖ High speeds

Question Number : 35 Question Id : 1298402315 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For 2D incompressible flows, the combination of uniform flow with a source gives

Options :

1. ✖ Flow past a cylinder

2. ✖ Flow past a Rankine oval

3. ✖ Vortex flow

4. ✔ Flow past a semi-infinite body

Question Number : 36 Question Id : 1298402316 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a NACA 2412 airfoil, the maximum thickness is ____ percent of the chord

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Options :

1. ✖ 24

2. ✖ 41

3. ✔ 12

4. ✖ 22

Question Number : 37 Question Id : 1298402317 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statement is not correct about the $\mathbf{c_l}$ versus $\boldsymbol{\alpha}$ curve for an airfoil

Options :

1. ✖ The curve is linear for low angles of attack

2. ✖ Stall occurs due to flow separation

3. ✔ The slope of the curve increases with angle of attack

4. ✖ Flow is attached to the airfoil in the linear region

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Question Number : 38 Question Id : 1298402318 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is not a statement associated with Kutta condition for a given airfoil at angle of attack

Options :

1. ✔ The circulation is zero

2. ✖ Flow leaves the trailing edge smoothly

3. ✖ If the trailing edge angle is finite, then it is a stagnation point

4. ✖ If the trailing edge angle is cusped, the velocities leaving the top surface and bottom surface are equal

Question Number : 39 Question Id : 1298402319 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The slope of the $\mathbf{c_l}$ versus $\boldsymbol{\alpha}$ curve as predicted by the thin airfoil theory is

Options :

1. ✖ π

2. ✔ 2π

3. ✖ 3π

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4. ✖ 4π

Question Number : 40 Question Id : 1298402320 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a 3D wing in incompressible flow, the downwash causes the

Options :

1. ✔ Effective angle of attack to be less than geometric angle of attack

2. ✖ Effective angle of attack to be greater than geometric angle of attack

3. ✖ Lift to increase

4. ✖ Drag to decrease

Question Number : 41 Question Id : 1298402321 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The induced drag coefficient is related to the lift coefficient and aspect ratio as

Options :

1. ✖ $C_{D,i} = \frac{C_L}{\pi e AR}$

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2. ✔ $C_{D,i} = \frac{C_L^2}{\pi eAR}$

3. ✖ $C_{D,i} = \frac{C_L^3}{\pi eAR}$

4. ✖ $C_{D,i} = \frac{C_L^2}{2\pi eAR}$

Question Number : 42 Question Id : 1298402322 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements about a delta wing is not correct

Options :

1. ✖ The lift curve slope is small compared to a straight wing

2. ✖ The lift continues to increase to large values of angle of attack

3. ✖ The leading edge vortices create a suction force on the wing

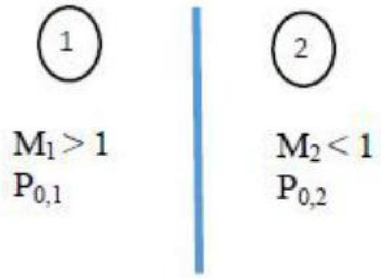
4. ✔ The stall happens due to flow separation

Question Number : 43 Question Id : 1298402323 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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Across a normal shock as shown in the figure, which of the statements about stagnation pressure is correct



Options :

1. ✖ $P_{0,1} = P_{0,2}$

2. ✖ $P_{0,1} < P_{0,2}$

3. ✔ $P_{0,1} > P_{0,2}$

4. ✖ $P_{0,2} = 0$

Question Number : 44 Question Id : 1298402324 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements about normal shock is not correct

Options :

1. ✖ Across a normal shock, temperature increases

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2. ✔ Across a normal shock, total temperature increases

3. ✖ Across a normal shock, pressure increases

4. ✖ Across a normal shock, entropy increases

Question Number : 45 Question Id : 1298402325 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statement about oblique shock waves is not correct

Options :

1. ✖ For any given supersonic Mach number, there is a maximum deflection angle

2. ✖ If the deflection is more than the maximum deflection angle, detached shock waves are formed

3. ✖ For a given deflection angle, as the Mach number increases, the shock angle decreases

4. ✔ For a given Mach number, as the deflection increases, the shock angle decreases

Question Number : 46 Question Id : 1298402326 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

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Correct Marks : 1 Wrong Marks : 0

As the flow goes through Prandtl-Meyer expansion waves,

Options :

1. ✖ The flow Mach number decreases from supersonic to subsonic

2. ✖ The flow Mach number increases from subsonic to supersonic

3. ✔ The flow Mach number increases

4. ✖ The flow Mach number remains constant

Question Number : 47 Question Id : 1298402327 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

During under expanded operation of a convergent-divergent nozzle,

Options :

1. ✖ Normal shock waves are produced at the nozzle exit

2. ✖ Shock waves are produced at the nozzle throat

3. ✖ Oblique shock waves are produced at the nozzle exit

4. ✔ Expansion waves are produced at the nozzle exit

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Question Number : 48 Question Id : 1298402328 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The choked mass flow rate through a convergent-divergent nozzle is directly proportional to

Options :

1. ✔ Stagnation pressure

2. ✖ Stagnation temperature

3. ✖ Back pressure

4. ✖ Molecular weight of the gas

Question Number : 49 Question Id : 1298402329 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The orbital velocity of a satellite of mass m executing a circular orbit of radius r around a planet of mass M is

Options :

1. ✖ $\sqrt{\frac{Gm}{r}}$

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2. ✖ $\sqrt{\frac{2Gm}{r}}$

3. ✔ $\sqrt{\frac{GM}{r}}$

4. ✖ $\sqrt{\frac{2GM}{r}}$

Question Number : 50 Question Id : 1298402330 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Which of the following statement is not associated with Kepler's laws of planetary motion

Options :

1. ✖ Each planet describes an ellipse, with the sun located at one of its foci

2. ✔ The angular velocity of the planet is proportional to the distance from the sun

3. ✖ The radius vector drawn from the sun to a planet sweeps equal areas in equal intervals of time

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4. ✖ The squares of the time period of the planets are proportional to the cubes of the semi major axes of the orbits

Question Number : 51 Question Id : 1298402331 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Acceleration due to gravity on a planet

Options :

1. ✖ Remains constant with altitude

2. ✔ Decreases with altitude

3. ✖ Increases with altitude

4. ✖ Decreases with longitude on the equatorial plane

Question Number : 52 Question Id : 1298402332 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Ballistic missiles, which are designed to hit the earth's surface, travel along an

Options :

1. ✔ Elliptical trajectory

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2. ✖ Parabolic trajectory

3. ✖ Hyperbolic trajectory

4. ✖ Circular trajectory

Question Number : 53 Question Id : 1298402333 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A geostationary orbit is a

Options :

1. ✔ Circular orbit 35, 786 km above Earth's equator

2. ✖ Circular orbit 42, 164 km above Earth's equator

3. ✖ Circular orbit 35, 786 m above Earth's equator

4. ✖ Circular orbit 42, 164 m above Earth's equator

Question Number : 54 Question Id : 1298402334 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Satellites used by GPS orbit in

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Options :

1. ✖ Low earth orbit

2. ✔ Middle earth orbit

3. ✖ Geosynchronous orbit

4. ✖ Geostationary orbit

Question Number : 55 Question Id : 1298402335 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For an aircraft, the drag polar of which is given by $C_D = C_{D,0} + K\,C_L^2$, the minimum value of thrust required/weight for steady, level flight is

Options :

1. ✖ $4\,C_{D,0}K$

2. ✔ $\sqrt{4\,C_{D,0}K}$

3. ✖ $\frac{4\,C_{D,0}}{K}$

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4. ✖ $\sqrt{\frac{4\,C_{D,0}}{K}}$

Question Number : 56 Question Id : 1298402336 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For an aircraft, the drag polar of which is given by $C_D = C_{D,0} + K\,C_L^2$, when L/D is a maximum value

Options :

1. ✖ Lift = Drag

2. ✔ Zero-lift drag equals drag due to lift

3. ✖ Zero-lift drag equals three times drag due to lift

4. ✖ Zero-lift drag equals one-third drag due to lift

Question Number : 57 Question Id : 1298402337 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In steady level flight, the maximum velocity of an aircraft is at the

Options :

1. ✔ Intersection of thrust available and thrust required curves

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2. ✖ Stall velocity

3. ✖ Velocity required for minimum thrust required

4. ✖ Velocity required for minimum drag

Question Number : 58 Question Id : 1298402338 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is not a function of Fowler flap

Options :

1. ✖ Increase $c_{l,max}$

2. ✖ Increase slope of c_l versus α curve

3. ✖ Change zero-lift angle of attack

4. ✔ Delay stall

Question Number : 59 Question Id : 1298402339 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The rate of climb (R/C) of an aircraft in steady, unaccelerated, climbing flight is

Options :

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1. ✔ R/C = Excess power/Weight

2. ✖ R/C = Excess power x Weight

3. ✖ R/C = Excess power + Weight

4. ✖ R/C = Excess power – Weight

Question Number : 60 Question Id : 1298402340 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Maximum rate of climb of a jet propelled aircraft does not directly depend on

Options :

1. ✖ Thrust to Weight ratio

2. ✖ Wing loading

3. ✖ Lift to Drag ratio

4. ✔ Wing dihedral angle

Question Number : 61 Question Id : 1298402341 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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The minimum glide angle for a glider is given by

Options :

1. ✖ $\tan\theta_{min} = \frac{1}{(\frac{L}{W})max}$

2. ✖ $\tan\theta_{min} = (\frac{L}{D})_{max}$

3. ✔ $\tan\theta_{min} = \frac{1}{(\frac{L}{D})max}$

4. ✖ $\tan\theta_{min} = \frac{1}{(\frac{L}{D})min}$

Question Number : 62 Question Id : 1298402342 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Absolute ceiling of an airplane is defined as the

Options :

1. ✖ Altitude at which rate of climb is 100 feet/minute

2. ✖ Speed at which rate of climb is 100 feet/minute

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3. ✔ Altitude at which maximum rate of climb is 0 feet/minute

4. ✖ Altitude at which sink rate is 100 feet/minute

Question Number : 63 Question Id : 1298402343 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Breguet range equation is given by

Options :

1. ✖ $\frac{V_\infty}{c_t}\frac{D}{L}\ln\frac{W_0}{W_1}$

2. ✖ $\frac{c_t}{V_\infty}\frac{D}{L}\ln\frac{W_0}{W_1}$

3. ✔ $\frac{V_\infty}{c_t}\frac{L}{D}\ln\frac{W_0}{W_1}$

4. ✖ $V_\infty\frac{D}{L}\ln\frac{W_0}{W_1}$

Question Number : 64 Question Id : 1298402344 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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The endurance of a jet-propelled airplane is given by

Options :

1. ✖ $\frac{V_\infty}{c_t}\frac{L}{D}\ln\frac{W_0}{W_1}$

2. ✖ $\frac{V_\infty}{c_t}\frac{L}{W_0}\ln\frac{W_0}{W_1}$

3. ✖ $\frac{V_\infty}{c_t}\frac{1}{D}\ln\frac{W_0}{W_1}$

4. ✔ $\frac{1}{c_t}\frac{L}{D}\ln\frac{W_0}{W_1}$

Question Number : 65 Question Id : 1298402345 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

During a level turn (ϕ is the roll angle)

Options :

1. ✔ $L\cos\phi = W$

2. ✖ $W\cos\phi = L$

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3. ✖ $L \sin \phi = W$

4. ✖ $W \cos \phi = L$

Question Number : 66 Question Id : 1298402346 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

At the maneuver point in the V-n diagram for an airplane, which of the following is not correct

Options :

1. ✖ C_L is maximum

2. ✖ n is maximum

3. ✔ V is maximum

4. ✖ Maximum turn rate is possible for the airplane

Question Number : 67 Question Id : 1298402347 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the landing performance of a conventional aircraft, the ground roll distance

Options :

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1. ✔ Increases with wing loading

2. ✖ Decreases with wing loading

3. ✖ Is inversely proportional to wing loading

4. ✖ Is independent of wing loading

Question Number : 68 Question Id : 1298402348 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The aspect ratio of an aircraft wing is defined as (S is the gross planform area and b is the span)

Options :

1. ✖ b/S

2. ✔ b^2/S

3. ✖ S/b

4. ✖ S^2/b

Question Number : 69 Question Id : 1298402349 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

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Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The general requirement for longitudinal static stability is (C_m : pitching moment coefficient, C_l : rolling moment coefficient, C_L : coefficient of lift)

Options :

1. ✖ $C_L = 0 \ \& \ C_m = 0$

2. ✖ $\frac{dC_m}{dC_L} = 0$

3. ✔ $\frac{dC_m}{dC_L} < 0$

4. ✖ $\frac{dC_l}{dC_L} = 0$

Question Number : 70 Question Id : 1298402350 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

In an aircraft with conventional control configuration, positive push force on the right rudder pedal results in

Options :

1. ✖ Left wing down roll response

2. ✖ Nose down pitch response

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3. ✖ Nose up pitch response

4. ✔ Nose to the right yaw response

Question Number : 71 Question Id : 1298402351 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

_____ is a longitudinal dynamic stability mode which is characterized by lightly damped low frequency oscillation in speed which couples with the pitch attitude and height.

Options :

1. ✔ Phugoid

2. ✖ Short period pitching oscillation

3. ✖ Dutch roll

4. ✖ Spiral mode

Question Number : 72 Question Id : 1298402352 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The dutch roll mode is a

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Options :

1. ✖ Damped oscillation in pitch which couples into roll

2. ✖ Damped oscillation in yaw which couples into pitch

3. ✔ Damped oscillation in yaw which couples into roll

4. ✖ Damped oscillation in pitch which couples into yaw

Question Number : 73 Question Id : 1298402353 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Thrust Specific Fuel Consumption of a jet engine is defined as ($\dot{m}_f$ = fuel mass flow rate, T = net thrust)

Options :

1. ✖ $\dot{m}_f$

2. ✖ $\frac{T}{\dot{m}_f}$

3. ✖ $\dot{m}_f T$

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4. ✔ $\frac{\dot{m}_f}{T}$

Question Number : 74 Question Id : 1298402354 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The propulsive efficiency of a single inlet and single exhaust jet engine is

Options :

1. ✖ $\frac{V_e}{V_0}$

2. ✖ $2V_e$

3. ✖ $\frac{V_e}{2V_0}$

4. ✔ $\frac{2}{V_e/(V_0+1)}$

Question Number : 75 Question Id : 1298402355 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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The overall efficiency of a jet engine is related to the propulsive efficiency and the thermal efficiency as

Options :

1. ✖ $\eta_O = \eta_P + \eta_T$

2. ✖ $\eta_O = \eta_P - \eta_T$

3. ✔ $\eta_O = \eta_P \eta_T$

4. ✖ $\eta_O = \eta_P / \eta_T$

Question Number : 76 Question Id : 1298402356 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The propulsion system of SR-71 blackbird uses

Options :

1. ✖ Turbofan engine

2. ✖ Turboprop engine

3. ✖ Turboshaft engine

4. ✔ Turbojet/Ramjet combined cycle engine

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Question Number : 77 Question Id : 1298402357 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements about specific fuel consumption is correct

Options :

1. ✔ Turbojet engines have higher specific fuel consumption than turbofan engines

2. ✖ Turbojet engines have lower specific fuel consumption than turbofan engines

3. ✖ Turbojet engines have same specific fuel consumption as that of turbofan engines

4. ✖ Specific fuel consumption of turbojet engines decreases with Mach number

Question Number : 78 Question Id : 1298402358 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the steady flow of a nonreacting perfect gas in a constant-area, adiabatic duct with friction,

Options :

1. ✔ Total temperature remains constant

2. ✖ Velocity remains constant

3. ✖ Entropy remains constant

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4. ✖ Enthalpy remains constant

Question Number : 79 Question Id : 1298402359 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements about centrifugal compressors and the axial compressors is correct

Options :

1. ✖ Centrifugal compressors have lesser frontal area compared to axial compressors

2. ✖ The number of stages in a centrifugal compressor is higher than that of an axial compressor

3. ✖ The flow is predominantly radial in the axial compressor

4. ✔ Axial compressors have higher compressor ratio compared to that of centrifugal compressors

Question Number : 80 Question Id : 1298402360 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements about thrust augmentation in a gas turbine engine is correct

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Options :

1. ✖ Thrust augmentation can be achieved by water injection, but not by after burning

2. ✖ Thrust augmentation can be achieved by after burning, but not by water injection

3. ✔ Thrust augmentation can be achieved by both after burning and water injection

4. ✖ Thrust augmentation can be achieved by neither after burning nor water injection

Question Number : 81 Question Id : 1298402361 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The four processes in the Brayton cycle occurs in the order

Options :

1. ✔ Isentropic compression – Constant pressure heat addition – isentropic expansion – constant pressure heat rejection

2. ✖ Isentropic compression –isentropic expansion – Constant pressure heat addition – constant pressure heat rejection

3. ✖ Isentropic expansion –Isentropic compression – Constant pressure heat addition – constant pressure heat rejection

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4. ✖ Constant volume heat addition – isentropic expansion – Isentropic compression – constant pressure heat rejection

Question Number : 82 Question Id : 1298402362 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The thermal efficiency of ideal Brayton cycle

Options :

1. ✖ Is independent of compressor pressure ratio

2. ✔ Increases with compressor pressure ratio

3. ✖ Decreases linearly with compressor pressure ratio

4. ✖ Decreases monotonously with compressor pressure ratio

Question Number : 83 Question Id : 1298402363 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A typical Ramjet engine consists of

Options :

1. ✖ Diffuser – Compressor – Combustion chamber – Turbine- Nozzle

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2. ✖ Diffuser –Combustion chamber – Turbine- Nozzle

3. ✖ Diffuser – Compressor – Combustion chamber - Nozzle

4. ✔ Diffuser – Combustion chamber – Nozzle

Question Number : 84 Question Id : 1298402364 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Specific thrust of an ideal Ramjet engine

Options :

1. ✖ Is constant with Mach number

2. ✔ Peaks at supersonic Mach number

3. ✖ Linearly increases with Mach number

4. ✖ Decreases linearly with Mach number

Question Number : 85 Question Id : 1298402365 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the ideal turbojet engine at a given Mach number, $\mathbf{a_0}$ and $\boldsymbol{\tau_\lambda}$

Options :

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1. ✖ Specific thrust is independent of compressor pressure ratio

2. ✖ There exists an optimum compressor pressure ratio which minimizes specific thrust

3. ✔ There exists an optimum compressor pressure ratio which maximizes specific thrust

4. ✖ Specific thrust decreases and then increases with compressor pressure ratio

Question Number : 86 Question Id : 1298402366 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For an ideal turbojet with after burning effect

Options :

1. ✔ Specific thrust is higher when the after burner is turned on

2. ✖ Specific thrust is lower when the after burner is turned on

3. ✖ Specific thrust is independent of whether the after burner is turned on or off

4. ✖ Specific thrust is lower when the after burner is turned only when the Mach number is subsonic

Question Number : 87 Question Id : 1298402367 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is

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Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The bypass ratio of a turbofan engine is defined as

Options :

1. ✖ $\dot{m}_F + \dot{m}_C$

2. ✖ $\dot{m}_F \times \dot{m}_C$

3. ✖ $\dot{m}_F - \dot{m}_C$

4. ✔ $\frac{\dot{m}_F}{\dot{m}_C}$

Question Number : 88 Question Id : 1298402368 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

For an ideal turbofan engine at a given Mach number, fan pressure ratio and compressor pressure ratio,

Options :

1. ✖ Specific thrust is constant with by pass ratio

2. ✖ Specific thrust increases with by pass ratio

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3. ✔ Specific thrust decreases with by pass ratio

4. ✖ Specific thrust increases linearly with bypass ratio and then remains constant

Question Number : 89 Question Id : 1298402369 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The JT9D engine used in Boeing 747 had

Options :

1. ✖ By pass ratio = 0.6, Compressor pressure ratio = 22.3

2. ✖ By pass ratio = 0.6, Compressor pressure ratio = 2.3

3. ✔ By pass ratio = 5.1, Compressor pressure ratio = 22.3

4. ✖ By pass ratio = 5.1, Compressor pressure ratio = 2.3

Question Number : 90 Question Id : 1298402370 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The isentropic efficiency of a compressor is defined as

Options :

1. ✔ Ideal work of compression for given π_c/Actual work of compression for given π_c

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2. ✖ Actual work of compression for given π_c/Ideal work of compression for given π_c

3. ✖ Ideal work of compression for given π_t/Actual work of compression for given π_t

4. ✖ Actual work of compression for given π_t/Ideal work of compression for given π_t

Question Number : 91 Question Id : 1298402371 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Euler turbine equation give the output power as

Options :

1. ✔ $\dot{m}\omega(r_i v_i - r_e v_e)$

2. ✖ $\dot{m}\omega(r_i v_i + r_e v_e)$

3. ✖ $\dot{m}\omega^2(r_i v_i - r_e v_e)$

4. ✖ $\dot{m}\omega^2(r_i v_i + r_e v_e)$

Question Number : 92 Question Id : 1298402372 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The effective exhaust velocity of a rocket nozzle is defined as (Specific impulse I_s)

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Options :

1. ✔ gI_s

2. ✖ I_s/g

3. ✖ I_s

4. ✖ g/I_s

Question Number : 93 Question Id : 1298402373 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The maximum rocket velocity attained in a gravity-free, vacuum environment is

Options :

1. ✖ $g \ln\left(\frac{m_0}{m_f}\right)$

2. ✔ $c \ln\left(\frac{m_0}{m_f}\right)$

3. ✖ $g \ln\left(\frac{m_0}{c\, m_f}\right)$

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4. ✖ $\ln\left(\frac{c\,m_0}{m_f}\right)$

Question Number : 94 Question Id : 1298402374 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A Reaction Control System (RCS) in a spacecraft is not used to

Options :

1. ✖ Trajectory corrections

2. ✖ Correcting attitude control

3. ✖ Correcting rotational position error

4. ✔ Controlling chemical reaction in the rocket motor

Question Number : 95 Question Id : 1298402375 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Multistaging in rockets are not done for

Options :

1. ✖ Higher vehicle velocity

2. ✖ More payload for space vehicle

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3. ✔ Better accuracy for missiles

4. ✖ Larger area of coverage for missiles

Question Number : 96 Question Id : 1298402376 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statements about multistage launch vehicles is not correct

Options :

1. ✖ Booster stage usually has the largest thrust

2. ✔ Strap on motors are attached to the upper stages

3. ✖ Thrust requirement depends on the mass of the payload

4. ✖ Upper stages have lower thrust than that of booster stage

Question Number : 97 Question Id : 1298402377 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following shapes is not used for rocket nozzles

Options :

1. ✖ Conical

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2. ✖ Bell

3. ✖ Aerospike

4. ✔ Ogive

Question Number : 98 Question Id : 1298402378 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

During the operation of convergent-divergent rocket nozzle, the maximum heat transfer occurs at

Options :

1. ✖ Nozzle inlet

2. ✖ Nozzle exit

3. ✔ Nozzle throat

4. ✖ In the divergent section of the nozzle

Question Number : 99 Question Id : 1298402379 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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Which of the following is not used for mitigating combustion instability in rocket engines

Options :

1. ✖ Injector baffles

2. ✖ Acoustic cavities

3. ✖ Combustion chamber liners

4. ✔ Nozzle jet vanes

Question Number : 100 Question Id : 1298402380 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is a propellant used in solid rocket motors

Options :

1. ✖ Hydrazine

2. ✔ Hydroxyl terminated polybutadiene

3. ✖ RP-1

4. ✖ N_2O_4

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Question Number : 101 Question Id : 1298402381 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For stable combustion of a solid propellant, the pressure exponent (n)

Options :

1. ✖ $n = 0$

2. ✔ $n < 1$

3. ✖ $n > 1$

4. ✖ $n = 2$

Question Number : 102 Question Id : 1298402382 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The rate of decrease in temperature with altitude for the standard atmosphere at sea level is

Options :

1. ✖ 1°C / m

2. ✖ 1°C / km

3. ✖ 6.5°C / m

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4. ✔ $6.5^{0}C$ / km

Question Number : 103 Question Id : 1298402383 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the Mohr's circle for stress,

Options :

1. ✔ Normal stress is plotted on the x-axis and shear stress is plotted on y-axis

2. ✖ Normal stress is plotted on the x-axis and normal strain is plotted on y-axis

3. ✖ Normal stress is plotted on the x-axis and shear strain is plotted on y-axis

4. ✖ Normal strain is plotted on the x-axis and shear stress is plotted on y-axis

Question Number : 104 Question Id : 1298402384 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The center of the Mohr's circle of stress lies on the

Options :

1. ✔ σ – axis

2. ✖ τ – axis

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3. ✖ ε – axis

4. ✖ origin

Question Number : 105 Question Id : 1298402385 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The condition under which particles undergo displacement which is restricted to a plane is known as

Options :

1. ✖ Plane stress

2. ✖ Biaxial stress

3. ✔ Plane strain

4. ✖ Biaxial strain

Question Number : 106 Question Id : 1298402386 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The deflection at the midspan of a linear elastic, simply-supported beam of length L, and flexural rigidity EI, subjected to a load W at the mid-span is

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Options :

1. ✖ $\frac{WL^2}{24EI}$

2. ✖ $\frac{WL}{24EI}$

3. ✔ $\frac{WL^3}{48EI}$

4. ✖ $\frac{WL^2}{48EI}$

Question Number : 107 Question Id : 1298402387 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The deflection of a plate (w) with flexural rigidity D, subjected to a distributed load q is related by

Options :

1. ✖ $\nabla^2 w = \frac{q}{D}$

2. ✔ $\nabla^4 w = \frac{q}{D}$

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3. ✖ $\nabla^2 q = \frac{w}{D}$

4. ✖ $\nabla^4 q = \frac{q}{D}$

Question Number : 108 Question Id : 1298402388 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The boundary conditions at the clamped edge of a cantilever beam in terms of deflection are

Options :

1. ✔ $w = 0, \frac{dw}{dx} = 0$

2. ✖ $w = 0, \frac{d^2w}{dx^2} = 0$

3. ✖ $\frac{dw}{dx} = 0, \frac{d^2w}{dx^2} = 0$

4. ✖ $w > 0, \frac{d^2w}{dx^2} = 0$

Question Number : 109 Question Id : 1298402389 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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The deflection at the center of a square plate (a X a) of thickness t and Young's Modulus E, subjected to a load intensity q_0 ,

Options :

1. $\frac{0.0443q_0a^4}{Et^3}$ ✔

2. $\frac{0.0443Eq_0a^4}{t^3}$ ✖

3. $\frac{0.0443q_0a^4}{Et^2}$ ✖

4. $\frac{0.0443q_0a^3}{Et^3}$ ✖

Question Number : 110 Question Id : 1298402390 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Euler buckling load of a clamped-clamped beam of same length and flexural rigidity of that of simply-supported beam

Options :

1. Will be equal to the Euler buckling load of the simply supported beam ✖

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2. ✖ Will be half the Euler buckling load of the simply supported beam

3. ✖ Will be one-fourth the Euler buckling load of the simply supported beam

4. ✔ Will be four times the Euler buckling load of the simply supported beam

Question Number : 111 Question Id : 1298402391 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The shape of the wing cross section is maintained by

Options :

1. ✖ Spars

2. ✔ Ribs

3. ✖ Stringers

4. ✖ Skin

Question Number : 112 Question Id : 1298402392 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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High frequency stress fluctuations due to vibrations excited by jet or propeller noise can cause

Options :

1. ✖ Thermal fatigue

2. ✖ Fretting fatigue

3. ✖ Corrosion fatigue

4. ✔ Acoustic fatigue

Question Number : 113 Question Id : 1298402393 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Shear centre for the cross section of a beam is defined as

Options :

1. ✖ That point about which shear loads act for any type of loading

2. ✖ That point about which shear loads produce no bending

3. ✔ That point about which shear loads produce no twisting

4. ✖ That point about which shear loads produce no deformation

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Question Number : 114 Question Id : 1298402394 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The hoop stress in a thin walled cylindrical pressure vessel is

Options :

1. ✖ $\frac{pr}{2t}$

2. ✖ $\frac{pt}{2r}$

3. ✔ $\frac{pr}{t}$

4. ✖ $\frac{pt}{2r}$

Question Number : 115 Question Id : 1298402395 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

_____ is an example of dynamic aeroelastic problem

Options :

1. ✖ Divergence

2. ✖ Control reversal

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3. ✔ Flutter

4. ✖ Load redistribution

Question Number : 116 Question Id : 1298402396 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The natural frequency of a beam in bending is proportional to

Options :

1. ✖ $\sqrt{\frac{1}{EI}}$

2. ✔ $\sqrt{EI}$

3. ✖ $\sqrt{\frac{1}{E+I}}$

4. ✖ $\sqrt{E+I}$

Question Number : 117 Question Id : 1298402397 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

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For a liquid propellant rocket engine, which of the following is not used as a fuel

Options :

1. ✖ Liquid Hydrogen

2. ✔ Carbon Dioxide

3. ✖ Kerosene

4. ✖ Alcohol

Question Number : 118 Question Id : 1298402398 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

A propeller of diameter 1.8m is mounted as an airplane when moving at a speed of 200 kmph. It produces a thrust of 2070 N under standard sea level conditions. What is the ideal efficiency of the propeller

Options :

1. ✖ 81

2. ✔ 91

3. ✖ 71

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4. ✖ 61

Question Number : 119 Question Id : 1298402399 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In fully turbulent flow regime, the friction factor

Options :

1. ✔ Independent of Reynolds number

2. ✖ Increases with Reynolds number

3. ✖ Decreases with Reynolds number

4. ✖ Depends only upon the velocity of the fluid and increases with velocity of the fluid.

Question Number : 120 Question Id : 1298402400 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The drag force exerted by a fluid as a body immersed in the fluid is due to

Options :

1. ✖ Pressure and Lorentz forces

2. ✔ Pressure and Viscous forces

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3. ✖ Pressure and Surface Tension forces

4. ✖ Viscous and Maragoni forces

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