

Telangana State Council Higher Education

Notations :

- Options shown in **green** color and with  icon are correct.
- Options shown in **red** color and with  icon are incorrect.

Question Paper Name :	Aerospace Engineering 1st Jun 2026 Shift 2
Subject Name :	Aerospace Engineering
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Aerospace Engineering

Group Number :	1
Group Id :	10513150
Group Maximum Duration :	0
Group Minimum Duration :	120
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	120

Mathematics

Section Id :	105131109
Section Number :	1
Section type :	Online

Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	10
Section Marks :	10
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	105131109
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 1051316361 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If P is an orthogonal matrix of order 3×3 , $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ and the eigen values of

$P^T A P$ are α, β, γ , then $\alpha^2 + \beta^2 + \gamma^2 =$

Options :

1. ✖ 3
2. ✔ 27
3. ✖ 15
4. ✖ 12

Question Number : 2 Question Id : 1051316362 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Consider the system of equations $x + y + z = 4\mu$, $x + 2y + 2z = 10\mu$, $x + 3y + 4z = \mu^2 + 15$, where λ and μ are real numbers. Which of the following is correct?

Options :

1. ✖ The system is consistent for all values of λ and μ
2. ✖ The system has infinite number of solutions if $\lambda \neq \frac{3}{4}$ and $\mu = 15$

3. ✓ The system is inconsistent if $\lambda = \frac{3}{4}$, $\mu \neq 1$ and $\mu \neq 15$

4. ✗ The system has unique solutions if $\lambda = \frac{3}{4}$ and $\mu \neq 15$

Question Number : 3 Question Id : 1051316363 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

$$\lim_{x \rightarrow 0} \frac{e^{\tan x} - e^{\sin x}}{(1 - \cos x) \tan x} =$$

Options :

1. ✗ 0

2. ✗ $\frac{1}{2}$

3. ✓ 1

4. ✗ does not exist

Question Number : 4 Question Id : 1051316364 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Let $f(x) = x^3 - \frac{3}{2}x^2$, which of the following is not correct?

Options :

1. ✗ In $(0, 2)$, $3x^2 - 3x - 1 = 0$ has atleast one solution

2. ✗ $f''(x) = 0$ has a solution in $(0, 2)$

3. ✗ $f(x)$ is increasing in $(-\infty, 0)$ and $(1, \infty)$

4. ✓ $f(x)$ is decreasing in $(0, \infty)$

Question Number : 5 Question Id : 1051316365 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If $I = \int_C x^2 y dx - xy^2 dy$, where C is the circle $x^2 + y^2 = 16$, then $2I =$

Options :

1. ✖ -128π

2. ✔ -256π

3. ✖ -512π

4. ✖ 0

Question Number : 6 Question Id : 1051316366 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The solution of $\frac{dy}{dx} + (2(x-1)\sin x + x(x-2)\cos x)y = \frac{e^{2x\sin x}}{e^{x^2\sin x}}$ at $x = 2$ if $y(\pi) = 0$ is

Options :

1. ✔ $2 - \pi$

2. ✖ $\frac{\pi}{2}$

3. ✖ $\pi + 2$

4. ✖ π^2

Question Number : 7 Question Id : 1051316367 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The Laplace transform of $\int_0^t p \sin(t-p) dp =$

Options :

1. ✖ $\frac{s}{s^2+1}$

2. ✖ $\frac{s+1}{s^2+1}$

3. ✔ $\frac{1}{s} - \frac{s}{s^2+1}$

4. ✖ $\frac{1}{(s-1)(s+1)}$

Question Number : 8 Question Id : 1051316368 Question Type : MCQ Option Shuffling : Yes
 Display Question Number : Yes
 Correct Marks : 1 Wrong Marks : 0

The complete solution of $y^3 \frac{\partial u}{\partial x} + x^2 \frac{\partial u}{\partial y} = 0$ is $u(x, y) =$

Options :

1. ✖ $Ae^{K(x^3-y^4)}$

2. ✖ $Ae^{K(x^2+y^3)}$

3. ✖ $Ae^{K \frac{x^3}{y^4}}$

4. ✔ $Ae^{K\left(\frac{x^3}{3} - \frac{y^4}{4}\right)}$

Question Number : 9 Question Id : 1051316369 Question Type : MCQ Option Shuffling : Yes
 Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The iterative formula for finding $2^{1/5}$ using Newton-Raphson method is $x_{n+1} =$

Options :

1. ✓ $\frac{4}{5}x_n + \frac{2}{5} \frac{1}{x_n^4}$

2. ✗ $x_n - \frac{5x_n^4}{x_n^5 - 2}$

3. ✗ $x_n + \frac{x_n^5 - 2}{5x_n^4}$

4. ✗ $x_n + \frac{5x_n^4}{x_n^5}$

Question Number : 10 Question Id : 1051316370 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A multistep method for solving a differential equation numerically among the following is

Options :

1. ✗ Runge-Kutta method

2. ✗ Euler's method

3. ✗ Successive approximation method

4. ✓ Adams-Bashforth method

Aerospace Engineering

Section Id :

105131110

Section Number :

2

Section type :

Online

Mandatory or Optional :

Mandatory

Number of Questions :	110
Number of Questions to be attempted :	110
Section Marks :	110
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	105131110
Question Shuffling Allowed :	Yes

Question Number : 11 Question Id : 1051316371 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The "elevons" are primary control surfaces that combine the functions of the following two components?

Options :

1. ✖ Ailerons and Flaps
2. ✔ Ailerons and Elevators
3. ✖ Elevators and Rudders
4. ✖ Flaps and Slats

Question Number : 12 Question Id : 1051316372 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following best defines Density Altitude?

Options :

1. ✔ Pressure altitude corrected for non-standard temperature
2. ✖ The height of the aircraft above the Ground (AGL)
3. ✖ The altitude indicated on the altimeter when set to the local altimeter setting
4. ✖ The vertical distance of the aircraft above the standard datum plane

Question Number : 13 Question Id : 1051316373 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Equivalent Air Speed (EAS) is?

Options :

1. ✖ Indicated airspeed corrected for installation and instrument errors
2. ✖ The speed of the aircraft relative to the ground
3. ✖ The actual speed of the aircraft through the air mass
4. ✔ Calibrated airspeed corrected for adiabatic compressible flow at a particular altitude

Question Number : 14 Question Id : 1051316374 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If a pilot fails to update the altimeter setting when flying from a high-pressure area to a low-pressure area, the aircraft altitude will be

Options :

1. ✖ Higher than the altimeter indicates
2. ✔ Lower than the altimeter indicates
3. ✖ At the exact altitude indicated
4. ✖ Performing better due to increased air density

Question Number : 15 Question Id : 1051316375 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

An aircraft has the drag polar $C_D = 0.020 + 0.040C_L^2$. What is the total drag coefficient when the aspect ratio is 4?

Options :

1. ✖ 0.025
2. ✔ 0.030

3. ✖ 0.040

4. ✖ 0.050

Question Number : 16 Question Id : 1051316376 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

How does an increase in density altitude (lower air density) affect the take-off ground roll distance (S_g)?

Options :

1. ✖ It decreases the distance due to reduced aerodynamic drag

2. ✖ It has no effect on the distance as weight remains constant

3. ✔ It increases the distance because the required True Airspeed for lift-off increases and also the engine thrust decreases

4. ✖ It decreases the distance because the coefficient of friction is lower in thinner air

Question Number : 17 Question Id : 1051316377 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

For a jet airplane, the maximum rate of climb occurs at the speed where

Options :

1. ✖ Thrust required is minimum

2. ✖ Drag is minimum

3. ✖ Excess thrust is maximum

4. ✔ Excess power is maximum

Question Number : 18 Question Id : 1051316378 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

An aircraft is gliding at an altitude of 3,000 meters with the engine failed. The aircraft has a maximum Lift-to-Drag ratio $(L/D)_{\max}$ of 15. Calculate the maximum horizontal distance the aircraft can cover before hitting the ground?

Options :

1. ✓ 45 km
2. ✗ 48 km
3. ✗ 35 km
4. ✗ 28 km

Question Number : 19 Question Id : 1051316379 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In an aircraft, what is the condition for the absolute ceiling?

Options :

1. ✓ Maximum rate of climb is 0
2. ✗ Maximum rate of climb is 100 ft/min
3. ✗ Rate of decent is 0
4. ✗ Rate of decent is 100 ft/min

Question Number : 20 Question Id : 1051316380 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

An aircraft has a minimum sink rate of 1.5 m/s. If it starts gliding from an altitude of 1,800 meters, what is its maximum endurance (loiter time) in minutes?

Options :

1. ✗ 22 minutes
2. ✓ 20 minutes

3. ✖ 28 minutes

4. ✖ 30 minutes

Question Number : 21 Question Id : 1051316381 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Corner point in V-n diagram is

Options :

1. ✖ Maximum velocity

2. ✔ Stall limit meets structural limit

3. ✖ Lift equals weight

4. ✖ Drag is in maximum condition

Question Number : 22 Question Id : 1051316382 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Crosswind primarily affects

Options :

1. ✖ Lift

2. ✖ Ground speed

3. ✔ Directional control

4. ✖ Engine power

Question Number : 23 Question Id : 1051316383 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

An airplane with symmetric airfoil requires a lift coefficient 0.52, if the lift curve slope is 0.1 per degree and the angle of zero lift is 0, calculate the required angle of attack (in radians)?

Options :

1. ✓ 0.052
2. ✗ 5.2
3. ✗ 52
4. ✗ 0.0052

Question Number : 24 Question Id : 1051316384 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

During a sideslip, the pilot applies

Options :

1. ✗ Aileron and rudder in the same direction
2. ✓ Opposite aileron and rudder
3. ✗ Elevator only
4. ✗ Rudder only

Question Number : 25 Question Id : 1051316385 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Stick-fixed condition is that

Options :

1. ✗ The pilot holds the stick stationary and control surfaces are free to move
2. ✓ The control surfaces are fixed relative to the stick
3. ✗ The autopilot controls the aircraft

4. ✖ The stick is disconnected from the controls

Question Number : 26 Question Id : 1051316386 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

An aircraft has its Neutral Point X_{np} located at 0.35 c (35% of the Mean Aerodynamic Chord). The current Center of Gravity (CG) X_{cg} is 0.2 c (20% of the Mean Aerodynamic Chord). The pilot wants to move the CG to a new position such that the Static Margin is reduced by exactly 50%. Calculate the new location of CG?

Options :

1. ✔ 0.175 c

2. ✖ 0.275 c

3. ✖ 0.1 c

4. ✖ 0.0035 c

Question Number : 27 Question Id : 1051316387 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The Free Elevator Factor (FEF) primarily indicates

Options :

1. ✔ The reduction in stick-free longitudinal stability compared to stick-fixed stability

2. ✖ The increase in elevator deflection due to pilot input

3. ✖ The maximum nose-up trim angle of the aircraft

4. ✖ The ratio of tail lift to wing lift

Question Number : 28 Question Id : 1051316388 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Phugoid oscillation of an aircraft is

Options :

1. ✖ A rapid exchange between wing bending energy and fuselage torsional energy.
A constant exchange between the aircraft's potential energy (altitude) and kinetic energy (airspeed) at a nearly constant angle of attack.
2. ✔
3. ✖ A high-frequency exchange between the horizontal tail's lift and the wing's pitching moment, causing rapid changes in the angle of attack.
4. ✖ An exchange of energy between the lateral side-slip and the directional rolling moment

Question Number : 29 Question Id : 1051316389 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The yawing moment coefficient per sideslip angle is positive. What does this indicate?

Options :

1. ✖ The aircraft is statically unstable in yaw
2. ✔ The aircraft has positive static directional stability
3. ✖ The aircraft will enter a spiral dive immediately
4. ✖ The rudder is ineffective

Question Number : 30 Question Id : 1051316390 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The longitudinal motion of an aircraft is governed by the following characteristic equation for its Short Period Mode: $s^2 + 4.8s + 16 = 0$. Calculate the damping ratio?

Options :

1. ✖ 0.8
2. ✔ 0.6
3. ✖ 0.7

4. ✖ 0.5

Question Number : 31 Question Id : 1051316391 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Euler angles describe an aircraft's orientation relative to

Options :

1. ✖ Its own body axes only
2. ✔ The inertial frame
3. ✖ The wind direction only
4. ✖ The runway heading

Question Number : 32 Question Id : 1051316392 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The 6-DOF translational equation along the x-axis is

Options :

1. ✔ $X = m(\dot{u} + qw - rv)$
2. ✖ $X = m(\dot{v} + ru - pw)$
3. ✖ $X = m(\dot{w} + pv - qu)$
4. ✖ $X = I_x \dot{p} - (I_y - I_z)qr$

Question Number : 33 Question Id : 1051316393 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A satellite is in a circular orbit around Earth at an altitude where the orbital radius is exactly 4 times the radius of another satellite's orbit. If the first satellite has a time period of 2 hours, what is the time period of the second satellite (in hours)?

Options :

1. ✖ 8
2. ✔ 16
3. ✖ 64
4. ✖ 24

Question Number : 34 Question Id : 1051316394 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A satellite is transferred from a circular orbit of radius r to a circular orbit of radius $5r$. What is the time taken for the transfer in terms of the period (T_1) of the first orbit?

Options :

1. ✖ $5.59 T_1$
2. ✖ $3 T_1$
3. ✖ $6 T_1$
4. ✔ $8 T_1$

Question Number : 35 Question Id : 1051316395 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In space dynamics, which of the following manoeuvre is an out-of-plane manoeuvre?

Options :

1. ✖ Increasing the semi-major axis using a tangential burn
2. ✖ Circularizing an elliptical orbit

3. ✓ Performing an inclination change manoeuvre
4. ✗ Changing the eccentricity using a radial burn

Question Number : 36 Question Id : 1051316396 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

When the stream function Ψ satisfies the Laplace equation ($\nabla^2\Psi = 0$), the flow is confirmed to be

Options :

1. ✗ Rotational
2. ✓ Irrotational
3. ✗ Unsteady
4. ✗ Three dimensional flow

Question Number : 37 Question Id : 1051316397 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

1 Poise is equal to

Options :

1. ✗ 1 Ns/m²
2. ✓ 0.1 Ns/m²
3. ✗ 10 Ns/m²
4. ✗ 0.01 Ns/m²

Question Number : 38 Question Id : 1051316398 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If the Reynolds number (Re) at a point on a flat plate doubles while the flow remains laminar, what happens to the boundary layer thickness δ ?

Options :

1. ✓ Decreases
2. ✗ Increases
3. ✗ Remains same
4. ✗ Becomes zero

Question Number : 39 Question Id : 1051316399 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A source of strength Γ is placed in a uniform flow V_∞ , the distance r of the stagnation point from the source is

Options :

1. ✓ $\frac{\Gamma}{2\pi V_\infty}$
2. ✗ $\frac{\Gamma}{3\pi V_\infty}$
3. ✗ $\frac{\Gamma}{4\pi V_\infty}$
4. ✗ $\frac{\Gamma}{5\pi V_\infty}$

Question Number : 40 Question Id : 1051316400 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The potential lines for a doublet flow are

Options :

1. ✗ Straight radial lines

2. ✖ Concentric circles
3. ✔ Circles passing through the origin
4. ✖ Parallel straight lines

Question Number : 41 Question Id : 1051316401 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The drag of a rough cylinder compared to a smooth cylinder of the same size is

Options :

1. ✖ Always Higher
2. ✔ Always Lower
3. ✖ First higher then lower
4. ✖ Unaffected by surface roughness

Question Number : 42 Question Id : 1051316402 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

D'Alemberts Paradox states that the drag force on a body in an ideal fluid is

Options :

1. ✖ Maximum
2. ✔ Zero
3. ✖ Infinite
4. ✖ Equal to lift

Question Number : 43 Question Id : 1051316403 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Water flows steadily through a horizontal pipe from point 1 to point 2. At point 1, the velocity is 2 m/s and the pressure is 300 kPa. At point 2, the velocity is 4 m/s and the height difference between the points is negligible. The density of water is 1000 kg/m^3 . The pressure at point 2 is

Options :

1. ✖ 304 kPa
2. ✔ 294 kPa
3. ✖ 296 kPa
4. ✖ 300 kPa

Question Number : 44 Question Id : 1051316404 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In the NACA 64-212 designation, the third digit indicates

Options :

1. ✔ Design Lift Coefficient
2. ✖ Location of Minimum Pressure
3. ✖ Maximum Thickness
4. ✖ Location of thickness

Question Number : 45 Question Id : 1051316405 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Cusped airfoil is

Options :

1. ✖ Stagnation point Trailing edge
2. ✖ Unsymmetrical air foil with more camber

3. ✓ Upper and lower surfaces are parallel at Trailing edge
4. ✗ Blunt trailing edge

Question Number : 46 Question Id : 1051316406 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The aerodynamic center of a subsonic airfoil is located at

Options :

1. ✗ Leading edge
2. ✓ 25% of chord from leading edge
3. ✗ 50% of chord
4. ✗ Trailing edge

Question Number : 47 Question Id : 1051316407 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Primary purpose of trim tab is to

Options :

1. ✓ Ensure that the total moment about the center of gravity equals zero
2. ✗ Increase lift
3. ✗ Make the total drag equal to zero
4. ✗ Decrease lift

Question Number : 48 Question Id : 1051316408 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Magnus effect deals with

Options :

1. ✖ Magnetic flux on spinning object
2. ✔ Side force generation on spinning object
3. ✖ Magnetisation of spinning object
4. ✖ Slip stream effect on spinning object

Question Number : 49 Question Id : 1051316409 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

As per Kutta Joukowski Theorem, Lift per unit span is directly proportional to

Options :

1. ✔ Circulation strength
2. ✖ Temperature
3. ✖ Acceleration
4. ✖ Chord length

Question Number : 50 Question Id : 1051316410 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

For any thin airfoil (symmetrical or cambered), the rate at which lift increases with the angle of attack is

Options :

1. ✔ 6.28 per radian
2. ✖ 9.42 per radian
3. ✖ 3.14 per radian
4. ✖ 5.14 per radian

Question Number : 51 Question Id : 1051316411 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If the Aspect Ratio of a wing is doubled, what will happen to the Induced Drag Coefficient, assuming the lift coefficient and efficiency factor to remain constant?

Options :

1. ✖ Remain same
2. ✖ 50 % increase
3. ✔ 50% decrease
4. ✖ 100 % increase

Question Number : 52 Question Id : 1051316412 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Critical Mach number of the airfoil is

Options :

1. ✔ Free stream Mach number
2. ✖ Local Mach number over the air foil
3. ✖ Mach number at trailing edge
4. ✖ Mach number at the leading edge

Question Number : 53 Question Id : 1051316413 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If an aircraft is flying at its Drag Divergence Mach Number and the pilot increases speed slightly, what happens to the fuel consumption?

Options :

1. ✖ It stays the same because the aircraft is still subsonic

2. ✖ It decreases because the wing becomes more efficient
3. ✔ It increases sharply due to the rapid onset of wave drag and flow separation
4. ✖ It increases linearly at the same rate as in subsonic flight

Question Number : 54 Question Id : 1051316414 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The aerodynamic centre of an aerofoil is defined as the point

Options :

1. ✖ Where lift becomes zero
2. ✖ Where pressure is maximum
3. ✔ About which pitching moment is independent of angle of attack
4. ✖ About which sum of all the forces are equal to zero

Question Number : 55 Question Id : 1051316415 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A horse-shoe vortex is primarily associated with

Options :

1. ✖ Boundary layer separation
2. ✔ Finite wing tip effects
3. ✖ Shock waves
4. ✖ Laminar flow

Question Number : 56 Question Id : 1051316416 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Find the isentropic compressibility of an ideal gas with an adiabatic index of 1.4 at a pressure of 1 atm

Options :

1. ✓ $\frac{1}{1.4}$ atm

2. ✗ 1.4 atm

3. ✗ 1 atm

4. ✗ 0.4 atm

Question Number : 57 Question Id : 1051316417 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

An aircraft is flying at an altitude where the ambient pressure is 0.9 kPa and the density is 1.226 Kg/m^3 . Calculate the velocity of sound when adiabatic index is 1.226.

Options :

1. ✗ 45 m/s

2. ✗ 25 m/s

3. ✓ 30 m/s

4. ✗ 90 m/s

Question Number : 58 Question Id : 1051316418 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In a diffuser, the primary purpose is to

Options :

1. ✗ Increase velocity

2. ✗ Decrease pressure

- 3. ✓ Increase pressure
- 4. ✗ Increase Mach number

Question Number : 59 Question Id : 1051316419 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Fanno flow is characterized by

Options :

- 1. ✗ Heat transfer without friction
- 2. ✓ Friction without heat transfer
- 3. ✗ Isentropic flow
- 4. ✗ Shockless flow

Question Number : 60 Question Id : 1051316420 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If the critical speed of sound is 300 m/s, upstream velocity across the normal shock wave is 600 m/s, the downstream velocity is

Options :

- 1. ✗ 175 m/s
- 2. ✓ 150 m/s
- 3. ✗ 225 m/s
- 4. ✗ 178 m/s

Question Number : 61 Question Id : 1051316421 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If a supersonic flow ($M = 2.0$) encounters a convex corner (expansion), what happens to the stagnation pressure?

Options :

1. ✖ It increases because the flow speeds up
2. ✖ It decreases because of the expansion fan
3. ✔ It remains constant because the process is isentropic
4. ✖ It drops to zero

Question Number : 62 Question Id : 1051316422 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

During a rocket launch from Sea Level to Space, a fixed-geometry nozzle that is over-expanded at the launch pad will eventually become

Options :

1. ✖ More over-expanded as it gains altitude
2. ✔ Perfectly expanded, then under-expanded as back pressure drops
3. ✖ Subsonic at the throat
4. ✖ Extremely separated at high altitudes

Question Number : 63 Question Id : 1051316423 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In a subsonic jet engine, what is the primary thermodynamic purpose of the diffuser located after the compressor?

Options :

1. ✖ To decrease the static temperature of the air
2. ✖ To act as a heat exchanger for the incoming fuel

3. ✓ To increase static pressure by decreasing flow velocity
4. ✗ To increase Mach number to ensure rapid fuel mixing

Question Number : 64 Question Id : 1051316424 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In Rayleigh flow, what happens to the stagnation pressure when heat is added, regardless of whether the flow is subsonic or supersonic?

Options :

1. ✗ It increases because energy is being added to the system
2. ✗ It remains constant because the duct area is constant
3. ✓ It decreases because heat addition is an irreversible process
4. ✗ It only decreases if the flow is supersonic

Question Number : 65 Question Id : 1051316425 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Air $\gamma = 1.4$ flows isentropically through a convergent-divergent nozzle. At a certain section, the Mach number is 1.0 (at the throat). If the Stagnation temperature is 720 K, find the Static temperature at the throat?

Options :

1. ✗ 720 K
2. ✓ 600 K
3. ✗ 560 K
4. ✗ 864 K

Question Number : 66 Question Id : 1051316426 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A steel bar is held between two rigid fixed supports. If the temperature of the bar is increased by 100°C , what is the magnitude of the thermal stress induced in the bar? (Coefficient of thermal expansion is $11 \times 10^{-6} / ^{\circ}\text{C}$ and Young's modulus of elasticity is 210 GPa)

Options :

1. ✖ 110 MPa
2. ✖ 210 MPa
3. ✔ 231 MPa
4. ✖ 462 MPa

Question Number : 67 Question Id : 1051316427 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A cylindrical alloy rod is subjected to a tensile force such that its length increases by 4% from its original length. During this deformation, the diameter of the rod is observed to decrease by 1%. What is the Poisson's ratio of the alloy?

Options :

1. ✖ 0.15
2. ✖ 0.20
3. ✔ 0.25
4. ✖ 0.30

Question Number : 68 Question Id : 1051316428 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A point in a structural member is subjected to a plane stress state where $\sigma_x = 80\text{ MPa}$, $\sigma_y = 20\text{ MPa}$, and $\tau_{xy} = 40\text{ MPa}$. What is the maximum principal stress?

Options :

1. ✖ 60 MPa
2. ✔ 100 MPa
3. ✖ 120 MPa
4. ✖ 200 MPa

Question Number : 69 Question Id : 1051316429 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

An element is subjected to a pure shear stress of magnitude τ . Which of the following statement is incorrect regarding the Mohr's Circle for this stress state?

Options :

1. ✖ The center of the Mohr's Circle coincides with the origin (0,0)
2. ✖ The maximum principal stress is equal in magnitude to the applied shear stress
3. ✖ The radius of the Mohr's Circle is equal to τ
4. ✔ The maximum normal stress acting on the element is 2τ

Question Number : 70 Question Id : 1051316430 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The sum of normal stresses on any two mutually perpendicular planes is

Options :

1. ✖ Variable depending on the angle θ
2. ✔ Constant value
3. ✖ Equal to the maximum shear stress
4. ✖ Always zero

Question Number : 71 Question Id : 1051316431 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

What is the angle between the principal plane and the plane of maximum in-plane shear stress?

Options :

1. ✖ 180°

2. ✖ 0°

3. ✔ 45°

4. ✖ 90°

Question Number : 72 Question Id : 1051316432 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

On a principal plane, the relationship between the stress components is such that

Options :

1. ✖ The normal stress is maximum and shear stress is maximum

2. ✖ The normal stress is zero and shear stress is maximum

3. ✔ The shear stress is zero and normal stress is an extremum

4. ✖ The normal stress and shear stress are equal in magnitude

Question Number : 73 Question Id : 1051316433 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

According to Rankine's failure theory, failure occurs when

Options :

1. ✖ Maximum shear stress reaches shear yield stress

2. ✖ Distortion energy reaches critical value
3. ✔ Maximum principal stress reaches ultimate strength
4. ✖ Maximum strain energy reaches critical value

Question Number : 74 Question Id : 1051316434 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

According to Tresca theory, yielding begins when

Options :

1. ✖ Maximum principal stress equals yield stress
2. ✔ Maximum shear stress equals half the yield stress
3. ✖ Distortion energy equals strain energy at yield
4. ✖ Volumetric strain becomes zero

Question Number : 75 Question Id : 1051316435 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A plane truss has 10 joints. For it to be a perfect truss, the number of members must be

Options :

1. ✖ 15
2. ✔ 17
3. ✖ 19
4. ✖ 20

Question Number : 76 Question Id : 1051316436 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

According to Bredt–Batho theory, shear flow in a thin-walled closed section under torsion is

Options :

1. ✖ Zero at corners
2. ✖ Varies linearly along perimeter
3. ✔ Constant along the wall
4. ✖ Maximum at centroid

Question Number : 77 Question Id : 1051316437 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A symmetrical section subjected to a load inclined to its principal axis will produce

Options :

1. ✖ Pure bending
2. ✖ Symmetrical bending
3. ✔ Unsymmetrical bending
4. ✖ Torsion

Question Number : 78 Question Id : 1051316438 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The standard shear flow formula $q = \frac{VQ}{I}$ is not applicable to thick-walled section, the primary reason is

Options :

1. ✖ Thick sections do not experience shear forces
2. ✖ The moment of inertia (I) cannot be calculated for thick sections

3. ✓ The shear stress is no longer uniform across the thickness of the section
4. ✗ Thick sections are always perfectly rigid and do not deform under shear

Question Number : 79 Question Id : 1051316439 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which structural design philosophy allows the outer skin of an aircraft to carry a significant portion of the load?

Options :

1. ✗ Truss structure
2. ✗ Open-frame construction
3. ✓ Semi-Monocoque
4. ✗ Pure Monocoque

Question Number : 80 Question Id : 1051316440 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

For a thin-walled C-channel, why does a load applied at the centroid produce twisting?

Options :

1. ✗ Because the shear flow in the flanges is always zero
2. ✗ Because the centroid is always the point where torsion is maximized
3. ✗ Because C-channels lack a longitudinal axis of symmetry
4. ✓ Because the centroid and the shear center are at different locations in unsymmetrical sections

Question Number : 81 Question Id : 1051316441 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which specific flight load acts like a 'hammer blow' to the wing structure, momentarily increasing the angle of attack and lift?

Options :

1. ✖ Thrust loads
2. ✖ Maneuvering loads
3. ✔ Gust loads
4. ✖ Centrifugal loads

Question Number : 82 Question Id : 1051316442 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In a semi-Monocoque wing undergoing upward bending, which of the following is true regarding the wing skins?

Options :

1. ✔ The top skin is in compression and the bottom skin is in tension
2. ✖ The skins carry only shear loads and no normal stresses
3. ✖ Both skins are in pure tension
4. ✖ The top skin is in tension and the bottom skin is in compression

Question Number : 83 Question Id : 1051316443 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which material property is most important for the web of a Wagner Beam?

Options :

1. ✖ High compressive strength
2. ✖ Extremely high thickness
3. ✔ High tensile strength

4. ✖ Low elasticity

Question Number : 84 Question Id : 1051316444 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The natural frequency of a simple spring mass system with static deflection 9.81 cm is

Options :

- 1. ✔ 10 rad/sec
- 2. ✖ 100 rad/sec
- 3. ✖ 9.81 rad/sec
- 4. ✖ 1 rad/sec

Question Number : 85 Question Id : 1051316445 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In an under damped single degree of freedom system the ratio of the first peak amplitude to the seventh peak amplitude is $\frac{x_1}{x_7} = 64$, then the ratio of two successive peak amplitudes is

Options :

- 1. ✖ 1.26
- 2. ✖ 1.50
- 3. ✔ 2.00
- 4. ✖ 6.40

Question Number : 86 Question Id : 1051316446 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Let A be a square matrix. Which of the following statement about eigenvectors is correct?

Options :

1. ✖ Eigen vectors are always unique
2. ✖ Eigen vectors are unique only if the eigen value has multiplicity 1
3. ✔ Eigen vectors are unique up to a scalar multiple
4. ✖ Eigen vectors cannot be scaled

Question Number : 87 Question Id : 1051316447 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In the context of mechanical vibrations, static coupling refers to

Options :

1. ✖ Interaction between different degrees of freedom due to mass and inertia
2. ✖ Interaction between different degrees of freedom due to damping only
3. ✔ Interaction between different degrees of freedom due to stiffness, independent of motion
4. ✖ Interaction that occurs only during dynamic motion

Question Number : 88 Question Id : 1051316448 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following statement about Airy's stress function $\phi(x, y)$ is correct?

Options :

1. ✖ It is a vector function used to represent displacement components.
2. ✔ It automatically satisfies the equilibrium equations in two dimensional elasticity.
3. ✖ It only applies to three dimensional elasticity problems.

4. ✖ It does not need to satisfy any differential equation.

Question Number : 89 Question Id : 1051316449 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A man is sitting inside a house during the winter season. The main mode of heat transfer from the man's body to the surroundings is

Options :

- 1. ✖ Conduction
- 2. ✖ Convection
- 3. ✔ Radiation
- 4. ✖ Evaporation

Question Number : 90 Question Id : 1051316450 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A turbofan engine has a high bypass ratio, meaning most of the air flows through the bypass duct instead of the core. The engine manufacturer claims this design "improves fuel efficiency and reduces noise". Which of the following statements reflects the best critical evaluation of this claim?

Options :

- 1. ✖ The claim is false because bypass air does not contribute to thrust
- 2. ✔ The claim is likely valid, but it depends on the engine's overall design and operating conditions
- 3. ✖ The claim is irrelevant because all jet engines work the same way
- 4. ✖ The claim is exaggerated because bypass ducts increase engine weight without any benefits

Question Number : 91 Question Id : 1051316451 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In a ramjet engine, the air compression takes place by

Options :

1. ✖ Compressor
2. ✔ Diffuser and shock waves
3. ✖ Turbine
4. ✖ Convergent nozzle

Question Number : 92 Question Id : 1051316452 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In a jet engine's combustion chamber, detonation refers to

Options :

1. ✖ Subsonic burning of fuel-air mixture producing steady pressure
2. ✔ Supersonic combustion producing a shock wave and sudden pressure rise
3. ✖ Use of turbines to compress the fuel-air mixture before ignition
4. ✖ Acceleration of exhaust gases through a convergent nozzle

Question Number : 93 Question Id : 1051316453 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following sequences correctly represents the flow of air in a basic turbojet engine?

Options :

1. ✖ Nozzle → Combustor → Intake → Turbine
2. ✔ Intake → Combustor → Turbine → Nozzle
3. ✖ Turbine → Nozzle → Intake → Combustor

4. ✖ Combustor → Intake → Nozzle → Turbine

Question Number : 94 Question Id : 1051316454 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A convergent-divergent nozzle is used in jet engines to

Options :

1. ✖ Mix air and fuel in the combustor
2. ✖ Compress incoming air at subsonic speeds
3. ✔ Accelerate exhaust gases to supersonic speeds for high-speed flight
4. ✖ Reduce engine noise

Question Number : 95 Question Id : 1051316455 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The main thermodynamic cycle used in a turbojet engine is

Options :

1. ✖ Otto cycle
2. ✖ Diesel cycle
3. ✔ Brayton cycle
4. ✖ Rankine cycle

Question Number : 96 Question Id : 1051316456 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In an axial compressor, the change in angular momentum of air through the rotor is directly related to

Options :

1. ✖ Pressure at the inlet
2. ✔ Work done per unit mass on the air
3. ✖ Degree of reaction
4. ✖ Rotor efficiency

Question Number : 97 Question Id : 1051316457 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The work done by the rotor in an axial compressor primarily results in

Options :

1. ✖ Increase in air density only
2. ✔ Increase in kinetic energy of the air, partly converted to pressure rise
3. ✖ Heat loss to the surroundings
4. ✖ Decrease in static pressure

Question Number : 98 Question Id : 1051316458 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The degree of reaction of an axial compressor stage is defined as the ratio of

Options :

1. ✖ Rotor work to total work
2. ✔ Static pressure rise in rotor to total static pressure rise of the stage
3. ✖ Stator work to rotor work
4. ✖ Total pressure rise to kinetic energy rise

Question Number : 99 Question Id : 1051316459 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Stage efficiency of a single-stage axial compressor is defined as

Options :

1. ✖ Ratio of actual work input to isentropic enthalpy rise
2. ✔ Ratio of isentropic enthalpy rise to actual work input
3. ✖ Ratio of rotor speed to stator speed
4. ✖ Ratio of inlet temperature to exit temperature

Question Number : 100 Question Id : 1051316460 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The degree of reaction in an axial compressor stage is

Options :

1. ✔ The ratio of static pressure rise in the rotor to total stage enthalpy rise
2. ✖ The ratio of rotor speed to airflow speed
3. ✖ Always 0.5 in all compressors
4. ✖ Ratio of inlet velocity to exit velocity

Question Number : 101 Question Id : 1051316461 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

An axial turbine stage has a degree of reaction of 50% and operates with symmetrical velocity triangles (i.e., absolute inlet and exit flow angles are equal in magnitude but opposite in direction). The axial velocity remains constant through the stage. Which of the following statements is correct?

Options :

1. ✖ The entire pressure drop occurs in the stator only
2. ✔ The enthalpy drop in rotor equals the enthalpy drop in stator
3. ✖ The whirl component of velocity at rotor exit is zero
4. ✖ The stage work output is zero

Question Number : 102 Question Id : 1051316462 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

For an axial turbine stage, the work done per unit mass flow is directly proportional to

Options :

1. ✖ Change in axial velocity
2. ✔ Change in whirl (tangential) velocity
3. ✖ Absolute inlet velocity only
4. ✖ Blade height only

Question Number : 103 Question Id : 1051316463 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In an impulse turbine stage (degree of reaction = 0)

Options :

1. ✖ Pressure drop occurs only in the rotor
2. ✖ Pressure drop is equally divided between stator and rotor
3. ✔ Pressure drop occurs only in the stator
4. ✖ No pressure drop occurs in the stage

Question Number : 104 Question Id : 1051316464 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A centrifugal compressor has an impeller tip speed of 200 m/s. The whirl component of absolute velocity at the impeller exit is 150 m/s. The whirl component of velocity at the inlet is zero. The specific heat at constant pressure is 1 kJ/kg K. Using Euler's compressor principle, determine the temperature rise across the impeller?

Options :

1. ✖ 15 K
2. ✔ 30 K
3. ✖ 45 K
4. ✖ 60 K

Question Number : 105 Question Id : 1051316465 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The primary function of the inducer in a centrifugal compressor is to

Options :

1. ✖ Increase static pressure significantly
2. ✔ Reduce inlet Mach number and guide flow smoothly into impeller
3. ✖ Convert kinetic energy into pressure energy
4. ✖ Increase whirl velocity at exit

Question Number : 106 Question Id : 1051316466 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The work done per unit mass in a centrifugal compressor mainly depends on

Options :

1. ✖ Change in axial velocity

2. ✓ Change in whirl velocity
3. ✗ Diffuser vane angle
4. ✗ Eye diameter only

Question Number : 107 Question Id : 1051316467 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Slip factor in a centrifugal compressor accounts for

Options :

1. ✗ Shock losses at inducer
2. ✓ Deviation of actual flow from ideal blade direction at impeller exit
3. ✗ Mechanical losses in bearings
4. ✗ Friction losses in diffuser

Question Number : 108 Question Id : 1051316468 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Compressor surge occurs when

Options :

1. ✗ Mass flow rate becomes too high
2. ✗ Pressure ratio becomes zero
3. ✓ Flow reverses due to excessive back pressure
4. ✗ Blade tip speed becomes zero

Question Number : 109 Question Id : 1051316469 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Specific impulse of a rocket engine is defined as

Options :

1. ✖ Thrust produced per unit chamber pressure
2. ✔ Thrust produced per unit weight flow rate of propellant
3. ✖ Exhaust velocity divided by mass flow rate
4. ✖ Chamber pressure divided by mass flow rate

Question Number : 110 Question Id : 1051316470 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In a solid propellant rocket, the thrust level is primarily controlled by

Options :

1. ✖ Injector design
2. ✖ Turbopump speed
3. ✔ Grain geometry and burning surface area
4. ✖ Mixture ratio control

Question Number : 111 Question Id : 1051316471 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

One major advantage of liquid propellant rockets over solid propellant rockets is

Options :

1. ✖ Higher structural simplicity
2. ✔ Ability to throttle and restart
3. ✖ Lower cost

4. ✖ No need for feed system

Question Number : 112 Question Id : 1051316472 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

For maximum thrust in a rocket nozzle, the exit pressure should be

Options :

1. ✖ Equal to chamber pressure
2. ✔ Equal to ambient pressure
3. ✖ Greater than ambient pressure
4. ✖ Zero

Question Number : 113 Question Id : 1051316473 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Liquid chemical rockets are often classified by the type of propellants used. Which of the following is correct?

Options :

1. ✖ Monopropellant, Bipropellant, Hybrid
2. ✖ Solid, Gel, Cryogenic
3. ✔ Hypergolic, Cryogenic, Storable
4. ✖ Air-breathing, Non-air-breathing, Hybrid

Question Number : 114 Question Id : 1051316474 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In multi-stage rockets, the stage mass fraction is defined as

Options :

1. ✖ Ratio of payload mass to total rocket mass
2. ✔ Ratio of propellant mass to total stage mass
3. ✖ Ratio of total rocket mass to payload mass
4. ✖ Ratio of dry mass to payload mass

Question Number : 115 Question Id : 1051316475 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A rocket stage that ignites after the previous stage is jettisoned is called

Options :

1. ✖ Parallel staging
2. ✔ Serial (tandem) staging
3. ✖ Cluster staging
4. ✖ Hybrid staging

Question Number : 116 Question Id : 1051316476 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A rocket produces maximum thrust in vacuum because

Options :

1. ✖ Mass flow rate increases in vacuum
2. ✖ Exhaust velocity is higher in vacuum
3. ✔ There is no atmospheric pressure opposing expansion
4. ✖ Nozzle area increases automatically

Question Number : 117 Question Id : 1051316477 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following increases the thrust of a rocket engine?

Options :

1. ✖ Decreasing exit area
2. ✖ Increasing ambient pressure
3. ✔ Increasing exhaust velocity or mass flow rate
4. ✖ Using heavier rocket structure

Question Number : 118 Question Id : 1051316478 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Drag loss in a rocket flight is

Options :

1. ✔ Loss of velocity due to atmospheric resistance
2. ✖ Energy lost to gravity
3. ✖ Loss due to propellant inefficiency
4. ✖ Loss due to nozzle inefficiency

Question Number : 119 Question Id : 1051316479 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Gravity loss during rocket flight occurs because

Options :

1. ✖ Thrust is less than drag
2. ✖ Vehicle accelerates horizontally only

- 3. ✓ Part of thrust is used to overcome weight
- 4. ✗ Exhaust velocity is reduced

Question Number : 120 Question Id : 1051316480 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A vertical rocket has mass of 10,000 kg, Thrust 150,000 N and Drag 20,000 N. The instantaneous acceleration (in m/s^2) is

Options :

- 1. ✗ 9.5
- 2. ✗ 2.8
- 3. ✓ 3.2
- 4. ✗ 4.0