

Question Paper Preview

Question Paper Name: Aerospace Engineering 11th May 2018 Shift1
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Aerospace Engineering

Display Number Panel: Yes
Group All Questions: No

Question Number : 1 Question Id : 2203604081 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The system $x + 2y = 5, 4x + 8y = 12, 3x + 6y + 3z = 15$ has

Options :

1. No solution
2. A unique solution
3. Finite number of solutions
4. Infinite number of solutions

Question Number : 2 Question Id : 2203604082 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

One solution of the linear system of equations $x + y + z = 6, 2x + 3y - 2z = 2, 5x + y + 2z = 13$ is

Options :

1. $x = 2, y = 1, z = 3$
2. $x = 1, y = 2, z = 3$
3. $x = 1, y = 1, z = 1$
4. $x = 0, y = 4, z = 2$

Question Number : 3 Question Id : 2203604083 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If $\phi(x, y, z)$ is a scalar function and $\nabla\phi$ is the gradient, then the directional derivative in the direction of $\bar{b}$ is given by

Options :

1. $\frac{\nabla\phi.\bar{b}}{|\nabla\phi|}$

2. $\frac{\nabla\phi.\bar{b}}{|\bar{b}|}$

3. $\nabla\phi.$

4. $\bar{b}$

Question Number : 4 Question Id : 2203604084 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If V is the volume enclosed inside the sphere $x^2 + y^2 + z^2 = a^2$ and

$f(x, y, z) = x\bar{i} + y\bar{j} + z\bar{k}$ then $\int_V (\text{Curl } \bar{F}) \cdot d\bar{v} =$

Options :

1. πa^2

2. πa^3

3. $(4/3) \pi a^3$

4. 0

Question Number : 5 Question Id : 2203604085 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If $u(x, y)$ is a real valued function such that $r = \frac{\partial^2 u}{\partial x^2}$, $s = \frac{\partial^2 u}{\partial x \partial y}$ and $t = \frac{\partial^2 u}{\partial y^2}$, then

$u(x, y)$ has a local minimum at a point

Options :

1. $r > 0$ and $rt - s^2 > 0$

2. $r > 0$ and $rt - s^2 < 0$

3. $r = 0$

4. $rt - s^2 = 0$

Question Number : 6 Question Id : 2203604086 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is the wave equation?

Options :

1. $\frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} = 0$

2. $\frac{\partial^2 f}{\partial x^2} = A \frac{\partial f}{\partial t}$

3. $\frac{\partial^2 f}{\partial x^2} = A^2 \frac{\partial^2 f}{\partial t^2}$

4. $\frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} + \frac{\partial^2 f}{\partial z^2} = 0$

Question Number : 7 Question Id : 2203604087 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is the one dimensional wave equation?

Options :

1. $\frac{\partial^2 f}{\partial t^2} = c^2 \frac{\partial^2 f}{\partial x^2}$

2.
$$\frac{\partial f}{\partial t} = c^2 \frac{\partial^2 f}{\partial x^2}$$

3.
$$\frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} = 0$$

4.
$$\frac{\partial f}{\partial t} = c^2 \left(\frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} \right)$$

Question Number : 8 Question Id : 2203604088 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The error involved in Simpson's $\frac{1}{3}$ rule is _____

Options :

1.
$$\frac{-h^3}{12} f''(x)$$

2.
$$\frac{-h^5}{90} f^{iv}(x)$$

3.
$$\frac{-3h^5}{80} f^{iv}(x)$$

4.
$$\frac{-8h^7}{345} f^{vi}(x)$$

Question Number : 9 Question Id : 2203604089 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Taylor's series solution of $y' = -xy, y(0) = 1$ upto x^4 is _____.

Options :

1.
$$y = 1 + x^2 + x^4$$

2. $y = 1 + \frac{x^2}{2} + \frac{x^4}{8}$

3. $y = 1 + \frac{x}{2} - \frac{x^4}{8}$

4. $y = 1 - \frac{x}{2} - \frac{x^4}{8}$

Question Number : 10 Question Id : 2203604090 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The Newton- Raphson interactive formula to find $\sqrt{N}$ is

Options :

1. $x_{n+1} = \frac{1}{2} \left(x_n + \frac{N}{x_n} \right)$

2. $x_{n+1} = \frac{1}{2} \left(x_n - \frac{N}{x_n} \right)$

3. $x_{n+1} = \frac{1}{2} \left(x_n + \frac{1}{Nx_n} \right)$

4. $x_{n+1} = \frac{1}{2} \left(x_n - \frac{1}{Nx_n} \right)$

Question Number : 11 Question Id : 2203604091 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The typical mean temperature _____ with increasing altitude in the stratosphere.

Options :

1. decreases

2. increases

3. remains constant and then increases

4. decreases and then increases

Question Number : 12 Question Id : 2203604092 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The speed of winds in the atmosphere depends strongly on

Options :

1. gradient of speed of wind
2. pressure gradient
3. earth's gravitational pull
4. moon's gravitational pull

Question Number : 13 Question Id : 2203604093 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

At an altitude of 10 Km above sea level, the atmospheric pressure is approximately _____.

Options :

1. $\frac{1}{4}$
2. $\frac{1}{2}$
3. $\frac{1}{3}$
4. $\frac{3}{4}$

Question Number : 14 Question Id : 2203604094 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Clouds that are very thick and extending several kilometers vertically and typically observed below 6 km are known as _____ clouds.

Options :

1. Stratus
2. Cumulus

3. Cirrus

4. Stratocumulus

Question Number : 15 Question Id : 2203604095 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The stratosphere extends upto a height of _____ km.

Options :

1. 10

2. 25

3. 50

4. 75

Question Number : 16 Question Id : 2203604096 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Placing the jet engine at the rear of an airplane

Options :

1. increases the static pitch stability

2. decreases the static pitch stability

3. increases the pitch control

4. decreases the pitch control

Question Number : 17 Question Id : 2203604097 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

An aircraft in flight has _____ degrees of freedom.

Options :

1. two

2. four

3. six

4. eight

Question Number : 18 Question Id : 2203604098 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The climb angle is defined as the angle between _____ and _____ axis.

Options :

1. vertical, body

2. vertical, wind X_s

3. horizontal, body

4. horizontal, wind X_s

Question Number : 19 Question Id : 2203604099 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

An aircraft with VSTOL capability is

Options :

1. F-15

2. Harrier

3. Mig-29

4. Su 30

Question Number : 20 Question Id : 2203604100 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

in a sustained turn of an aircraft, the load factor can be expressed as

Options :

1. $n = \frac{T}{W} \frac{L}{D}$

2.
$$n = \frac{L}{D}$$

3.
$$n = \frac{T}{W}$$

4.
$$n = \frac{T}{W} \frac{D}{L}$$

Question Number : 21 Question Id : 2203604101 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

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

Options :

1. Density meter

2. Machmeter

3. Accelerometer

4. Altitude indicator

Question Number : 22 Question Id : 2203604102 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For the same flight velocity, the Mach number

Options :

1. Decreases with altitude up to 12 km

2. Increases with altitude up to 12 km

3. Remains constant with altitude up to 12 km

4. Decreases with altitude up to 20 km

Question Number : 23 Question Id : 2203604103 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The total weight of a glider is 300 kg and its wing area is 15 m^2 . The wing loading of the glider is

Options :

1. 2 N/m^2
2. 20 N/m^2
3. 200 N/m^2
4. 0.05 N/m^2

Question Number : 24 Question Id : 2203604104 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The instrument used for making a continuous record of temperature is called

Options :

1. Anemometer
2. Barometer
3. Thermograph
4. Hygrometer

Question Number : 25 Question Id : 2203604105 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The ceilometer

Options :

1. measure humidity
2. detects clouds
3. measures temperature

4. measure atmospheric pressure

Question Number : 26 Question Id : 2203604106 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

the point on the airfoil about which the pitching moment remains constant with angle of attack is

Options :

1. center of pressure
2. aerodynamic center
3. quarter-chord point
4. mid-chord point

Question Number : 27 Question Id : 2203604107 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The transient motion involved in the process of recovering equilibrium following a disturbance is described by

Options :

1. Static stability
2. Dynamic stability
3. Trim
4. Controls free motion

Question Number : 28 Question Id : 2203604108 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

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

Options :

1. nose up pitch response
2. nose to the right response

- 3. left wing down response
- 4. right wing down response

Question Number : 29 Question Id : 2203604109 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The sum of forces on an aircraft along the Z_s -axis is (T – Thrust, W = Weight, L = Lift, D = Drag, α = angle of attach, γ = climb angle)

Options :

- 1. $T \cos \alpha - L - W \cos \gamma$
- 2. $T \sin \alpha - L - W \cos \gamma$
- 3. $T \cos \alpha - L - W \sin \gamma$
- 4. $T \sin \alpha - L - W \sin \gamma$

Question Number : 30 Question Id : 2203604110 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The essential requirement for dynamic stability is

Options :

- 1. positive static stability
- 2. a large deflection range of the stabilizer trim
- 3. a small CG range
- 4. effective elevator

Question Number : 31 Question Id : 2203604111 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which motions interact in a Dutch roll?

Options :

Pitch and adverse yaw

1.

Roll and yaw

2.

Pitch and yaw

3.

Pitch and roll

4.

Question Number : 32 Question Id : 2203604112 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The snap roll is initiated by

Options :

rapid application of elevator

1.

rapid application of rudder

2.

slow application of elevator

3.

slow application of rudder

4.

Question Number : 33 Question Id : 2203604113 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The 'short-period mode' is an

Options :

oscillation about the lateral axis

1.

oscillation about the vertical axis

2.

oscillation about the longitudinal axis

3.

oscillation induced by the pilot

4.

Question Number : 34 Question Id : 2203604114 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

An aeroplane that is longitudinally statically unstable is simultaneously dynamically

Options :

1. stable
2. neutral
3. unstable
4. positively stable

Question Number : 35 Question Id : 2203604115 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The contribution of wing dihedral to the directional stability of an aircraft

Options :

1. is stabilizing
2. is destabilizing
3. depends on C.G.
4. depends on wing aerodynamic centre

Question Number : 36 Question Id : 2203604116 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

All central force motion follow

Options :

1. Boyle's law
2. Kepler laws
3. Charles' law
4. Laws of gravitation

Question Number : 37 Question Id : 2203604117 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Trajectory of planetary motion is

Options :

1. circular
2. parabolic
3. hyperbolic
4. elliptic

Question Number : 38 Question Id : 2203604118 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The longitudinal motion of an airplane is characterized by _____ eigenvalues.

Options :

1. 12
2. 3
3. 6
4. 9

Question Number : 39 Question Id : 2203604119 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is not an aeroelastic phenomena?

Options :

1. Torsional divergence
2. Aileron reversal
3. Flutter
4. Drag divergence

Question Number : 40 Question Id : 2203604120 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The 'takeoff flight' do not include the following segment of the aircraft's path

Options :

1. Aircraft's ground roll on the runway
2. Rotation about the rear wheels and being airborne

The climb of the aircraft till the lowest portion of the aircraft has cleared the obstacle height

3.

The climb of the aircraft till the cruise altitude

4.

Question Number : 41 Question Id : 2203604121 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The total drag of an aircraft flying at minimum power conditions in steady level flight is _____% more than the minimum drag.

Options :

1. 10
2. 15
3. 20
4. 25

Question Number : 42 Question Id : 2203604122 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Using the Breguet range equation, 1% reduction in specific fuel consumption results in

Options :

1. 1% increase in range
2. 1% increase in endurance

3. 1% decrease in range

4. 1% decrease in endurance

Question Number : 43 Question Id : 2203604123 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For a symmetric aircraft, using the body fixed coordinate system, which of the following is true?

Options :

1. $I_{xz} \ll I_x, I_y, I_z$

2. $I_{xz} \gg I_x, I_y, I_z$

3. $I_{xz} \cong I_x, I_y, I_z$

4. $I_{xz} = I_{xy}$

Question Number : 44 Question Id : 2203604124 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Expand the abbreviation: STOL

Options :

1. Short Take-Off and Landing

2. Steady Take-Off and Landing

3. Smooth Take-Off and Landing

4. Supersonic Take-Off and Landing

Question Number : 45 Question Id : 2203604125 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

for aircraft capable of thrust vectoring, for maximizing the sustained turn rate the thrust should be aligned at _____ to flight direction.

Options :

1. 0°
2. 30°
3. 60°
4. 90°

Question Number : 46 Question Id : 2203604126 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The first space shuttle was named _____.

Options :

1. Challenger
2. Columbia
3. Atlantis
4. Discovery

Question Number : 47 Question Id : 2203604127 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The first artificial satellite is

Options :

1. Explorer
2. Sputnik
3. Aryabhata
4. GSAT

Question Number : 48 Question Id : 2203604128 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The relative speed of a satellite moving in a circular orbit at a height h above the earth's surface is

Options :

1. $\sqrt{\frac{2gR}{1+\frac{h}{R}}}$

2. $\sqrt{\frac{2gR}{1+\frac{R}{h}}}$

3. $\sqrt{\frac{gR}{1+\frac{h}{R}}}$

4. $\sqrt{\frac{gR}{1+\frac{R}{h}}}$

Question Number : 49 Question Id : 2203604129 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The escape velocity is equal to _____ times the circular velocity.

Options :

1. 2

2. 0.5

3. $1/\sqrt{2}$

4. $\sqrt{2}$

Question Number : 50 Question Id : 2203604130 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For a parabolic trajectory of an unpowered space vehicle around earth, the velocity at the closest point to the earth is

Options :

1. $\sqrt{\frac{GM}{r}}$

2. $\sqrt{\frac{2GM}{r}}$

3. $\sqrt{\frac{3GM}{r}}$

4. $\sqrt{\frac{2GM}{r^2}}$

Question Number : 51 Question Id : 2203604131 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For a satellite moving in an elliptic orbit around earth, the minimum speed will be at the point

Options :

1. farthest from the earth
2. on the semi-minor axis
3. on the ellipse making 135° with the apogee
4. closest to the earth

Question Number : 52 Question Id : 2203604132 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The point on an elliptical trajectory which is closest to the earth is called

Options :

1. Focus
2. Center
3. Perigee

Apogee

4.

Question Number : 53 Question Id : 2203604133 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Vorticity is defined as

Options :

1. $\nabla \times V$

2. $\nabla \cdot V$

3. $\nabla \times \nabla \times V$

4. $V \times V$

Question Number : 54 Question Id : 2203604134 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The location of the center of the sun in trajectory followed by the planets is at

Options :

1. the perigee

2. the apogee

3. co-vertex

4. focus

Question Number : 55 Question Id : 2203604135 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The eccentricity of a hyperbolic orbit is

Options :

1. zero

2. greater than 0 and less than 1

3. 1

4. greater than 1

Question Number : 56 Question Id : 2203604136 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The Reynolds number is physically a measure of the ratio of

Options :

1. inertial and surface tension forces
2. inertial and body forces
3. inertial and viscous forces
4. inertial and buoyancy forces

Question Number : 57 Question Id : 2203604137 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A flow that is assumed to involve no friction, thermal conduction or diffusion is called

Options :

1. Incompressible flow
2. Inviscid flow
3. Potential flow
4. Laminar flow

Question Number : 58 Question Id : 2203604138 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A higher altitude at a constant mass and Mach number requires

Options :

1. a lower C_d
2. a lower angle of attack
3. a higher angle of attack

4. a lower C_1

Question Number : 59 Question Id : 2203604139 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The position at which it is assumed that the total lift acts is the

Options :

1. aerodynamic centre

2. CG

3. neutral point

4. CP

Question Number : 60 Question Id : 2203604140 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The velocity profile for the laminar flow through a circular duct is

Options :

1. top hat

2. paraboloid of revolution

3. hemispherical shape

4. hemielliptical shape

Question Number : 61 Question Id : 2203604141 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The mass flow rate across a streamtube is

Options :

1. zero

2. positive

3. negative

4. proportional to density and local flow speed

Question Number : 62 Question Id : 2203604142 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The stagnation state is achieved by bringing the fluid to rest by _____ process.

Options :

1. isothermal
2. isentropic
3. adiabatic
4. polytropic

Question Number : 63 Question Id : 2203604143 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

NACA is the abbreviation for

Options :

1. National Aerospace Committee of America
2. National Aeronautics Committee of America
3. National American Committee for Aeronautics
4. National Advisory Committee for Aeronautics

Question Number : 64 Question Id : 2203604144 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is not a high-lift device?

Options :

1. Rudder
2. Flap
3. Slat

4. Slot

Question Number : 65 Question Id : 2203604145 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The height of the airfoil measured perpendicular to the chord line is known as

Options :

1. Thickness
2. Camber
3. Chord
4. Span

Question Number : 66 Question Id : 2203604146 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The aerodynamic force acting on the airfoil is independent of

Options :

1. Density
2. Mach number
3. Reynolds number
4. Acceleration due to gravity

Question Number : 67 Question Id : 2203604147 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In the aerodynamic analysis of airfoil, which of the following relations is not of fundamental importance?

Options :

1. C_l versus α
2. C_m versus α

3. C_l versus C_d

4. C_m versus Re

Question Number : 68 Question Id : 2203604148 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The plot between c_l and c_d is known as

Options :

1. V-n diagram

2. Drag polar

3. Flight envelope

4. Lift curve

Question Number : 69 Question Id : 2203604149 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For the incompressible flow past a 2D airfoil, c_p at the stagnation point is

Options :

1. -1

2. 0

3. 1

4. ∞

Question Number : 70 Question Id : 2203604150 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In a turbulent wall flow, the region where the viscous and Reynolds shear stresses are equal in magnitude is known as

Options :

1. Viscous sublayer

2. Log layer

3. Buffer layer
4. Laminar layer

Question Number : 71 Question Id : 2203604151 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In the viscous sublayer within a turbulent boundary layer, the velocity is

Options :

1. Equal to the mean velocity
2. Increases linearly with wall normal distance
3. Increases exponentially with wall normal distance
4. Increases logarithmically with wall normal distance

Question Number : 72 Question Id : 2203604152 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is a turbulence model used in aerodynamic calculation of turbulent flows?

Options :

1. Cebeci-Smith
2. Newton-Chebeski
3. Goldwin-Lomax
4. Euler-Bernoulli

Question Number : 73 Question Id : 2203604153 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The proportion of the time the flow is turbulent is known as

Options :

1. Stability
2. Entrainment

3. Intermittency

4. transition

Question Number : 74 Question Id : 2203604154 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Pitot-static tube measures

Options :

1. only static pressure

2. only dynamic pressure

3. both static pressure and stagnation pressure

4. both static pressure and dynamic pressure

Question Number : 75 Question Id : 2203604155 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Smoke visualization cannot be used to observe

Options :

1. streamlines over a airfoil

2. shocks over an airfoil

3. separation over an airfoil

4. vortices over an airfoil

Question Number : 76 Question Id : 2203604156 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

When measuring the pressure distribution over a cylinder, the maximum pressure is felt at

Options :

1. the point right on top of the cylinder

2. the point right at the bottom of the cylinder
3. the point right at the front of the cylinder
4. the point right at the back of the cylinder

Question Number : 77 Question Id : 2203604157 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The experimental pressure distribution on a symmetric airfoil at zero angle of attack does not result in

Options :

1. zero drag
2. zero lift
3. zero moment about the center of pressure
4. zero moment about the aerodynamic center

Question Number : 78 Question Id : 2203604158 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

An inclined manometer is used

Options :

1. to ensure the manometric liquid does not overflow
2. when the manometer cannot be set straight
3. to obtain magnification of the movement of the meniscus
4. to consider effects of gravity

Question Number : 79 Question Id : 2203604159 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The drag that occurs due to separation of flow is

Options :

1. profile drag

2. skin-friction drag

3. induced drag

4. pressure drag

Question Number : 80 Question Id : 2203604160 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The flow entering the test section is desired to be

Options :

1. laminar

2. turbulent

3. unsteady

4. cross flow

Question Number : 81 Question Id : 2203604161 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Across an expansion wave, which of the following is true?

Options :

1. Velocity increases and total pressure decreases

2. Velocity decreases and entropy remains same

3. Entropy increases and total pressure remains same

4. Velocity increases and entropy remains same

Question Number : 82 Question Id : 2203604162 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The freestream Mach number at which the entire flow around the body reaches the speed of sound but does not exceed it is called as _____.

Options :

1. lower critical Mach number
2. upper critical Mach number
3. drag divergence Mach number
4. characteristic Mach number

Question Number : 83 Question Id : 2203604163 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Rankine vortex is a combination of _____.

Options :

1. source and vortex
2. sink and vortex
3. vortex and doublet
4. free and forced vortex

Question Number : 84 Question Id : 2203604164 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A pitot static tube is used to measure the velocity in a wind tunnel. If the pressure difference across the pitot static tube is 10 cm of water, what is the airspeed at the test section?

Options :

1. 10 m/s
2. 20 m/s
3. 30 m/s
4. 40 m/s

Question Number : 85 Question Id : 2203604165 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If the highest speed attainable at the cross section of a low speed wind tunnel is 20 m/s, what will be the speed achieved if the cross sectional area of the test section is reduced by half?

Options :

1. 40 m/s
2. 20 m/s
3. 10 m/s
4. 5 m/s

Question Number : 86 Question Id : 2203604166 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is not an objective of operational test and evaluation?

Options :

1. Establish aircraft's operational effectiveness
2. Identify needed modifications
3. Provide information on personnel requirements
4. Determine the installed thrust of the engine

Question Number : 87 Question Id : 2203604167 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

To reduce the pressure lag error in pitot-static probe, which of the following options is best?

Options :

1. Increase line lengths
2. Decrease line lengths
3. Decrease tube diameter

4. Increase the number of bends in the lines

Question Number : 88 Question Id : 2203604168 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In a supersonic wind tunnel, which of the following sequences does the flow follow?

Options :

1. Nozzle-test section- diffuser
2. Diffuser- test section- nozzle
3. Test section – diffuser – nozzle
4. Test section – nozzle - diffuser

Question Number : 89 Question Id : 2203604169 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Hot wire Anemometer is suitable for _____ flow regimes.

Options :

1. low subsonic
2. high subsonic
3. transonic
4. supersonic

Question Number : 90 Question Id : 2203604170 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In Schlieren system for flow visualization, a knife-edge is used

Options :

1. in the test section
2. immediately next to the light source
3. at the focal point of the first lens

at the focal point of the second lens

4.

Question Number : 91 Question Id : 2203604171 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Fatigue characteristics of materials are presented using

Options :

1. stress-strain curves
2. strain-time curve
3. stress-time curve
4. S/N curve

Question Number : 92 Question Id : 2203604172 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The maximum stress attained on the stress-strain curve is known as

Options :

1. yield stress
2. elastic limit
3. proportional limit
4. ultimate tensile stress

Question Number : 93 Question Id : 2203604173 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Steels can be softened by

Options :

1. cold working
2. heat treating
3. annealing

4. ageing

Question Number : 94 Question Id : 2203604174 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

_____ is generally used as a criterion of the stiffness of the material for structural design.

Options :

1. Fracture toughness
2. Young's modulus
3. Ultimate tensile stress
4. Yield stress

Question Number : 95 Question Id : 2203604175 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Temperature above room temperature causes

Options :

1. decrease in strength properties in metallic alloys
2. increase in strength properties in metallic alloys
3. no effect in strength properties in metallic alloys
4. marginal effect in strength properties in metallic alloys

Question Number : 96 Question Id : 2203604176 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The ratio of total stress to total strain at any value of strain is known as

Options :

1. Young's modules
2. modulus of rigidity

3. tangent modulus

4. Secant modulus

Question Number : 97 Question Id : 2203604177 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following statements is false?

Options :

1. For a statically determinate system, the internal forces are determined uniquely by static equilibrium conditions.

2. For a statically indeterminate system, the internal forces are determined uniquely by static equilibrium conditions.

3. For a statically indeterminate system, the internal forces satisfy the conditions of compatibility of displacement of elastic structure.

4. For a statically indeterminate system, the total complementary energy has a stationary value at equilibrium.

Question Number : 98 Question Id : 2203604178 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The slenderness ratio of a column is defined as the ratio of

Options :

1. length of radius of curvature of column.

2. radius of curvature to length of the column.

3. radius of gyration to length of the column.

4. length of the column to radius of gyration.

Question Number : 99 Question Id : 2203604179 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For a rectangular plate, simply supported along all edges, in compression, the number of half waves formed in a direction perpendicular to the direction of loading is

Options :

1. zero
2. one
3. two
4. three

Question Number : 100 Question Id : 2203604180 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The product of limit load and ultimate factor is called

Options :

1. proof load
2. ultimate load
3. proof factor
4. service load

Question Number : 101 Question Id : 2203604181 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following creep is/are of longest duration?

Options :

1. Primary creep only
2. Secondary creep only
3. Tertiary creep only
4. Primary and tertiary creep

Question Number : 102 Question Id : 2203604182 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If the applied load passes through the shear centre of the section of the beam, then there will be _____.

Options :

1. bending occurs without twisting
2. twisting occurs without bending
3. both bending and twisting occurs
4. neither bending nor twisting occurs

Question Number : 103 Question Id : 2203604183 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is the fundamental equation of simple harmonic motion?

Options :

1. $x + (k/m)x = 0$
2. $x + \omega^2 x = 0$
3. $x + (k/m)^2 x = 0$
4. $x^2 + \omega x^2 = 0$

Question Number : 104 Question Id : 2203604184 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The strain energy of a system is defined as $\int_0^y P dy$, where P is the load and y is the deflection. Then the complementary energy is defined as

Options :

1. $\int_0^y \frac{1}{P} dy$
2. $\int_0^y (1 - P) dy$

3. $\int_0^P y dP$

4. $\int_0^P (1 - y) dP$

Question Number : 105 Question Id : 2203604185 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The modulus of volume expansion is related to Young's modulus as

Options :

1. $K = \frac{E}{3(1-2\nu)}$

2. $K = \frac{E}{3(1+2\nu)}$

3. $K = \frac{E}{(1-2\nu)}$

4. $K = \frac{E}{2(1-2\nu)}$

Question Number : 106 Question Id : 2203604186 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

From the theory of the torsion of circular section bars, the shear stress on the cross section is given by

Options :

1. $\frac{Tr}{2J}$

2. $\frac{Tr}{\pi J}$

3. $\frac{Tr}{J}$

$$\frac{T}{rJ}$$

Question Number : 107 Question Id : 2203604187 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For an isotropic material, the principal planes of stress and strains

Options :

1. are at 0° to each other
2. are at 30° to each other
3. are at 45° to each other
4. are at 60° to each other

Question Number : 108 Question Id : 2203604188 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The two principal planes of stress are oriented at ____ to each other.

Options :

1. 30°
2. 45°
3. 60°
4. 90°

Question Number : 109 Question Id : 2203604189 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The specific impulse for a rocket is defined as

Options :

1. the thrust per unit of propellant weight flow
2. the power per unit of propellant weight flow

3. the thrust times the velocity of the rocket

4. the thrust developed per unit time

Question Number : 110 Question Id : 2203604190 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following relations is false?

Options :

1.
$$c_p = \frac{\gamma R}{\gamma - 1}$$

2.
$$c_v = \frac{R}{\gamma - 1}$$

3.
$$c_p = \frac{R}{\gamma - 1}$$

4.
$$c_p - c_v = R$$

Question Number : 111 Question Id : 2203604191 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For a gas to be calorically perfect

Options :

1.
$$\gamma = 1.4$$

2. c_p and c_v are constants

3. it should obey ideal gas equation

4. it should obey van Der Waal's equation

Question Number : 112 Question Id : 2203604192 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In a convergent divergent nozzle operating under perfectly expanded condition

Options :

1. the Mach number of the flow increases along the duct
2. the Mach number of the flow decreases along the duct
3. the Mach number of the flow increases till the throat and then decreases
4. the Mach number of the flow decreases till the throat and then increases

Question Number : 113 Question Id : 2203604193 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The advantage of a bell nozzle in comparison to a conical nozzle is

Options :

1. better performance at lower altitudes
2. shorter length
3. ease of manufacturing
4. cost saving

Question Number : 114 Question Id : 2203604194 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

At the nozzle design altitude,

Options :

1. the chamber pressure is equal to the ambient pressure
2. the exit pressure is equal to the ambient pressure
3. the chamber pressure is less than the ambient pressure
4. the exit pressure is less than the ambient pressure

Question Number : 115 Question Id : 2203604195 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Rotating stall refers to the non-axisymmetric flow that moves around the annulus of the compressor, whereas the surge is

Options :

1. radial oscillation of the flow
2. axial oscillation of the flow
3. circumferential oscillation
4. axisymmetric oscillations

Question Number : 116 Question Id : 2203604196 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Inlet distortions and power transients are the main causes of

Options :

1. only surge
2. only stall
3. both surge and stall
4. failure of axial compressor

Question Number : 117 Question Id : 2203604197 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Liaw and Abed proposed a control law that modifies the throttle characteristics, the practical replacement of this law in compressor operation is

Options :

1. blades
2. spools
3. modeler
4. bleed valve

The ratio of available KE after diffusion to available KE before diffusion is known as

Options :

1. KE efficiency
2. KE effectiveness
3. diffuser efficiency
4. jet efficiency

The vortex propagator downstream the ram jet, releasing energy at a rate that reaches maximum when the vortex impinges on the wall of the chamber. In this case,

Options :

1. the propagation rate and strength of the vortex must increase with frequency.
2. the propagation rate and strength of the vortex must decrease with frequency.
3. the propagation rate and strength of the vortex must remain constant with frequency.
4. the propagation rate and strength of the vortex has no effect with frequency.

The mechanism for the instability is associated with vortex shedding and periodic pulses of energy released by combustion in the vortices and

Options :

1. the velocity fluctuation
2. the pressure fluctuation

3. density fluctuation

4. nothing else