Telangana State Council Higher Education

Notations :

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

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

Question Paper Name :	Aerospace Engineering 24th Sept 2020 Shift 2
Subject Name :	Aerospace Engineering
Creation Date :	2020-09-24 17:57:42
Duration :	120
Total Marks :	120
Display Marks:	No
Share Answer Key With Delivery Engine :	Yes
Actual Answer Key :	Yes
Calculator :	None
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console? :	Yes

Aerospace Engineering

Group Number :	1
Group Id :	88039699
Group Maximum Duration :	0
Group Minimum Duration :	120
Show Attended Group? :	No

Edit Attended Group? :	No
Break time :	0
Group Marks :	120
Is this Group for Examiner? :	No

Mathematics

Section Id :	880396181
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	10
Section Marks :	10
Display Number Panel :	Yes
Group All Questions :	Yes
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	880396181
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 88039611761 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $A=\begin{pmatrix} 1 & 0 & -1 \\ -1 & 1 & 0 \\ 0 & 1 & -1 \end{pmatrix}$, then $A^3=$

Options :

88039647041. ✔ A^2+A

88039647042. ✖ A^2-A

88039647043. ✖ $2A^2+A$

88039647044. ✖ $2A^2 - A$

Question Number : 2 Question Id : 88039611762 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The number of solutions of the system of equations

$2x - y + z = 4$
$x + y - z = 6$
$x - y + z = 12$ is

Options :

88039647045. ✔ 0

88039647046. ✖ 1

88039647047. ✖ 2

88039647048. ✖ infinite

Question Number : 3 Question Id : 88039611763 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

If $f(x) = 6x^3 - 7x^2 + 2x$, $x \in \left[\frac{1}{2}, \frac{2}{3}\right]$, then the point 'P' on $y = f(x)$ at which the tangent has slope zero, has abscissa equal to

Options :

88039647049. ✖ $\frac{7-\sqrt{13}}{18}$

88039647050. ✔ $\frac{7+\sqrt{13}}{18}$

88039647051. ✖ $\frac{7+\sqrt{13}}{9}$

88039647052. ✖ $\frac{7-\sqrt{13}}{9}$

Question Number : 4 Question Id : 88039611764 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Divergence of $(y - e^x, \sin(x^2))$ is

Options :

88039647053. ✖ 0

88039647054. ✖ e^x

88039647055. ✔ $-e^x$

88039647056. ✖ $\sin(x^2)$

Question Number : 5 Question Id : 88039611765 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$$\int_1^3 \int_1^4 \cos(x^2)\, xy \, dy \, dx =$$

Options :

88039647057. ✔ $\frac{15}{4}(\sin 9 - \sin 1)$

88039647058. ✖ $\frac{15}{2}(\sin 9 - \sin 1)$

88039647059. ✖ $\frac{15}{4}(\sin 9 + \sin 1)$

88039647060. ✖ $\frac{15}{2}(\sin 9 + \sin 1)$

Question Number : 6 Question Id : 88039611766 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Curl $(x - e^{2y}, x\cos(y^2), -xy + z^2)$ is $(f(x), y, \cos(y^2) + 2e^{2y})$ where $f(x)$

Options :

88039647061. ✔ $-x$

88039647062. ✖ x

88039647063. ✖ $-2x$

88039647064. ✖ $2x$

Question Number : 7 Question Id : 88039611767 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Particular integral of $y'' + y' = x^2 + x$, then y_p is

Options :

88039647065. ✖ $\frac{x^3}{3} - \frac{x^2}{2}$

88039647066. ✔ $\frac{x^3}{3} - \frac{x^2}{2} + x$

88039647067. ✖ $\frac{x^3}{3} + \frac{x^2}{2}$

88039647068. ✖ $\frac{x^3}{3}+\frac{x^2}{2}+x$

Question Number : 8 Question Id : 88039611768 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$y = a\cos(2x) + b\sin 2x - \frac{x}{4}cox\ 2x$, then $y'' + 4y$ *is*

Options :

88039647069. ✖ $\frac{1}{2}\cos(2x)$

88039647070. ✖ $\frac{1}{2}\sin(2x)$

88039647071. ✔ $\sin(2x)$

88039647072. ✖ $\cos(2x)$

Question Number : 9 Question Id : 88039611769 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

$z = f(x+y) + g(x-y) \Rightarrow \frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial y^2} =$

Options :

88039647073. ✖ 3z

88039647074. ✖ z

88039647075. ✖ 2z

88039647076. ✔ 0

Question Number : 10 Question Id : 88039611770 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Integrating $\sin(x)$ over $[0, 3]$, using trapezoidal rule with 3 intervals we have where $f(n)=$

Options :

88039647077. ✖ $\cos(n) + \cos(1+n)$

88039647078. ✖ $\sin(n) + \sin(n-1)$

88039647079. ✔ $\sin(n) + \sin(1+n)$

88039647080. ✖ $\sin(n+2) + \sin n$

Aerospace Engineering

Section Id :	880396182
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory

Number of Questions :	110
Number of Questions to be attempted :	110
Section Marks :	110
Display Number Panel :	Yes
Group All Questions :	Yes
Mark As Answered Required? :	Yes
Sub-Section Number :	1
Sub-Section Id :	880396182
Question Shuffling Allowed :	Yes

Question Number : 11 Question Id : 88039611771 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Select the right condition for maximum range in gliders.

Options :

88039647081. ✖ $R_{max} = L \times (D/h)_{max}$

88039647082. ✖ $R_{max} = L \times (h/D)_{min}$

88039647083. ✔ $R_{max} = h \times (L/D)_{max}$

88039647084. ✖ $R_{max} = h_{max} \times (L/D)$

Question Number : 12 Question Id : 88039611772 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The downward deflection of the plain flap at trailing edge, a sudden increase in the lift coefficient occurs due to:

Options :

88039647085. ✖ Decrease in the effective camber of the airfoil

88039647086. ✖ Decrease in the local airspeed near the trailing edge

88039647087. ✔ Increase in the effective camber of the airfoil

88039647088. ✖ Increase in the boundary layers thickness near the airfoil surface

Question Number : 13 Question Id : 88039611773 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

For an aircraft, which is climbing up in the vertical direction, the lift is

Options :

88039647089. ✖ same as the thrust

88039647090. ✖ same as the weight

88039647091. ✔ zero

88039647092. ✖ same as the draft

Question Number : 14 Question Id : 88039611774 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Artificial horizon is a type of flight instrument used on an aircraft, to find

Options :

88039647093. ✔ Orientation change

88039647094. ✖ Altitude

88039647095. ✖ Speed

88039647096. ✖ Temperature

Question Number : 15 Question Id : 88039611775 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For any stationary aircraft at its own hanger, the vertical ground load factor is

Options :

88039647097. ✔ 1

88039647098. ✖ -1

88039647099. ✖ 0.5

88039647100. ✖ 0

Question Number : 16 Question Id : 88039611776 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider a low speed aircraft is flying to maintain a steady level flight with minimum thrust required. For this aircraft, if $C_L = 0.7$, $C_D = 0.018$ and $e = 1$, then the aspect ratio of wings is nearly equal to:

Options :

88039647101. ✖ 6.23

88039647102. ✖ 18.35

88039647103. ✖ 7.25

88039647104. ✔ 8.66

Question Number : 17 Question Id : 88039611777 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

During hot summer days, an aircraft is needed to have a longer ground roll to lift-off because

Options :

88039647105. ✖ friction will be maximum in summer

88039647106. ✖ drag will be higher in summer

88039647107. ✔ thrust is directly proportional to the freestream density

88039647108. ✖ lift will be low in summer

Question Number : 18 Question Id : 88039611778 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For an aircraft, which is having a maximum lift to drag ratio of 25 and gliding at an altitude of 9 km, the maximum glide range is:

Options :

88039647109. ✖ 105 km

88039647110. ✖ 395 km

88039647111. ✖ 625 km

88039647112. ✔ 225 km

Question Number : 19 Question Id : 88039611779 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

During steady climbing with specified forward speed, the drag on an aircraft

Options :

88039647113. ✖ depends on the climb angle

88039647114. ✖ is directly proportional to the climb angle

88039647115. ✔ is lower than the drag in steady level flight

88039647116. ✖ is independent of the climb angle

Question Number : 20 Question Id : 88039611780 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In trimmed condition, aircraft has zero pitching moment at its:

Options :

88039647117. ✖ Trailing edge

88039647118. ✖ Leading edge

88039647119. ✔ Centre of gravity

88039647120. ✖ Aerodynamic centre

Question Number : 21 Question Id : 88039611781 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For an airfoil, critical Mach number is attained when,

Options :

88039647121. ✖ The Mach number somewhere on the airfoil is subsonic

88039647122. ✖ The Mach number somewhere on the airfoil is supersonic

88039647123. ✔ The Mach number somewhere on the airfoil is unity

88039647124. ✖ The Mach number of free stream is sonic

Question Number : 22 Question Id : 88039611782 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An aircraft has the gross weight of 9000 N and wing area 25 m^2. If the maximum lift coefficient is 2 and the density of the air at the flying altitude is 1.2 kg/m^3, the stall speed will be (approximately)?

Options :

88039647125. ✖ 10 m/s

88039647126. ✖ 14 m/s

88039647127. ✔ 17 m/s

88039647128. ✖ 20 m/s

Question Number : 23 Question Id : 88039611783 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For an aircraft operation, which of the following conditions are favourable?

Options :

88039647129. ✔ Head wind during landing phase and tail wind during cruising phase

88039647130. ✖ Tail wind during both landing and cruising phases

88039647131. ✖ Head wind during both landing and cruising phases

88039647132. ✖ Head wind during cruising phase and tail wind during landing phase

Question Number : 24 Question Id : 88039611784 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the supersonic airfoil, with chord length C, the aerodynamic centre is located at

Options :

88039647133. ✖ 0.1 C

88039647134. ✖ 0.2 C

88039647135. ✖ 0.4 C

88039647136. ✔ 0.5 C

Question Number : 25 Question Id : 88039611785 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The conventional altimeter is a

Options :

88039647137. ✖ Density transducer

88039647138. ✖ Temperature transducer

88039647139. ✔ Pressure transducer

88039647140. ✖ Velocity transducer

Question Number : 26 Question Id : 88039611786 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The dive manoeuvre can be initiated for an aircraft by

Options :

88039647141. ✖ Increasing the angle of attack

88039647142. ✖ Decreasing the angle of attack

88039647143. ✔ Generating a nose down pitch rate

88039647144. ✖ Decreasing the engine thrust

Question Number : 27 Question Id : 88039611787 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following remain unchanged in cruise climb of an aircraft

Options :

88039647145. ✖ The altitude and lift coefficient

88039647146. ✖ The equivalent air speed and altitude

88039647147. ✔ The equivalent air speed and lift coefficient

88039647148. ✖ The lift coefficient and aircraft mass

Question Number : 28 Question Id : 88039611788 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For an aircraft weighing 40000 N the available excess power is 2×10^6 Watt. The steady rate of climb will be

Options :

88039647149. ✖ 0.01 m/s

88039647150. ✖ 0.02 m/s

88039647151. ✔ 50 m/s

88039647152. ✖ 100 m/s

Question Number : 29 Question Id : 88039611789 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

For NACA 24012 airfoil, the maximum thickness in % is given by

Options :

88039647153. ✖ 0.04

88039647154. ✖ 0.06

88039647155. ✖ 0.14

88039647156. ✔ 0.12

Question Number : 30 Question Id : 88039611790 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

An aircraft is taking a coordinated turn manoeuvre at a bank angle of 45^0, with forward velocity of 150 m/s. What is the load factor and corresponding turn radius?

Options :

88039647157. ✖ 1.41 and 0.015 km

88039647158. ✔ 1.41 and 2.25 km

88039647159. ✖ 1.0 and 2.5 km

88039647160. ✖ 2.0 and 0.015 km

Question Number : 31 Question Id : 88039611791 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a semi-monocoque construction of an aircraft wing, the skin and spar webs are the primary carriers of

Options :

88039647161. ✖ shear stresses due to an aerodynamic moment component alone.

88039647162. ✔ shear stresses due to aerodynamic forces and a moment component.

88039647163. ✖ shear stresses due to aerodynamic forces alone.

88039647164. ✖ normal (bending) stresses due to aerodynamic forces.

Question Number : 32 Question Id : 88039611792 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Buckling of the fuselage skin can be delayed by:

Options :

88039647165. ✖ Reducing skin thickness.

88039647166. ✖ Placing stiffeners farther apart.

88039647167. ✔ Increasing internal pressure.

88039647168. ✖ Placing stiffeners farther and decreasing internal pressure.

Question Number : 33 Question Id : 88039611793 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The governing equation for the static transverse deflection of a beam under a uniformly distributed load, according to Euler-Bernoulli beam theory, is a

Options :

88039647169. ✖ 2^{nd} order linear non-homogeneous ordinary differential equation

88039647170. ✖ 2^{nd} order linear homogeneous partial differential equation

88039647171. ✔ 4^{th} order linear non-homogeneous ordinary differential equation

88039647172. ✖ 4^{th} order non-linear homogeneous ordinary differential equation

Question Number : 34 Question Id : 88039611794 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Poisson's ratio $'\nu'$ of most aircraft grade metallic alloys has values in the range of

Options :

88039647173. ✖ $0 \leq \nu \leq 0.2$

88039647174. ✖ $-1 \leq \nu \leq 0$

88039647175. ✔ $0.2 \leq \nu \leq 0.4$

88039647176. ✖ $0.4 \leq \nu \leq 0.5$

Question Number : 35 Question Id : 88039611795 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the absence of body moments, the symmetry of the stress tensor is derived from

Options :

88039647177. ✖ Compatibility conditions

88039647178. ✖ Linear relations between stresses and strains

88039647179. ✔ Moment equilibrium conditions

88039647180. ✖ Force equilibrium conditions

Question Number : 36 Question Id : 88039611796 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a 3-D orthotropic material, the number of independent elastic constants in linear stress-strain relationship is

Options :

88039647181. ✖ 21

88039647182. ✖ 5

88039647183. ✖ 3

88039647184. ✔ 9

Question Number : 37 Question Id : 88039611797 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The compatibility conditions in theory of elasticity ensures that

Options :

88039647185. ✔ Displacements are single-valued and continuous

88039647186. ✖ Stresses satisfy bi-harmonic equation

88039647187. ✖ Relationships between stresses and strains are consistent with constitutive relations

88039647188. ✖ There is compatibility between various direct and shear stresses

Question Number : 38 Question Id : 88039611798 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

A statically indeterminate frame structure has

Options :

88039647189. ✔ Number of joint degrees of freedom less than the number of equilibrium equations

88039647190. ✖ Same number of joint degrees of freedom as the number of equilibrium equations

88039647191. ✖ Number of joint degrees of freedom greater than the number of equilibrium equations

88039647192. ✖ Unknown number of joint degrees of freedom, which cannot be solved using laws of mechanics

Question Number : 39 Question Id : 88039611799 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Assuming that the aircraft is flying straight, the top spar cap/flange of a wing is most likely to fail by

Options :

88039647193. ✔ Buckling

88039647194. ✖ Crushing

88039647195. ✖ Creep

88039647196. ✖ Yielding

Question Number : 40 Question Id : 88039611800 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

A flow field has the following stream function and velocity potential,

$$\Psi = (x^2 - y^2)$$

$$\Phi = (x^3 + y^3)$$

Which of the following statements is correct?

Options :

88039647197. ✖ Flow is incompressible and irrotational

88039647198. ✖ Flow is incompressible and rotational

88039647199. ✔ Flow is compressible and irrotational

88039647200. ✖ Flow is compressible and rotational

Question Number : 41 Question Id : 88039611801 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Consider the following

I. Pathline

II. Streakline

III. Streamline

Which of the above concepts are REAL in nature?

Options :

88039647201. ✖ I only

88039647202. ✔ I and II

88039647203. ✖ II and III

88039647204. ✖ I and III

Question Number : 42 Question Id : 88039611802 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Consider the following statements:

I. A perfect gas must be both thermally and calorically perfect

II. A calorically perfect gas must be thermally perfect.

III. A thermal perfect gas must be calorically perfect.

Which of the following is true?

Options :

88039647205. ✖ I only

88039647206. ✔ Both, I and II

88039647207. ✖ Both, I and III

88039647208. ✖ I,II and III are correct

Question Number : 43 Question Id : 88039611803 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The **free molecular flow** is the regime in which the fluid molecules are so widely dispersed that the intermolecular forces can be neglected. This situation is best described by which of the following range of **Knudsen number** (Kn)?

Options :

88039647209. ✖ $\mathrm{Kn} < 0.01$

88039647210. ✖ $0.01 < Kn < 0.1$

88039647211. ✖ $0.1 < Kn < 5$

88039647212. ✔ $\mathrm{Kn} > 5$

Question Number : 44 Question Id : 88039611804 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If 'ρ' is the measured density around the airplane and 'ρ_S' is the standard sea-level density then which of the following is TRUE for air-speeds of an aircraft?

Options :

88039647213. ✖ $V_{true} = V_{equivalent}\sqrt{\frac{\rho}{\rho_S}}$

88039647214. ✔ $V_{equivalent} = V_{true}\sqrt{\frac{\rho}{\rho_S}}$

88039647215. ✖ $V_{equivalent} = V_{true}\sqrt{\rho} \times \sqrt{\rho_S}$

88039647216. ✖ $V_{true} = V_{equivalent}\frac{\rho}{\rho_S}$

Question Number : 45 Question Id : 88039611805 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Which of the following is the CORRECT combination of green-house gases?

Options :

88039647217. ✔ Carbon-dioxide, Methane, Nitrous Oxide, Ozone, and Water vapour

88039647218. ✖ Oxygen, Methane, Nitrous Oxide, Ozone, and Water vapour

88039647219. ✖ Carbon-dioxide, Hydrogen, Nitrous Oxide, and Ozone.

88039647220. ✖ Oxygen, Hydrogen, Sulphur-dioxide, and Ozone.

Question Number : 46 Question Id : 88039611806 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For an aircraft engine, propulsive efficiency is also known as:

Options :

88039647221. ✖ Brayton efficiency

88039647222. ✖ Reynolds efficiency

88039647223. ✖ Weber efficiency

88039647224. ✔ Froude efficiency

Question Number : 47 Question Id : 88039611807 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For jet engines with reheat or after burning:

Options :

88039647225. ✖ Fuel consumption would be low, but SFC would be high.

88039647226. ✖ Fuel consumption would be high, but SFC would be low.

88039647227. ✖ Both fuel consumption and SFC would be low.

88039647228. ✔ Both fuel consumption and SFC would be high.

Question Number : 48 Question Id : 88039611808 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question

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

Which of the following is considered as the standard fixed point in thermometry?

Options :

88039647229. ✖ Freezing point

88039647230. ✖ Boiling point

88039647231. ✔ Triple point of water

88039647232. ✖ At absolute zero temperature

Question Number : 49 Question Id : 88039611809 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Consider the following statements.

I. A real gas behaves as an ideal gas at low pressure and high temperature.

II. A real gas behaves as an ideal gas at high pressure and low temperature.

III. The dissociation of oxygen begins approximately at 4000 K.

IV. The dissociation of nitrogen completes around 9000 K.

Which of the above is/are correct?

Options :

88039647233. ✖ I only

88039647234. ✖ I, III and IV

88039647235. ✔ I and IV

88039647236. ✖ II, III and IV

Question Number : 50 Question Id : 88039611810 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following has the highest specific impulse?

Options :

88039647237. ✖ Solid rocket motor

88039647238. ✖ Liquid rocket motor

88039647239. ✖ Ramjet engine

88039647240. ✔ Cryogenic engine

Question Number : 51 Question Id : 88039611811 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Interferometry is an optical diagnostic technique which is sensitive to changes of the

Options :

88039647241. ✔ Refractive index of the medium.

88039647242. ✖ First derivative of the fluid density.

88039647243. ✖ First derivative of the fluid density and second derivative of the refractive index of the medium.

First derivative of the refractive index of the medium and second derivative of the fluid density.

88039647244. ✖

Question Number : 52 Question Id : 88039611812 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In pulsejet type propulsion engines, combustion occurs in an enclosed chamber and is approximately an:

Options :

88039647245. ✖ Isobaric process

88039647246. ✔ Isochoric process

88039647247. ✖ Isothermal process

88039647248. ✖ Isentropic process

Question Number : 53 Question Id : 88039611813 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Angle of attack (α) for an airfoil is defined as the angle between

Options :

88039647249. ✖ Lift and drag forces

88039647250. ✖ Lift and chord

88039647251. ✔ Freestream velocity and chord

88039647252. ✖ Freestream velocity and drag

Question Number : 54 Question Id : 88039611814 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Sutherland's law relates the coefficient of viscosity for a fluid with

Options :

88039647253. ✖ Pressure

88039647254. ✖ Density

88039647255. ✖ Entropy

88039647256. ✔ Temperature

Question Number : 55 Question Id : 88039611815 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

For an aircraft in horizontal and steady flight, which of the following relations is true

(L : lift, D : Drag, W: Weight, T:Thrust)

Options :

88039647257. ✖ L = D = W =T

88039647258. ✖ L =D, T =W

88039647259. ✔ L=W, T=D

88039647260. ✖ L = D + T

Question Number : 56 Question Id : 88039611816 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider the flow of air through a wind tunnel. At a point in the flow, the static pressure is $10^5\,\mathrm{N/m^2}$, temperature is 300 K and velocity is 30 m/s. The density at the point is

Options :

88039647261. ✖ $0.5\ \mathrm{kg/m^3}$

88039647262. ✖ $0.8\ \mathrm{kg/m^3}$

88039647263. ✔ $1.16\ \mathrm{kg/m^3}$

88039647264. ✖ $1.67\ \mathrm{kg/m^3}$

Question Number : 57 Question Id : 88039611817 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is not a correct definition of circulation (ω is vorticity and V is velocity)

Options :

88039647265. ✖ $-\oint V.ds$

88039647266. ✖ $-\iint \nabla \times V\,.dS$

88039647267. ✖ $-\iint \omega\,.dS$

88039647268. ✔ $-\oint \omega . ds$

Question Number : 58 Question Id : 88039611818 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Velocity potential cannot be defined for

Options :

88039647269. ✖ Unsteady flow

88039647270. ✖ 3D flow

88039647271. ✔ Viscous flow

88039647272. ✖ Incompressible flow

Question Number : 59 Question Id : 88039611819 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The boundary layer thickness for incompressible laminar flow over a flat plate at zero angle of attack is

Options :

88039647273. ✔ $\frac{5.0x}{\sqrt{Re_x}}$

88039647274. ✖ $\frac{1.328x}{\sqrt{Re_x}}$

88039647275. ✖ $\frac{1.328}{\sqrt{Re_x}}$

88039647276. ✖ $\frac{5.0}{\sqrt{Re_x}}$

Question Number : 60 Question Id : 88039611820 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Pressure drag on an airfoil in incompressible flow is caused by

Options :

88039647277. ✔ Flow separation

88039647278. ✖ Attached flow

88039647279. ✖ Laminar flow

88039647280. ✖ Flow transition

Question Number : 61 Question Id : 88039611821 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Downward deployment of trailing edge flap in an airfoil results in

Options :

88039647281. ✖ Change of lift curve slope

88039647282. ✖ Reduction in drag

88039647283. ✔ Enhancement of lift

88039647284. ✖ Delay in stall

Question Number : 62 Question Id : 88039611822 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a delta wing in incompressible flow

Options :

88039647285. ✖ Lift-curve slope is greater than that of a high aspect ratio straight wing

88039647286. ✖ Lift-curve slope is equal to that of a high aspect ratio straight wing

88039647287. ✖ Stall angle is equal to that of a high aspect ratio straight wing

88039647288. ✔ Stall angle is greater than that of a high aspect ratio straight wing

Question Number : 63 Question Id : 88039611823 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For the inviscid, incompressible, uniform flow past a sphere, the maximum velocity on the sphere is

Options :

88039647289. ✖ V_∞

88039647290. ✖ $2V_\infty$

88039647291. ✔ $\frac{3}{2}V_\infty$

88039647292. ✖ $\frac{1}{2}V_{\infty}$

Question Number : 64 Question Id : 88039611824 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The relationship between specific heat at constant pressure (C_p), specific heat at constant volume (C_v) and specific gas constant (R) for an ideal gas is

Options :

88039647293. ✖ $C_p + C_v = R$

88039647294. ✖ $C_p \times C_v = R$

88039647295. ✔ $C_p - C_v = R$

88039647296. ✖ $C_p \div C_v = R$

Question Number : 65 Question Id : 88039611825 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a compressible flow, the total enthalpy of a fluid element remains constant if the flow is

Options :

88039647297. ✔ Steady, adiabatic and inviscid

88039647298. ✖ Steady and inviscid

88039647299. ✖ Steady and adiabatic

88039647300. ✖ Unsteady

Question Number : 66 Question Id : 88039611826 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Across a normal shock, _____ remains constant

Options :

88039647301. ✖ Density

88039647302. ✖ Pressure

88039647303. ✖ Mach number

88039647304. ✔ Stagnation temperature

Question Number : 67 Question Id : 88039611827 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $M^*_{1,2}$ is the characteristic Mach number and 1 & 2 refer to the conditions before and after a normal shock, then

Options :

88039647305. ✖ $M_1^* = M_2^*$

88039647306. ✔ $M_1^* M_2^* = 1$

88039647307. ✖ $M_1^* + M_2^* = 1$

88039647308. ✖ $M_1^* - M_2^* = 1$

Question Number : 68 Question Id : 88039611828 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The speed of sound at an altitude of 10 km where the temperature is 223 K is

Options :

88039647309. ✔ 300 m/s

88039647310. ✖ 320 m/s

88039647311. ✖ 340 m/s

88039647312. ✖ 360 m/s

Question Number : 69 Question Id : 88039611829 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Pitot tube is used for measuring

Options :

88039647313. ✖ Temperature

88039647314. ✔ Velocity

88039647315. ✖ Density

88039647316. ✖ Mass flow rate

Question Number : 70 Question Id : 88039611830 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Mach angle corresponding to Mach number 2 is

Options :

88039647317. ✖ 15^0

88039647318. ✔ 30^0

88039647319. ✖ 45^0

88039647320. ✖ 60^0

Question Number : 71 Question Id : 88039611831 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

During the supersonic flow through a variable area nozzle, as cross section area increases

Options :

88039647321. ✖ Static pressure increases

88039647322. ✖ Static pressure remains constant

88039647323. ✔ Static pressure decreases

88039647324. ✖ Static pressure is equal to stagnation pressure

Question Number : 72 Question Id : 88039611832 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In an over-expanded convergent-divergent nozzle,

Options :

88039647325. ✖ Exit pressure equals back pressure

88039647326. ✖ Exit pressure is greater than back pressure and oblique shock waves are formed at the nozzle exit

88039647327. ✔ Exit pressure is less than back pressure and oblique shock waves are formed at the nozzle exit

88039647328. ✖ Exit pressure is greater than back pressure and expansion fan is formed at the nozzle exit

Question Number : 73 Question Id : 88039611833 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a rocket, the thrust is given by $F = \dot{m}V_e + A_e(P_e - P_o)$. For fixed values of chamber pressure 'P_0' and nozzle throat area, the maximum thrust will occur when

Options :

88039647329. ✖ $P_e = 2P_o$

88039647330. ✖ $P_e = P_o/2$

88039647331. ✔ $P_e = P_o$

88039647332. ✖ $P_e = P_o/\pi$

Question Number : 74 Question Id : 88039611834 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Specific impulse of a solid rocket propellant is

Options :

88039647333. ✖ $0 < I_{sp} < 100$

88039647334. ✔ $170 < I_{sp} < 250$

88039647335. ✖ $250 < I_{sp} < 460$

88039647336. ✖ $460 < I_{sp} < 1000$

Question Number : 75 Question Id : 88039611835 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question

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

During the ideal operation of a converging-diverging nozzle

Options :

88039647337. ✔ Flow is subsonic in converging section and supersonic in diverging section

88039647338. ✖ Flow is supersonic in converging section and subsonic in diverging section

88039647339. ✖ Flow is subsonic in both converging and diverging sections

88039647340. ✖ Flow is supersonic in both converging and diverging sections

Question Number : 76 Question Id : 88039611836 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The characteristic velocity of a rocket propellant is defined as

Options :

88039647341. ✖ $\frac{\dot{m}}{P_c A^*}$

88039647342. ✖ $\frac{\dot{m} A^*}{P_c}$

88039647343. ✖ $\frac{A^*}{\dot{m} P_c}$

88039647344. ✔ $\frac{P_c A^*}{\dot{m}}$

Question Number : 77 Question Id : 88039611837 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

HTPB stands for

Options :

88039647345. ✖ Hydroxyl terminated poly Benzene

88039647346. ✖ Hydroxyl terminated plastic binder

88039647347. ✖ Hydroxyl terminated penta Butane

88039647348. ✔ Hydroxyl terminated poly butadiene

Question Number : 78 Question Id : 88039611838 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

_____ is known as universal oxidizer

Options :

88039647349. ✖ Ammonium nitrate

88039647350. ✔ Ammonium perchlorate

88039647351. ✖ Sodium nitrate

88039647352. ✖ Sodium perchlorate

Question Number : 79 Question Id : 88039611839 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Thrust vector control nozzles are used to divert the thrust away from the longitudinal axis for

Options :

88039647353. ✔ Pitch, roll and yaw control

88039647354. ✖ Thrust improvement

88039647355. ✖ Drag reduction

88039647356. ✖ Improved nozzle flow control

Question Number : 80 Question Id : 88039611840 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Tsiolkovsky rocket equation relating ΔV, specific impulse (I_{sp}) and mass ratio (R) is

Options :

88039647357. ✖ $\Delta V = I_{sp} \ln R$

88039647358. ✖ $\Delta V = \ln(I_{sp} R)$

88039647359. ✔ $\Delta V = g\, I_{sp} \ln R$

88039647360. ✖ $\Delta V = 2 I_{sp} \ln R$

Question Number : 81 Question Id : 88039611841 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Most modern helicopters are powered by

Options :

88039647361. ✖ Turbojet engines

88039647362. ✖ Turboprop engines

88039647363. ✔ Turboshaft engines

88039647364. ✖ Turbofan engines

Question Number : 82 Question Id : 88039611842 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Among the reciprocating engines, frontal area is large for _____ configuration.

Options :

88039647365. ✔ Radial

88039647366. ✖ In-line

88039647367. ✖ V-type

88039647368. ✖ Inverted V-type

Question Number : 83 Question Id : 88039611843 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a four-stroke, spark-ignition engine (Otto cycle), the combustion is assumed to be happening at

Options :

88039647369. ✖ Constant temperature

88039647370. ✔ Constant volume

88039647371. ✖ Constant pressure

88039647372. ✖ Constant entropy

Question Number : 84 Question Id : 88039611844 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A supercharger is used in a reciprocating aero engine to

Options :

88039647373. ✖ Compress the fuel

88039647374. ✖ Heat the fuel

88039647375. ✔ Compress the air

88039647376. ✖ Heat the air

Question Number : 85 Question Id : 88039611845 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Relation between angle of attack (α), pitch angle (β) and twist angle (φ) for the airfoil cross section of a propeller is

Options :

88039647377. ✖ $\varphi = \alpha + \beta$

88039647378. ✖ $\varphi = \alpha - \beta$

88039647379. ✖ $\varphi = 2\alpha + \beta$

88039647380. ✔ $\varphi = \beta - \alpha$

Question Number : 86 Question Id : 88039611846 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Bypass ratio of a turbofan engine is defined as

Options :

88039647381. ✔ Cold mass flow rate/hot mass flow rate

88039647382. ✖ Hot mass flow rate/Cold mass flow rate

88039647383. ✖ Hot mass flow rate/total mass flow rate

88039647384. ✖ Cold mass flow rate/total mass flow rate

Question Number : 87 Question Id : 88039611847 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a turbojet engine, the order in which air passes through various components is

Options :

88039647385. ✖ Intake-Turbine-Combustor-Compressor-Nozzle

88039647386. ✔ Intake-Compressor -Combustor-Turbine -Nozzle

88039647387. ✖ Intake-Compressor -Turbine-Combustor -Nozzle

88039647388. ✖ Intake- Combustor-Compressor- Turbine-Nozzle

Question Number : 88 Question Id : 88039611848 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Thrust specific fuel consumption of a turbojet engine is (F is the thrust, $\dot{m}_{air}$ is the mass flow rate of air and $\dot{m}_{fuel}$ is the mass flow rate of fuel)

Options :

88039647389. ✖ $\frac{F}{\dot{m}_{air}}$

88039647390. ✖ $\frac{F}{\dot{m}_{fuel}}$

88039647391. ✖ $\frac{\dot{m}_{air}}{F}$

88039647392. ✔ $\frac{\dot{m}_{fuel}}{F}$

Question Number : 89 Question Id : 88039611849 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Supercritical operation of a subsonic air intake can result in

Options :

88039647393. ✖ Flow separation outside the intake

88039647394. ✔ Flow separation inside the intake

88039647395. ✖ Flow separation both inside and outside the intake

88039647396. ✖ Flow separation neither in the inside or outside the intake

Question Number : 90 Question Id : 88039611850 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following techniques is not used for boundary layer ingestion into the Engine

Options :

88039647397. ✖ Diverter

88039647398. ✖ Fence

88039647399. ✖ Bleed

88039647400. ✔ Guide vanes

Question Number : 91 Question Id : 88039611851 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question

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

Which of the following is not an advantage for centrifugal compressor

Options :

88039647401. ✖ Relatively short length

88039647402. ✖ High compression ratio per stage

88039647403. ✖ Robust operation

88039647404. ✔ High isentropic efficiency compared to axial compressor

Question Number : 92 Question Id : 88039611852 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

_____ is the state of the art in turbine blade manufacture

Options :

88039647405. ✖ Conventional casting

88039647406. ✖ Directionally solidified blade

88039647407. ✔ Single crystal blade

88039647408. ✖ CNC machining

Question Number : 93 Question Id : 88039611853 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

An aircraft capable of flying at Mach 3 is

Options :

88039647409. ✔ SR – 71

88039647410. ✖ Su - 30

88039647411. ✖ B - 2

88039647412. ✖ F - 22

Question Number : 94 Question Id : 88039611854 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

An aircraft capable of VTOL is

Options :

88039647413. ✖ SR – 71

88039647414. ✔ F – 35

88039647415. ✖ B – 2

88039647416. ✖ Su - 30

Question Number : 95 Question Id : 88039611855 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In the standard atmosphere model of the Earth's atmosphere, for altitude less than 10km, the temperature decreases at the rate of

Options :

88039647417. ✖ 1 K/km

88039647418. ✔ 6.5 K/km

88039647419. ✖ 65 K/km

88039647420. ✖ 100 K/km

Question Number : 96 Question Id : 88039611856 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The rate of climb of an aircraft is given by (P_A : power available, P_R : power required, W : Weight)

Options :

88039647421. ✖ $(P_A + P_R)/W$

88039647422. ✔ $(P_A - P_R)/W$

88039647423. ✖ P_R/W

88039647424. ✖ P_A/W

Question Number : 97 Question Id : 88039611857 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The altitude at which the rate of climb of an aircraft is zero is called

Options :

88039647425. ✖ Tropopause

88039647426. ✔ Absolute ceiling

88039647427. ✖ Service ceiling

88039647428. ✖ Cruise altitude

Question Number : 98 Question Id : 88039611858 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

At the maneuver point on the V-n diagram,

Options :

88039647429. ✖ V is maximum

88039647430. ✖ n is minimum

88039647431. ✔ C_L is maximum

88039647432. ✖ V is minimum

Question Number : 99 Question Id : 88039611859 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following statement about static stability of an aircraft is not correct

Options :

88039647433. ✖ Vertical stabilizer contributes to directional stability

88039647434. ✖ Wing dihedral contributes to lateral stability

88039647435. ✖ Fuselage behind the cg contributes to directional stability

88039647436. ✔ Ailerons contributes to directional stability

Question Number : 100 Question Id : 88039611860 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For a re-entry vehicle, the ballistic parameter is defined as (m : mass, C_D : Coefficient of drag, S: reference area)

Options :

88039647437. ✖ m/ C_D

88039647438. ✔ $m/(C_DS)$

88039647439. ✖ C_D/m

88039647440. ✖ C_DS/m

Question Number : 101 Question Id : 88039611861 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The Reynold's analogy relating Stanton number (C_H) and skin friction coefficient (C_f)is

Options :

88039647441. ✖ $C_H = C_f$

88039647442. ✔ $C_H = C_f/2$

88039647443. ✖ $C_H = 3C_f$

88039647444. ✖ $C_H = 2C_f$

Question Number : 102 Question Id : 88039611862 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

During the steady, level flight of an aircraft, the upper portion of the wing is in

Options :

88039647445. ✖ Tension

88039647446. ✔ Compression

88039647447. ✖ Shear

88039647448. ✖ Torsion

Question Number : 103 Question Id : 88039611863 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Duralumin is an alloy of

Options :

88039647449. ✔ Aluminum

88039647450. ✖ Titanium

88039647451. ✖ Iron

88039647452. ✖ Copper

Question Number : 104 Question Id : 88039611864 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following about "ribs" in a wing is correct

Options :

88039647453. ✔ Ribs give structural shape to wings

88039647454. ✖ Ribs are I-section beams running along the wing

88039647455. ✖ Ribs are cantilever beams

88039647456. ✖ Ribs are attached to fuselage

Question Number : 105 Question Id : 88039611865 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In an axial flow compressor, when the degree of reaction is 50% , it implies that

Options :

88039647457. ✖ Work done in compression will be the least.

88039647458. ✖ 50% stages of the compressor will be ineffective

88039647459. ✖ Pressure after compressor will be optimum

88039647460. ✔ The compressor will have symmetrical blades

Question Number : 106 Question Id : 88039611866 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Which one of the following types of impeller vanes are most commonly used in centrifugal type compressors?

Options :

88039647461. ✖ Forward curved

88039647462. ✖ Radial

88039647463. ✔ Backward curved

88039647464. ✖ Tangential

Question Number : 107 Question Id : 88039611867 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Surging is the phenomenon of

Options :

88039647465. ✖ Steady, periodic, and reversed flow

88039647466. ✔ Unsteady, periodic, and reversed flow

88039647467. ✖ Unsteady, periodic, and uniform flow

88039647468. ✖ One dimensional steady and uniform flow

Question Number : 108 Question Id : 88039611868 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question

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

At a point in a loaded component the state of the stress is given by $\sigma_x = 300\ MPa, \sigma_y = 150\ MPa\ and\ \tau_{xy} = \pm 50\ MPa$ Determine the maximum and minimum principal stresses.

Options :

88039647469. ✖ 350 MPa, 150 MPa

88039647470. ✔ 315 MPa, 135 MPa

88039647471. ✖ 405 MPa, 225 MPa

88039647472. ✖ 450 MPa, 150 MPa

Question Number : 109 Question Id : 88039611869 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

A thin cylindrical shell with hemispherical ends is subjected to internal fluid pressure. For equal maximum stress to occur in both the cylindrical and the spherical portions, what would be the ratio of thickness of the spherical portion to that of the cylindrical portion.

Options :

88039647473. ✖ $\frac{t_{spherical}}{t_{cylindrical}} = 2$

88039647474. ✔ $\frac{\tau_{spherical}}{\tau_{cylindrical}} = \frac{1}{2}$

88039647475. ✖ $\frac{\tau_{cylindrical}}{\tau_{spherical1}} = \frac{1}{2}$

88039647476. ✖ $\frac{\tau_{cylindrical}}{\tau_{spherical1}} = 2$

Question Number : 110 Question Id : 88039611870 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A beam of rectangular cross section 50 mm wide and 100 mm deep is simply supported over a span of 1500 mm. It carries a concentrated load of 50kN, 500 mm from the left support . What will be the maximum tensile stress in the beam.

Options :

88039647477. ✔ 200 MPa

88039647478. ✖ 100 MPa

88039647479. ✖ 300 MPa

88039647480. ✖ 400 MPa

Question Number : 111 Question Id : 88039611871 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a single degree damped vibrating system a suspended mass of 12 kg makes 24 oscillations in 18 seconds. The amplitude decreases to 0.2 of the initial value in 5 oscillations. Determine stiffness

Options :

88039647481. ✔ 0.84 N/mm

88039647482. ✖ 0.533 N/mm

88039647483. ✖ 1.2 N/mm

88039647484. ✖ 0.122 N/mm

Question Number : 112 Question Id : 88039611872 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A machine part having 3 kg vibrates in a viscous medium. A harmonic exiting force of 20 N acts on the part and causes resonance amplitude of 12 mm with a period of 0.2 sec. find the value of damping.

Options :

88039647485. ✔ 0.282

88039647486. ✖ 0.144

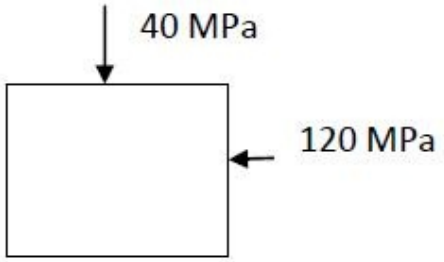
88039647487. ✖ 0.576

88039647488. ✖ 0.192

Question Number : 113 Question Id : 88039611873 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The figure shows the state of stress at certain point in a body. The magnitudes of normal stresses in x and y direction are 120 MPa and 40 MPa respectively. The radius of Mohr's stress circle representing this state of stress is



Options :

88039647489. ✖ 60 MPa

88039647490. ✖ 70 MPa

88039647491. ✔ 80 MPa

88039647492. ✖ 100 MPa

Question Number : 114 Question Id : 88039611874 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Who postulated the maximum distortion energy theory?

Options :

88039647493. ✖ Tresca

88039647494. ✖ Rankine

88039647495. ✖ St. Venant

88039647496. ✔ Mises-Henky

Question Number : 115 Question Id : 88039611875 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A small element at the critical section of a component is in a bi-axial state of stress with the two principal stresses being 400 MPa and 100 MPa. The maximum working stress according to Distortion Energy Theory is

Options :

88039647497. ✔ 360 MPa

88039647498. ✖ 300 MPa

88039647499. ✖ 500 MPa

88039647500. ✖ 400 MPa

Question Number : 116 Question Id : 88039611876 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

For $\sigma 1 \neq \sigma 2$ and $\sigma 3 = 0$, what is the physical boundary for maximum principal strain failure theory?

Options :

88039647501. ✖ A rectangle

88039647502. ✖ An ellipse

88039647503. ✔ A Rhombus

88039647504. ✖ A parabola

Question Number : 117 Question Id : 88039611877 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A Boeing 747 is flying at an altitude of 12 km and has a velocity of 250 m/s. The aircraft has a wing area of 500 m^2. The coefficient of lift is 0.54 and the density is of air at 12 km is approximately 0.303 kg/m^3. The weight of the 747 is 2900 kN. Determine lift.

Options :

88039647505. ✖ 2000 kN

88039647506. ✔ 2556 kN

88039647507. ✖ 5112 kN

88039647508. ✖ 1278 kN

Question Number : 118 Question Id : 88039611878 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider an airplane flying with a velocity of 70 m/s at a standard altitude of 3 km. At a point on the wing, the airflow velocity is 80 m/s. Calculate the pressure at this point assumimg incompressible flow. (Take pressure (7.010×10^4 N/m^2) and density (0.9090 kg/m^3) @ 3 km)

Options :

88039647509. ✔ 0.69 MPa

88039647510. ✖ 1.4 MPa

88039647511. ✖ 0.35 MPa

88039647512. ✖ 0.069 MPa

Question Number : 119 Question Id : 88039611879 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The altimeter on a low-speed airplane reads 2 km. The airspeed indicator reads 50 m/s. If the outside air temperature is 280 K, what is the true velocity of the airplane? (assume P = 79480 Pa at 2 km height)

Options :

88039647513. ✖ 50 m/s

88039647514. ✖ 72.25 m/s

88039647515. ✔ 55.64 m/s

88039647516. ✖ 111.25 m/s

Question Number : 120 Question Id : 88039611880 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

The material used as sensor in hot-wire anemometry is

Options :

88039647517. ✖ stainless steel

88039647518. ✖ nickel

88039647519. ✔ tungsten

88039647520. ✖ copper