

HUMAN PERFORMANCE - LAST MINUTE FACTS

1. The study of Human Performance is a mandatory part of gaining a professional pilots' licence.
2. Otic Barotrauma is worse in the descent.
3. If symptoms of hyperventilation occur at an altitude where hypoxia is not a consideration, the correct remedial action is to decrease the rate and depth of breathing
4. Acuity in a normal person is 6/6 (20/20) at the fovea. At 5° it decreases (rapidly) by half to 6/12 (20/40) and at 25°deceases to one tenth to 6/60 (20/200).
5. At 10,000ft the partial pressure of oxygen in the lungs will be approximately half the value at msl.
6. The part of the eye which bends most light is the cornea. (responsible for 70% - 80% of focussing).
7. When using 100% oxygen at 40,000 ft, the partial pressure in the lungs will be the same as that given by air at 10,000 ft.
8. Vision contributes most to maintaining spatial orientation.
9. W.H.O.'s definition of alcoholism is : when the excessive use of alcohol repeatedly damages a person's physical, mental and social life.
10. Hypoxia is difficult to detect by the sufferer and the time of useful consciousness can be very short.
11. A pilot may never use bi-focal contact lenses when flying. If a pilot is cleared to fly with contact lenses, he/she must be in possession of a pair of spectacles whilst exercising the privileges of his/her licence.
12. Aircrew who wish to give blood should not be discouraged. But take advice from Aviation Specialist, drink plenty of fluids and rest laying flat (supine) for a short time (15 - 20 mins) after donation. Do not fly for 24 hours.
13. The bronchi join the trachea to the lungs.
14. Rods are sensitive to much lower light levels and to movement than the cones.
15. The nose, filters, moistens and warms the air.

16. Hypertension is high blood pressure. Hypotension is low blood pressure.
17. At an altitude of over 10,000 ft, it is necessary to increase the concentration of oxygen.
18. The Vestibular Apparatus = Otoliths + Semicircular Canals.
19. Short-sighted people can see well at short distances but distant objects will appear out of focus.
20. Linear acceleration = Otoliths
Angular acceleration = Semi Circular Canals
21. Narcolepsy = inability to keep awake even when in sleep credit.
22. Electrical activity in the brain is measured by an electroencephalogram (EEG).
23. Gastro-enteritis always prevents flying.
24. Excessive noise never improves performance.
25. An example of Situational Insomnia is Circadian Desynchronisation (Jet lag).
26. Sitting below the Eye Design Point decreases downward vision and the undershoot is lost.
27. Permanent damage may be caused by alcohol consumption of over 5 units a day and 21 units a week for males and 3 units a day and 14 units a week for females.
28. Apnoea is a cessation of breathing whilst asleep. Not serious unless over 1 minute.
29. Use of red cockpit illumination can obscure detail from topographical charts and approach plates. Modern aircraft use white.
30. A handle used to open a valve should always rotate in an anti-clockwise direction
31. Body language on the flight deck is curtailed making words and the way they are said more important than when out of the cockpit seat.
32. Light levels at high altitude are dangerous as they contain more of the damaging blue and UV light.
33. It takes about 2 weeks to acclimatise to a hot & humid climate

34. Rule-based behaviour is kept in the long-term memory.
35. Motor programmes are behavioural sub-routines not requiring conscious thought. (Cognitive, Associative and Automatic stages).
36. An overbearing person normally becomes submissive when dealing with his/her seniors.
37. Disorientation : VMC - look at the horizon
 IMC - believe your instruments
38. An item in the Short-term memory (STM), unless it is deliberately rehearsed, will normally be lost in 10 – 20 seconds.
The maximum number of disassociated items which normally can be retained in the STM is 9 (normal 7 ± 2).
39. Scanning should consist of small and frequent eye movements to avoid Empty Field Myopia.
40. When flying a 3° approach, the angle between the horizon & visual impact point on the runway is 3°.
41. For a mid-air collision, the relative bearing of the other aircraft will remain constant. Also the aircraft will appear imperceptibly to increase in size while at a distance and it will suddenly appear to increase in size rapidly only just before impact.
42. It takes longer to recover from time zone changes after flying east.
43. Everyone within the Aviation Industry is responsible for contributing to flight safety.
44. Breathing 100% oxygen at a cabin altitude of 33,700 ft. is equivalent of breathing air at ground level
45. A pilot who becomes pregnant may continue to fly with the approval of the EASA.
46. An ideal leader would be both goal and person directed. (Team 9.9. or P + G +)
47. Mental Stress is when the perceived demand is greater than the perceived ability.
49. Above cloud a distant aircraft which appears to be at the same height will pass below.
50. Black hole effect gives the impression to the pilot that he/she is too high leading to a too low an approach.

51. Vibration between 1 - 4 Hz interferes with breathing, 4-10 Hz chest & abdominal pains, 8 - 12 Hz backache, 10 - 20 Hz, headache, eyestrain, pains in the throat, speech difficulties and degradation of acuity.
52. Slow wave sleep = stages 3 & 4.
53. 50% of a sleep is normally stage 2.
54. REM sleep is adversely affected by alcohol and one tends to wake up early.
55. Cockpit warnings should alert but not startle. Aural warnings are better for gaining attention but visual warning are better for leading the pilot to the correct location of the problem.
56. Amnesia affects Episodic Memory.
57. Situation awareness is when perception matches reality.
58. Qualitative/comparative/rate information is more suited to an analogue display. Quantitative information is better suited to a digital display
59. During a visual search, a rest cycle (saccade), usually lasts about 0.3 second. The cortex gives smooth scan so that the brain is unaware of saccade.
60. Responding automatically rather than diligently is the main error concerning check-lists. Procedures using checklists are vulnerable to interruptions (resulting in missing out of checks).
61. Personality assessment is best done with the use of questionnaires.
62. Information is held in the Iconic, Echoic and Working memory for 0.5 - 1.0 second, 2 - 8 seconds and 10 - 20 seconds respectively.
63. The errors associated with skilled-based behaviour are : Environmental Capture (Habituation) and Action Slip.
64. Small change in value is best displayed on a digital display
65. The 3 types of Stress Coping are : Action, Cognitive and Symptom-directed Coping
66. Coping with stress can be day by day but Stress Management concerns a life-style change.
67. REM sleep organises memory and refreshes the functions of the brain and memory. It

increases in duration as the sleep progresses.

68. There may be a variety of reasons for a faint, but the main cause is a reduction of the blood supply to the brain. As long as the reason is known, the sufferer may fly.
69. Lumbar support in a pilot's seat is to distribute compression loads evenly over the spinal discs.
70. The most important approach to stress management is recognising that there is a problem and deciding to do something about it.
71. Having made a decision, it is a tendency to stick with the decision and seek small pieces of information that will confirm that decision even to the extent of ignoring clear evidence that the decision is incorrect (Confirmation Bias)
72. 1-4 Hz - interferes with breathing, 4-10 Hz can cause chest and abdominal pains, 8-12 Hz will cause backache and 10-12 Hz causes headache, Eyestrain, pains in the throat, speech difficulties and muscular tensions.
73. Comfort level for most people in normal clothing : temperature 20°C and relative humidity 40% - 60 %.
74. 1st four of the Stress table are : Death of a spouse or partner, Divorce, Marital Separation and Death of a close family or illness.
75. Kinesthetic Receptors.(proprioceptors) : Sensory endings distributed throughout the body giving spatial orientation information to the brain. (Seat of the Pants)
76. Stressors (or stress factors) are cumulative as are effects of carbon monoxide poisoning, fatigue and conflict.
77. A major stressor with pilots is a lack of flying.
78. The most difficult stop-over is 24 hours. If over 24 hours - change to new time ASAP, If less - stay on home time.
79. In a large aircraft the touch-down point will be short of the visual aiming point.
80. The most important factor is the design of cockpit controls is standardisation.
81. The maximum amount of sleep credits is 16.
82. The eye datum point (or Design Eye Position) is so the pilot can maintain an adequate view of all the important displays inside and outside the cockpit with minimum head movement. If sitting below the eye datum point, the pilot will be unable to see the

undershoot. If above – unable to see the overshoot.

83. A highly automated cockpit can lead to boredom and loss of situational awareness.
84. After scuba diving to over 30 ft (10 metres) you should not fly for 24 hours.
85. Diastolic pressure is the ambient pressure and systolic measures the output pressure of the heart.
86. After bone marrow donation involving a general anaesthetic, the minimum recommended time interval before flying is 48 hours.
87. Haemoglobin has an affinity to carbon monoxide 210 - 250 times greater to that of oxygen.
88. Haemoglobin is made in the bone marrow and lives for approximately 108 days.
89. The normal temperature of the body is 37°C.
90. The Somatogravic illusion is to do with gravity.
91. Up-sloping runways - approach too low (runways also looks shorter). Down-sloping runways - approach too high (runway also looks longer).
92. Wider than normal runway - pilot thinks he/she too low and therefore tendency to fly too high an approach. Narrower than normal runway - pilot thinks he/she too high and therefore tendency to fly too low an approach.
93. Visual texture flow helps final judgement of height and speed.
94. Rain on the windscreen gives a blooming effect to runway lights giving the impression that the approach is faster than it actually is and that the runway is closer than it is in fact.
95. Rain drops on the windscreen will tend to make the pilot make a shallower/flatter than normal approach.
96. If a stimulus is expected and the response prepared, when an unexpected stimulus is received the prepared response is likely to be carried out.
97. Turn the cockpit lights up to full if there is the likelihood of an electrical storm.
98. Night vision is affected by age, altitudes over 5,000 ft, smoking, vitamin A and alcohol.

99. The maximum amount of G which can be tolerated by the human body (45G) is in the fore and aft axis (horizontal plane).
100. The only effective cure for obesity is to eat less.
101. The major cause for incapacitation in flight is gastro-enteritis. An interval of 90 minutes should be allowed after eating and flying if there is a possibility.
102. Dark adaption takes 7 minutes for cones and 30 minutes for rods when going from light to dark. When moving from a dark to a bright environment both rods and cones adapt in 10 seconds.
103. Hypermetropia is caused by a short eye ball and is overcome by a convex lens
104. In aircraft, relative humidity is sometimes allowed to fall to 3% as humidification involves a high weight penalty.
105. Excluding family history, the main factors leading to heart disease are smoking and excessive fat consumption.
106. Carbon monoxide is colourless, odourless and highly toxic after prolonged exposure.
107. The two main errors associated with the use of check lists in flying are responding automatically and not diligently and missing out items.
108. Aviation is the safest form of transportation.
109. One of the treatments for hyperventilation involves the patient breathing into a paper bag. This is because it helps to restore the acid-base balance.
110. The most important trait of personality in the decision-making process is stability.
111. The three principal minerals in the body are : Calcium, Phosphorus and Iron
112. The necessary trace minerals are obtained through a healthy balanced diet.
113. Internal respiration takes place in the cells by diffusion.
114. John R. Anderson renamed the three phases of a Motor Programme (Mental Schema) as :

Cognitive Phase	-	Declarative Knowledge
Associative Phase	-	Knowledge Compilation
Automatic Phase	-	Procedural Knowledge
115. Maslow's Model is concerned with Motivation

116. Of the Authoritarian, Laisser-Faire and the Synergistic cockpits, the Laisser-Faire is the most dangerous.
117. Aircraft accident rate is approximately 1 per million airport movements.
118. The major cause for pilot-induced accidents is loss of directional control.
119. The phase of flight most prone to accidents is the Intermediate and Final Approach.
120. Approximately 73% of all aircraft accidents are caused by human factors.
121. Of hardware introduced during the 1980's and 1990's, the GPWS has contributed most to the reduction in aircraft accidents.
122. The function of the left ventricle is to supply the main force that propels the blood through the circulatory system
123. The functions of the atria are to act as entryways to the ventricles and act as weak pumps to help move the blood
124. The narrowing or blockage of the coronary arteries and veins are the cause of one of the major heart diseases
125. Carbohydrates, protein and fats are the major sources of energy for the body.
126. Cardiac output = stroke volume x heart rate (pulse rate). Average 5.0 - 5.5 litres a minute.
127. Angina is a pain associated with the heart.
128. DCS is caused by nitrogen coming out of solution to form bubbles in the bloodstream and can be avoided by pre-breathing pure oxygen.
129. A headache is the principal symptom of carbon monoxide poisoning (effects are cumulative). Cherry-red lips and flushed cheeks is another symptom.
130. A 20 a day smoker at SL has a raised carboxy-haemoglobin level of approx 7% and is already at 4,000 - 5,000 feet.
131. Hypertension leads to strokes
132. Normal blood pressure is around 120/80
133. Pressoreceptors seek homeostasis when hydrostatic variation is disrupted.

134. After donating blood you cannot fly for 24 hours. After donation of bone marrow involving general anaesthetic minimum time interval before flying - 48 hours.
135. Tidal volume is the volume of air exhaled and inhaled with each normal breath (500 ml)
136. $\frac{1}{4}$ MSL = approximately 36,000 ft, $\frac{1}{2}$ MSL = 18,000 ft and : $\frac{3}{4}$ MSL = 8,000 ft
137. Composition of the atmosphere = 21% oxygen, 78% nitrogen & 1% other gases up to approximately 70,000 ft.
138. Absolute humidity is the weight of water vapour in unit volume of air (gms/m³).
139. Boyles Law =
- $$\frac{P_1}{P_2} = \frac{V_2}{V_1}$$
140. Dalton=s Law = $P_t = P_1 + P_2 + P_3 \dots\dots\dots P_n$
141. Charles=s Law =
- $$\frac{V_1}{V_2} = \frac{T_1}{T_2} = \frac{(t_1 + 273)}{(t_2 + 273)}$$
142. Combined Gas Law =
- $$\frac{PV}{T} = K$$
143. Saturation levels of haemoglobin are approx SL = 97.5, 10,000 ft. = 87% thereafter falls off rapidly so at 20,000 = 65%
144. Short-term memory loss starts at around 12,000 ft.
145. Cyanosis and Formication are both symptoms of hypoxia.
146. Deterioration of night vision can commence as low as 6,000 ft. Normally 8,000 ft.
147. The Venturi Effect is association with decompression.
148. Bends, Creeps, Chokes, and Staggers are all symptoms of DCS.
149. Messages are sent in the nervous systems by electro-chemical means.

- 150. The CNS is made up of the brain and the spinal cord.
- 151. The Autonomic Nervous System (ANS) = The Vegetative Nervous System.
- 152. All the senses adapt.
- 153. General Adaption Syndrome (GAS) -= Fight or Flight Syndrome
- 154. The Cochlea detects hearing and the range of hearing is approximately 20 - 20,000 Hertz.
- 155. The Leans = The Somatogyral Illusion
- 156. Coriolis Effect can occur when in a turn and the head is moved.
- 157. The amount of light entering the eye can be adjusted by 5:1 by the iris.
- 158. The optic nerve is joined to the cortex
- 159. Stereopsis aids depth perception (ie judging the length of a runway)
- 160. Empty Field Myopia is about just less than 1 metre to 1.5 metres.
- 161. High energy blue light can cause cumulative damage to the retina.
- 162. Cataracts are associated with the clouding of the lens.
- 163. Astigmatism is caused by a mis-shapened cornea and can be treated with cylindrical lenses or surgery.
- 164. Glaucoma is a disease causing the rise in pressure of the aqueous humor of the eye.
- 165. Colour blindness does not affect acuity.
- 166. Mental models of the world are based on past experiences and sensory information.
- 167. A one-eyed person cannot be accepted as fit to fly.
- 168. Positive g will increase hydrostatic variation.
- 169. Body position can increase g tolerance.
- 170. Ozone affects night vision and causes headaches. Normally filtered out at the compressor stage of cabin air supply. Increases above 40,000 ft.

171. BMI :
- | | |
|----------------|---------------|
| Underweight | under 18.5 |
| Normal | 18.5 – 25.0 |
| Overweight | 25.0 – 30.0 |
| Obese | 30.0 – 35.0 |
| Morbidly Obese | 35.0 and over |
172. To effectively reduce coronary artery disease exercise must be regular and sufficient to raise the pulse by 100% for at least 20 mins 3 times a week.
173. Breakfast is the most important meal & should supply about 25% of the daily calorie intake.
174. A snack will cure alleviate hypoglycemia.
175. Alcohol is absorbed directly into blood, stomach & intestines and broken down by the liver at a rate of one unit an hour (or 15 mg per 100 mls per hour).
176. 2 or 3 cups of coffee a day is about the limit and caffeine is addictive.
177. The best way of avoiding malaria is not to get bitten.
178. TB is an airborne contagion, cholera through food and water and tetanus via spores through a puncture of the skin.
179. Aircraft are fumigated against insects.
180. The Stroboscopic effect (mostly associated with helicopters) is caused normally by flash frequencies between 5 and 20 Hz. Passengers to either close eyes, use sunglasses, move away to a seat in the shade or aircraft to turn out of sun. Causes epileptic type fits. EASA can refer to this as the Flicker Effect.
181. Records of radiation kept over 49,000 ft.
182. Galactic (or Cosmic) radiation is low intensity, predictable and increases with height.
183. Solar radiation lower energy than Galactic (or Cosmic). Intense and unpredictable.
184. Radiation damages the CNS and cause cancer - especially of the skin.

185. Many over-the-counter medicines contain anti-histamines and stimulants. These should be avoided. Excessive aspirin cause gastric bleeding.
186. Never self-medicate. If a pilot is so unwell that medication is required, then he/she should consider himself/herself unfit to fly.
187. As a general rule always try and see a qualified aviation specialist
188. Homeostasis is the tendency of the internal environment of the body to remain constant in spite of varying externals conditions.
189. Physical stress is when outside conditions either put a strain upon the homeostatic mechanisms of the body or are so extreme as to nullify them.
190. Responses to stress are : sweating, dry mouth, breathing difficulties, raised pulse, anxiety, fatigue.
191. Imaginary stress is sometimes referred to as anxiety.
192. The shape of the graph when stress (or anxiety) is compared with performance is an inverted U.
193. The ANS (the Vegetative System) consists of the Sympathetic and Parasympathetic Systems
194. The Sympathetic System sets off the GAS Syndrome whereas the Parasympathetic System prolongs the body's mobilisation and, when the perceived danger is over, restores the body to normal functioning.
195. The Sympathetic and Parasympathetic Systems are neuro-hormonal in their make-up and are highly self-regulated under normal circumstances.
196. The 3 phases of GAS are : Alarm Reaction, Resistance and Exhaustion.
197. Good Stress stimulates and adapts the body whereas Bad Stress = Distress.
198. The 3 types of reaction of GAS are : Psychological, Psychosomatic and Somatic.
199. Eyeball resonance at 30 - 40 Hz. Resonance of the skull = 1 - 4 Hz.
200. Excessive sweating leads to depletion of body fluids and electrolytes.
201. Low humidity is a stressor/stress factor.

202. Internal physiological stressor/factors consist of : hunger, thirst, pain, lack of sleep and fatigue.
203. The two types of fatigue are : short-term and chronic.
204. Break point is that point after which, if stress continues, performance is degraded.
205. If the eye observes a close object the pupil becomes smaller and, if the object is at a distance, the pupil becomes larger.
206. In order to focus clearly on a near object, the lens is thickened. To focus on a distant point, the lens flattened.
207. The ossicles (Maleus, Incus & Stapes) are situated in the middle ear.
208. Paradoxical (REM) sleep increases as the night progresses. It refreshes the brain and memory.
209. You can only perceive what you can conceive.
210. Bottom-up processing = data driven perception, Top-down perception = conceptually-driven perception. When the two work together = interactive processing
211. Sensory threshold is the strength that a stimuli must reach before it is registered by a particular sense.
212. 2 types of attention : Divided and Selective (Cocktail-party Effect is an example of Selective Attention).
213. 2 types of overload = Qualitative (not understood) and Quantitative (too much).
214. The filters of perception are : past experience and learning.
215. 2 tools to improve STM are : Chunking and Association.
216. The main limitation of the Central Decision Maker is that it is single-channeled processing.
217. The normal response time is 0.2 of a second for a simple task.
218. A fault satisfies the operator's intent, but the intent itself was incorrect.
219. A slip does not satisfy the operator's intent although the intent was correct.

220. 4 types of learning : Operant Conditioning, Insight, Imitation and Experience.
221. Tools for retention of memory : Chunking, Association, Mnemonics, Repetition, Revision and Research
222. Jens Rasmussen introduced the SRK Model (Skill-based, Rule-based and Knowledge-based Behaviour).
223. Following an approach plate is an example of Rule-based behaviour.
224. Atmospheric pressure changes are non-linear with a higher rate of change at lower altitudes.
225. Rewards may be intrinsic (feeling of pride or achievement) or extrinsic (promotion).
226. The vestibular apparatus consists of the semi-circular canals and the ossicles
227. The Gestalt Theory is concerned with perception.
228. Illusions when taxiing : Relative movement and height above the taxiway.
229. Autokinesis is the illusion that a star is moving (danger is : muddle between aircraft lights and stars).
230. A scan should be short, sharp movements (to avoid empty field myopia) of 10° pausing at intervals of 2 seconds.
231. Zeitgebers keep the body on the unnatural 24 hours cycle (natural cycle = 25 hours). The most important Zeitgeber is the sun.
232. Sleep is difficult when the body temperature is increasing and much easier when the temperature is descending.
233. Jet-lag = Circadian Disrhythmia. Recovery rate is 1 day for every 90 minutes of jet-lag.
234. It takes about 5 minutes to recover fully from a nap.
235. Vigilance is the degree of activation of the CNS.
236. Personality traits are stable and genetically determined. The ideal personality for a pilot is that of a stable extrovert.
237. Attitude is a way of behaving and feeling about an object or class of objects.
238. G+ P+ is the ideal interactive style for a pilot.

239. When there is too much cohesion, Groupthink can have negative results.
240. Factors affecting Group Decisions are Role, Status, Ability, Conformity, Compliance, Status, Persuasion, Risky Shift and Group Duration.
241. A group decision is better than the average decision made by individuals within the group.
242. The pulmonary vein takes oxygenated blood from the lungs to the left atrium and the pulmonary artery takes de-oxygenated blood from the right ventricle to the lungs.
243. Personality is based on Heredity, Upbringing, Experience and Childhood.
244. Mode Error is to do with automation.
245. Paul Watzlawick's first axiom of Communication states that : one cannot not communicate.
246. Berlo's six components of interpersonal communications are : Source, Message, Encoder, Channel, Receiver and Decoder. Should only the four most basic be asked in the examination : Source, Message, Channel and Receiver.
247. 3 types of questions : Implicit (Open), Explicit (Closed) & Leading question.
248. Workload varies dependent on the situation, the pilot's expertise and the ergonomics of the system.
249. The effects of Jet Lag varies from person to person.
250. Intra-conflict = internal conflict within oneself . Inter-conflict = between two or more persons.
251. Conflict tends to escalate.
252. Tools to solve conflict are : Inquiry, Active Listening, Advocacy, Feedback, Metacommunications, Negotiation and Arbitration.
253. Metacommunications covers all the varieties of expression, body language, facial gestures, tone and pitch of voice etc. Ie everything except the words themselves.
254. Briefings should be short (less than 10 ideas).
255. 2 types of synchronisation : Cognitive and temporal.

256. Good synergy = $1 + 1 = > 2$. Poor synergy = $1 + 1 = < 2$.
257. The SHEL(L) Concept = Liveware, Software, Hardware and Environment.
258. Human error is inevitable.
259. Checklists should take full advantage of fonts, italics and cases to ensure clarity and emphasis.
260. Human error will always occur but can be decreased by training and technology.
261. Where a colour change is used to indicate a change of state, it should be accompanied by a change of caption or location.
262. 2 types of failures : Active (immediate effect and normally at the human-system interface) and Latent.
263. Protected system = 1 brick out and the wall system still stands. Vulnerable system = 1 brick out and the whole wall/system collapses.
264. Deciding = arbitrary. Decision-making = step-by-step scientific process (sometimes referred to as the Judgement Concept).
265. Advantages of Man over machine = creativeness, innovation, aptitude to deal with novel situations.
266. Decision-making = Diagnosis and define objective, Collect Information, Risk Assessment, Develop options, Evaluate Options, Decide, Implement Decision, Evaluate Consequences & Review and Feed-back.
267. Time can be a Stressor/Stress Factor which increases lineally as the deadline approaches.
268. 2 types of risk : External (Objective) and Internal (Subjective) Risk.
269. Man is not good at assessing risk.
270. Press-on-itis is normally the result of a pilot avoiding a sure loss and choosing a possible loss (even though the possible loss may end in disaster).
271. Deterioration Effect is normally the result of either lack of practice or over-confidence.
272. As little as 200 mg intake of caffeine can lead to a reduction of performance.

- 273. Aircrew should restrict daily caffeine intake to 250 - 300 mg a day.
- 274. The law governing the oxygen transfer at the alveoli is the Gas Diffusion Law (Fick)
- 275. Stressors, effects of carbon-monoxide poisoning, sleep deficit and inter-personal conflict are all cumulative.
- 276. Efficient crew co-ordination depends on effective communications and cooperation.
- 277. The use of Polaroid sunglasses should be avoided since problems can occur when used with laminated aircraft windscreens.
- 278. The most dangerous type of incapacitation is insidious.
- 279. The Otoliths are sometimes referred to as the Utricles and Saccules.
- 280. On initiating recovery from a spin, the pilot may have a strong sensation of turning in a direction opposite to that of the spin.
- 279. Dizziness is a symptom which marks the beginning of hyperventilation.
- 280. Subcutaneous means beneath or under the skin.
- 281. Proprioceptive stimuli are completely unreliable when visual contact with the ground is lost or when flying IMC and must be ignored.
- 282. Dalton's Law is associated with hypoxia and night vision.
- 283. Energy is derived from Carbohydrates, fats and Protein.
- 284. The effects of alcohol increase with altitude.
- 285. Flash blindness from thunderstorms can be avoided by turning up the cockpit lights and looking inside the cockpit
- 286. The Oculogyral Illusion is a false sensation of movement of an object viewed by such a pilot. It is the visual sister to the Somatogyral Illusion.
- 287. The Somatogyral Illusion is the sensation of turning in the opposite direction that occurs whenever the body undergoes angular deceleration from a condition of persisting angular velocity.
- 288. The Somatogavic Illusion is the illusion of pitching up or down as a result of the movement of the Otoliths due to linear acceleration. On take-off this is exacerbated by

the resultant vector of the g forces acting on the pilot and aircraft.

289. The Oculogravic Illusion is the visually apparent movement of a forward object that is actually in a fixed position relative to the observer due to the displacement of the Otoliths.
290. The Cerebellum is the part of the brain which is responsible for balance and one of its main inputs is from the Vestibular Apparatus.
291. Light sensitive lenses (Photochromic) are generally forbidden for use in flight.
292. Fog/mist/snow make objects appear to be further away than they really are. On finals this leads to a steeper approach than normal.
293. From SL - 10,000ft. is known as the indifferent zone altitude. Daytime vision is unaffected up to this altitude. However there is slight impairment of night vision. This can be as low as 5,000 ft.
294. 70% of information processed by man enters the visual channel.
295. The 4 Stages/Zones of Hypoxia are :
 1. The Indifferent Stage/Zone. GL - 10,000 ft
 2. The Compensatory Stage/Zone. 10,000 ft - 15,000 ft
 3. The Disturbance Stage/Zone. 15,000 ft - 20,000 ft
 4. The Critical Stage/Zone. 20,000 ft - 23,000 ft

OR

The 3 Thresholds of Hypoxia

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|----|---------------------------|---------------------|
| 1. | The Reaction Threshold | GL – 7,000 ft. |
| 2. | The Disturbance Threshold | 7,000 – 12,000 ft. |
| 3. | The Critical Threshold | 12,000 – 22,000 ft. |
296. Commitment refers to the degree of commitment to a solution when making a decision and which represents the point of no return.
 297. Decision-making is a systematic and analytical process.
 298. Co-action can be defined as working in parallel to a common goal.
 299. Personality is based on: Heredity, Childhood, Upbringing & Experience
 300. Vision through the functioning of the Rods is called Scotopic Vision whereas vision through the operation of the Cones is known as Photopic Vision.

- 301. Presbycusis causes loss of high tones.
- 302. Blood from the pulmonary artery low in oxygen and rich in carbon dioxide
- 303. Body temperatures of above 38°C and below 35°C will result in a degradation of mental and physical capabilities.
- 304. The eye can adjust to sudden high levels of illumination in about 10 seconds.
- 305. Carbon dioxide diffuses from the blood into the lungs during external respiration.
- 306. Oxygen diffusion from the blood to the cells depends on the oxygen partial pressure gradient
- 307. Excessive use of aspirin may cause gastric bleeding.
- 308. The behaviour of a leader depends upon the situation, the goals and the composition of the group
- 309. Greyout then blackout occurs with +Gz
- 310. Pilots should not fly for at least 12 hours after a local anaesthetic and 48 hours following a general anaesthetic.
- 311. EASA-OPS specifies that the maximum blood alcohol limit is 20 milligrams per 100 milliliters.
- 312. The blood alcohol concentration associated with a highly significant increase in errors associated with both experienced and inexperienced pilots even in a simple aircraft is 40 milligrams per 100 milliliters.
- 313. Stressors are both internal and external factors.
- 314. Pain in the cavities of the skull which accompanies a change of altitude is known as Barotrauma.
- 315. On expiration there is a higher CO₂ content than on intake.
- 316. Presbycusis is loss of hearing due to age and which effects high tones first.
- 317. Metacommunications compliment verbal communications.
- 318. Attitude is a person's response to a situation, person or object.

319. Under normal conditions, external respiration is a subconscious process that occurs at a rate of 12 to 20 breaths/min, averaging 16 breaths/minute.
320. Murphey's Law states that If anything can go wrong, it will. For example , if a system can be operated incorrectly, sooner or later it will be.
321. Anaemia is a lack of haemoglobin.
322. Anaemia can be caused by a defect in the bone marrow, lack of iron or bleeding.
323. The function of the retina is to convert light signals into electrical impulses.
324. When flying below 10,000 ft, significant symptoms of hypoxia are unlikely and hyperventilation may be assumed.
325. Automation is to assist rather than replace the pilot leaving him/her to make higher level decisions.
326. The pilot must at all times remain in control of the automation and aware of what it is doing
327. At internal body temperature of around 34.5°C, shivering will tend to cease and the body will get colder and colder.
328. Physical and mental performance start to be significantly impaired at an internal body temperature of about 38°C.
329. At height humidity in the cockpit can vary between 5% and 15%. Thus Flight Crew need to be careful to drink sufficient fluids in flight to avoid dehydration
330. A person suffering from extreme cold will feel a sense of contentment or apathy
331. Behaviour is the outward result of both personality and attitude.
332. Having given bone marrow you cannot fly for 48 hours.
333. The normal humidity in the cockpit should be approximately 30%.
334. A pilot carrying out a spin experiences radial acceleration.
335. Tar is the carcinogenic substance in cigarettes that can modify cells and cause cancer.
336. Most ozone is found in the Stratosphere.

- 337. Tuned resonance of the body parts, distressing the individual can be caused by Resonance between 1 - 100 Hz
- 339. As a result of hyperventilation the blood becomes more alkaline.
- 340. Hyperventilation can be caused by high acidity of the blood, shock or anxiety.
- 341. Good quality sunglasses provide no distortion of aircraft windscreens.
- 342. Using commonly understood context, language and Metacommunications constitutes effective communications.
- 343. Motor programmes are behavioural sub-routines.
- 344. "Risky Shift" is the tendency of a group of individuals to take a more risky decision than the average individual in the group.
- 345. The alerting system for an important system failure should be an audio warning.
- 346. The muscles of the heart require their own blood supply. This is provided by the coronary artery.
- 347. Motivation is no substitute for a lack of knowledge.
- 348. Hyperventilation can cause spasms in the muscles and possible unconsciousness.
- 349. The error rate that can be expected to be acceptable given reasonable training is : 1 in 1,000
- 350. The number of muscles that control the eye is 6
- 351. The partial pressure of carbon dioxide in the lungs is lower than the pressure of CO₂ in the blood
- 352. The oxygen-carrying capacity of a smoker who smokes 20 to 30 cigarettes a day is reduced by approximately 10%.
- 353. The effects of carbon monoxide increases with altitude.
- 354. A reflex is a stereotype and involuntary reaction to a stimulation.
- 355. Shivering and Vasoconstriction of the exterior blood vessels will take place if the body is subjected to extreme cold.

356. Sweating and Vascodilation of the exterior blood vessels will take place if the body is subjected to extreme heat.
357. The human error rate that could be considered realistic following methodical training is 1 in 1,000.
358. If feeling unwell before a flight should you should assess your own fitness and, if necessary, consult an Aviation Specialist. If in any doubt about your fitness, do not fly.
359. The main purpose of pre-flight briefings is to form general information about the flight and allocate responsibilities and reactions to likely or problematic events
360. The Pressoreceptors are located in the carotid sinus
361. Pilots should have a good command of the English language
362. A reflex is a stereotyped and involuntary reaction to a stimulus
363. If peripheral resistance is increased, Systolic blood pressure rises.
364. Very high ambition and drive for success can lead to conflict in the cockpit.
365. The introduction of automation and improvements in glass cockpit can sometimes be detrimental to performance as some systems provide poor quality feedback to pilots.
366. Flying by the “seat of one’s pants” is not reliable and does not indicate spatial orientation.
367. If you have an incorrect mental model, it is resistance to correction.
368. Leadership qualities should include technical competency and good communications.
369. Depth perception when objects are close (less than 1 metre) is achieved by Binocular vision.
370. Hyperventilation can, after a long period of time, lead to unconsciousness due low partial pressure of oxygen to the brain.
371. The walls of the capillaries of the lungs are permeable to gases.
372. Diffusion at both tissue and alveolar levels is related to partial pressure.

373. The following physiological systems are involved with motion sickness :
1. Vestibular 2. Visual 3. Proprioceptive.
374. Jet-lag = Circadian Disrhythmia varies substantially between individuals.
375. Approaching a sloping-up runway, the pilot may feel that he is higher than he actually is. This illusion may cause him to land short of the runway.
376. Whereas Otic Barotrauma is worse in the descent, sinus barotrauma is as painful in the climb as in the descent.
377. Conductive Deafness is caused by damage anywhere in the ear or a blockage due to wax buildup or any other reason which may cause a blockage (swelling etc)
378. Climatisation when operating in a hot country will generally take at least 2 weeks.
379. The EASA exam can refer to “Routine Errors”. They means errors when in a Motor Programme. i.e. Action Slip and Environmental Capture.
380. The EASA exam can refer to “Negative Habit Transfer” or “Habit Reversion”. By this the exam means Regression.
381. Stress Management is designed to both prevent stress and to remove stress.
382. Barotrauma is caused by pressure differentials between the ambient pressure and the gases in the cavities of the human body.
383. The term “complacency” means unjustified self-confidence that can result in careless negligence
384. Confirmation Bias is to ignore information that indicates that a hypothesis or decision is poor.
385. Feedback ensures that information has been received and understood
386. The Seat-of-the-Pants sensation emanates from receptors (proprioceptors) in the muscles and joints sensitive to the movement and position of the body.
387. The illusion that an aircraft is taxi-ing too fast can be caused by rain and a headwind.
388. Most of the activity employed when flying a coordinated turn is Skill-based behaviour.
389. With respect to Maslow’s Hierarchy of Needs, motives lower in the hierarchy are aroused first and must be satisfied first.

390. Mental rehearsal is useful to all pilots.
391. An individual's perception of stress is the subjective evaluation of a situation and the perceived ability to cope with it.
392. The metabolism of alcohol is affected by time.
393. Once a mental model is constructed, there is a tendency to give undue weight to information that confirms the model (Confirmation Bias)
394. The part of the retina which has the highest visual acuity is the fovea.
395. Using commonly understood context, language and metacommunications constitutes effective communications.
396. Metacommunications compliment verbal communications
397. Motor programmes save resources and therefore attention, however they may result in Routine Errors.
398. When the visual image is focused in front of the retina, the condition is Myopia.
399. Hearing through bone conduction by-passes both the middle and the outer ear.
400. Oxygen diffuses from the lungs to the blood during external respiration.
401. The body loses water through the skin, lungs and kidneys.
402. The two systems of circulation are : the Pulmonary System (takes de-oxygenated blood from the heart to the lungs and returns oxygenated blood to the heart) and the Systemic System (delivers oxygenated blood to the body tissues to allow metabolism and returns de-oxygenated blood to the heart).
403. The brain controls breathing rate based upon the acidity of the blood.
404. An active Safety Culture is at the heart of a successful Management system.
405. The 3 types of Safety Culture are : Open Culture, Closed Culture and National Culture.
406. 3 factors that promote a good Safety Culture are : Leadership, Commitment and Good Example.

407. When any of the holes of all the “slices” of Reason’s Swiss Cheese Model align, a hazard will pass through leading to a failure.
408. 5 elements of a Safety culture are : an informed culture, a reporting culture, a learning culture, a just culture and a flexible culture.
409. 3 components of Threat and Safety Management (TEM) are : Treats, Errors and Undesired aircraft states.
410. 3 types of threats : Latent threats, Environmental threats and Organisational threats.
411. 3 types of errors relating to TEM : Aircraft handling errors, Procedural errors and Communication errors.
412. Undesired aircraft states are defined as : Flight crew induced aircraft speed or position deviations, misapplication of flight controls, incorrect systems configuration which are associated with a reduction of safety margins.
413. Counter-measures against threats, errors and undesired aircraft states are divided into Hard Resources and Human Resources.
414. Human Resources consist of the following strategy : Avoid, Trap and Mitigate (ATM).
415. Avoid : an attempt to foresee potential problems.
416. Trap : deal with threats and hazards as they occur.
417. Mitigate : deal with the consequences of an error that has occurred.
418. The Safety Culture is a subsection of National Culture
419. Dengue Fever is contracted from infected mosquitoes (which are active by day)
420. The main cause of diabetes is obesity.
421. TUC :

Altitude	Seated or at rest	Moderate activity
20,000 ft.	30 minutes	5 minutes
30,000 ft.	1 – 2 minutes	-
35,000 ft.	30 – 90 seconds	-
40,000 ft.	15 – 20 seconds	-

422. In a healthy human, low saturated blood can be found in the Pulmonary Artery.

423. Two pilot having an argument is where in Maslow's Hierarchy of Needs ?
Answer : Self-esteem needs.
424. EASA consider Cosmic Radiation to be among the cockpit stressors.
425. Accommodation is associated with the crystalline lens of the eye.
426. Alphanumeric information is limited to the foveal area of the retina.
427. DCS can be avoided by pre-oxygenation before exposure to high altitudes.
428. Euphoria is one of the principal symptoms of hypoxia.
429. The PNS consists of sensory and motor nerves.
430. Automation Complacency leads to passive monitoring.
431. The CNS analyses sensory information.
432. TEM = Threats, Errors and Undesired Aircraft States.
433. The sub-divisions of Threats in the TEM model are : Latent threats, Environmental threats and Organisational threats.
434. The subdivisions of Errors in the TEM model are : Aircraft Handling errors, Procedural errors and Communication errors.
435. The minimum time between scuba diving and flying is 12 hours.
436. Solar Radiation is considered to be a cockpit stressor.
437. Protection against Galactic Radiation is worst at the pole and best at the equator.
438. Night vision is affected in the Indifferent Zone or the Reaction Threshold
439. The International Standard Atmosphere (ISA) :
Temperature : +15°C
Pressure : 1013.25 (hPa)
Density : 1.225 kgs/m³
Lapse rate :
Temperature decreases 1.98°C/1,000 ft until 36,090 ft above which it remains constant at -56°C

440. Humidity : is the amount of water vapour in the air measured in grammes per cubic meters.
441. Absolute humidity is the water content of the air at a given temperature.
442. Relative humidity absolute humidity relative to the maximum for that temperature expressed as a percentage.
443. The object of lumbar support is to distribute pressure evenly between the discs of the back.
444. The subdivisions of Safety Culture are : An Informed culture, A Reporting culture, A Flexible culture, a Just culture, a Learning culture and a National culture.
445. The Competent pilot depends on his/her knowledge, skill and attitude.
446. The most critical types of perceptual illusions are : Visual, Auditory and Kinaesthetic.
447. As light decreases, the colour sensitivity of the eye decreases.
448. High noise frequency is more damaging to performance than low frequency.
449. Pressoreceptors' main function is that of Homeostatis.
450. If the sensory threshold is high, sensitivity lowers.
451. The maximum amount of minus g the body can tolerate is approximately -3g
452. Myopia is caused by a lengthened eyeball (the image falls in front of the fovea) whereas Hypermetropia is caused by a shortened eyeball (the image falls in behind the fovea).
453. NIHL (Noise induced hearing loss) is caused by long exposure to noise over 90 dbs
454. The Frenzel and Valsalva maneuvers are associated with Barotrauma
455. Central vision is at the Fovea which consists only of cones
456. The objectives of Human Performance are the safety and efficiency of the operation and the well-being of the individual.
457. Normal cabin pressure is 6,000ft – 8,000ft.

458. Exposure to aerodontalgia is normally in the climb only and is associated with the teeth
459. The most common form of general accidents is CFIT (controlled flight into terrain)
460. One of the outcomes of rapid decompression is cabin fogging or misting.
461. Hypoxic hypoxia can occur at any altitude.
462. The thresholds of oxygen requirements are :
 - Up to 10,000ft. – air only
 - 10,000 to 33,700ft. – oxygen/air mix
 - 33,700 to 40,000ft. – 100% oxygen
 - above 40,000ft. – 100% oxygen under pressure
463. Motor nerves are concerned mostly with reflexes.
464. 3 types of deafness are : Conductive, Presbycusis and NIHL.
465. The function of the Eustachian tube is to equalise the pressure between the outer and middle ear.
466. Hypoxia is the lack of sufficient oxygen to meet the needs of the body tissues which require oxygen for oxidation of carbohydrates from food to produce energy
467. As altitude increases total pressure will fall and the partial pressures will decrease
468. A method to avoid Confirmation Bias is to search for information that will falsify your theory.
469. The three types of Authority Gradient Cockpits are : Autocratic, Laisser-Faire and Synergistic.
470. The most dangerous characteristic of perception is that it is extremely resistant to correction.
471. The body adapts to repeated exposure of moderate levels of environmental stress.
472. Thorough flight preparation and briefings are the best methods of protection against and to avoid :
 - a. taking risks
 - b. stress
 - c. wasting time

- 473. The definition of Competency according to ICAO Annex 1 is :
Competency. A combination of **skills, knowledge and attitudes** required to perform a task to the prescribed standard.
- 474. In a multi-crew cockpit environment the most apt behavioural characteristic is that of an **adult**.
- 474. Excessive motivation leads to stress which adversely effects performance.
- 475. Expectation often guides the focus of attention towards a particular aspect while possible alternates are neglected.
- 476. The first stage in the information process is sensory stimulation.
- 477. Working memory enables us to remember a clearance long enough to write it down.
- 478. Our mental model of the world is based on both our past experiences and the sensory information we receive.
- 479. Learning can be enhanced by re-enforcing successful performance.
- 480. The most dangerous characteristic of perception is that it is resistant to correction.
- 481. Active listening is the behaviour which is most likely to promote a constructive solution to personal conflict.
- 482. Communication uses up resources, thus limiting the resources allocated to the work in progress.
- 483. The main risk of a “laissez-faire” cockpit is an inversion of authority.
- 484. The first cockpit tool that tends to suffer as a result of stress is cockpit communication.
- 485. Differences of opinion should be regarded as helpful.
- 486. Cognitive Coping is ignoring or rationalising the stress factor.
- 487. The main advantages of the human over machine are creativity, innovation and the aptitude to deal with novel situations.
- 489. The Cocktail Party Effect is the ability to pick up relevant information unintentionally.