Introduction to Aircraft Design
July-2023

Assignment 12

Q 1	Why do we need morphing in an aircraft?	
MSQ (1 mark)	(A)	To optimize it for Multi-role missions.
	(B)	To optimize it for a specific mission.
	(C)	To decrease its complexity.
	(D)	To improve its efficiency in all flight conditions.
Solution: (A), (D)		

Q 2	Which of the following is/are the benefit(s) of morphing in an aircraft?	
MSQ (1 mark)	(A)	Expansion of its flight envelope.
	(B)	Improvement in its performance.
	(C)	Reduction in the vibration or control flutter.
	(D)	Reduction of Drag.
Solution: (A), (B), (C), (D)		

Q 3	Which of the following is/are the challenge(s) about morphing in an aircraft?	
MSQ (1 mark)	(A)	Selection of components to morph.
	(B)	Selection of mechanisms to induce morphing.
	(C)	Conflict between rigidity and flexibility.
	(D)	Deciding how much to morph.
Solution: (A), (B), (C), (D)		

Q 4	Which of the following aircraft is/are capable of changing its/their sweep of the wings?	
MSQ (1 mark)	(A)	Tupolev Tu-160
	(B)	Bell X-5
	(C)	LCA Tejas
	(D)	MiG 23
Solution: (A), (B), (D)		

Q 5	Which of the following statement(s) is/are TRUE about a *Swing-Role* aircraft??	
MSQ (1 mark)	(A)	It can change the sweep of this wing during flight.
	(B)	It can switch between various mission sets during a given mission.
	(C)	It has an ability of a quick role change at short notice.
	(D)	It is an unmanned aircraft with a highly unstable configuration.
Solution: (B), (C)		

Q 6	Which of the following structural technologies can be used for Morphing?	
MSQ (1 mark)	(A)	Rigid mechanism for Wing extension.
	(B)	Compliant mechanism for Wing Camber and Twist.
	(C)	Inflatable wings.
	(D)	Shape memory alloys.
Solution: (A), (B), (C), (D)		

Q 7	Which of the following is/are the benefit(s) of Inflatable wings?	
MSQ (1 mark)	(A)	Low cost
	(B)	Low Packing efficiency
	(C)	Impact Resistance
	(D)	Reusable
Solution: (A), (C), (D)		

Q 8	Which of the following is/are the limitation(s) of Inflatable wings?	
MSQ (1 mark)	(A)	Potential for leakages
	(B)	Low Aspect Ratio
	(C)	Thicker airfoil required
	(D)	High structural weight
Solution: (A), (B), (C)		

Q 9	Why is Rigidization required in Inflatable wings?	
MSQ (1 mark)	(A)	To reduce leakages
	(B)	To make the wings more stiffer
	(C)	To increase wing t/c
	(D)	To reduce required inflation pressure
Solution: (A), (B)		

Q 10	_____ is a degree of air superiority wherein the opposing air force is incapable of effective interference.	
MCQ (1 mark)	(A)	Air Control
	(B)	Air Dominance
	(C)	Air Parity
	(D)	Air Supremacy
Solution: (D)		

Q 11	_____ is the lowest level of control, where a side only holds control of skies above friendly troop positions.	
MCQ (1 mark)	(A)	Air Control
	(B)	Air Dominance
	(C)	Air Parity
	(D)	Air Supremacy
Solution: (C)		

Q 12	Which of the following aircraft is/are Airborne Early Warning and Control (AEW&C) aircraft?	
MSQ (1 mark)	(A)	Boeing E-3 *Sentry*
	(B)	Grumman E-2 *Hawkeye*
	(C)	DRDO *Netra*
	(D)	Lockheed EC-121 *Warning Star*
Solution: (A), (B), (C), (D)		

Q 13	Which of the following is/are the roles and missions of Air-to-Air fighter aircraft?	
MSQ (1 mark)	(A)	Close Air Support
	(B)	Close Combat
	(C)	Interdiction
	(D)	Reconnaissance
Solution: (B), (C)		

Q 14	Which of the following statement(s) is/are TRUE about Close Air Support?	
MSQ (1 mark)	(A)	The term was first coined during World War II.
	(B)	Requires excellent coordination with ground forces.
	(C)	Can be conducted using directed energy weapons such as lasers.
	(D)	Military helicopters are often used for this role.
Solution: (B), (C), (D)		

Q 15	Which of the following is/are the requirement(s) of a Ground Attack fighter aircraft?	
MSQ (1 mark)	(A)	Relaxed Static Stability
	(B)	Low speed maneuverability
	(C)	Survivability
	(D)	High Thrust to Weight ratio
	(E)	Short Take-off and Landing
	(F)	Payload carrying capacity
Solution: (B), (C), (E), (F)		