

# Introduction to Aircraft Design

## July-2023

### Assignment 3

Q 1	Which of the following is the largest supersonic aircraft with variable sweep wing?	
MCQ (1 mark)	(A)	<i>Bell X-5</i>
	(B)	<i>Dassault Mirage G</i>
	(C)	<i>Tupolev Tu-160</i>
	(D)	<i>General Dynamics F-111</i>
Solution: (C)		

Q 2	Which of the following statement(s) is/are TRUE about <i>Hondajet HA-420</i> ?	
MSQ (1 mark)	(A)	It has Natural Laminar Flow over its entire wing and nose.
	(B)	Its fuselage is constructed primarily from Carbon composites.
	(C)	It has engines mounted over the wings.
	(D)	Its optimum cruising altitude is 15 km.
	(E)	The 420 in its name stands for its design cruising speed in knots.
	(F)	Its shape was inspired by Salvatore Ferragamo shoes.
	(G)	It has won many design awards.
Solution: (B), (C), (E), (F)		

Q 3	Which of the following statement(s) is/are TRUE about <i>Airbus A-380</i> ?	
MSQ (1 mark)	(A)	It is the only full length double deck airliner.
	(B)	It is powered by two turbofan engines.
	(C)	It was retired from service in December 2021.
	(D)	It is the largest airliner in the world.
Solution: (A), (D)		

Q 4	Read the following statements and choose the correct option:  I. <i>Terrafugia SF-2</i> has seating capacity of six people. II. <i>AeroMobil 4.0</i> has seating capacity of four people. III. <i>AeroMobil 4.0</i> is powered by small size Turbofan engines.	
MCQ (1 mark)	(A)	All the statements are correct.
	(B)	Only I is correct.
	(C)	Only II is correct.
	(D)	Only III is correct.
	(E)	Both I and II are correct.
	(F)	Both I and III are correct.
	(G)	Both II and III are correct.
	(H)	All the statements are incorrect.
Solution: (H)		

Q 5	Which of the following is/are first generation fighter jet?	
MSQ (1 mark)	(A)	<i>Messerschmitt Me 262</i>
	(B)	<i>Dassault Mirage III</i>
	(C)	<i>Lockheed P-80 Shooting Star</i>
	(D)	<i>Gloster Meteor</i>
Solution: (A), (C), (D)		

Q 6	Which of the following is/are desirable requirement for a Combat Aircraft?	
MSQ (1 mark)	(A)	Low Wing Loading
	(B)	High Stealth
	(C)	High Maneuverability
	(D)	Low Thrust-to-Weight ratio
	(E)	Low IR signature
	(F)	Low fuel consumption
Solution: (B), (C), (E), (F)		

Q 7	Which of the following feature(s) is/are desirable for an airliner?	
MSQ (1 mark)	(A) Variable sweep wing	
	(B) Mid wing configuration	
	(C) Low emissions	
	(D) Low noise levels	
	(E) Twin boom configuration	
	(F) Butterfly tail configuration	
	(G) Single engine configuration	
Solution: (C), (D)		

Q 8	Read the following statements and choose the correct option: I. Engines mounted above the wing do not lead to load relief. II. Engines mounted below the wings have better propulsive efficiency. III. Mounting of engines in the nacelles results in lower weight.	
MCQ (1 mark)	(A) All the statements are correct.	
	(B) Only I is correct.	
	(C) Only II is correct.	
	(D) Only III is correct.	
	(E) Both I and II are correct.	

	(F)	Both I and III are correct.
	(G)	Both II and III are correct.
	(H)	All the statements are incorrect.
Solution: (H)		

Q 9	Which of the following statement(s) is/are TRUE about <i>Sukhoi Su-47 Berkut</i> ?	
MSQ (1 mark)	(A)	It has forward swept wings.
	(B)	It has lifting canards.
	(C)	It has two tailbooms whose lengths are not equal.
	(D)	It has thrust vectoring nozzles.
	(E)	It is fitted with multi element Elevons.
	(F)	It has extremely high agility at subsonic speeds.
	(G)	It was a technology demonstrator.
Solution: (A), (C), (D), (F), (G)		

Q 10	Which of the following statement(s) is/are TRUE about Canards?	
MSQ (1 mark)	(A)	They reduce the subsonic to supersonic aerodynamic center shift.
	(B)	They are beneficial only on ab-initio Trainer aircraft.
	(C)	They can disturb the flow ahead of the main wing.
	(D)	They can reduce the stealth characteristics of an aircraft.
	(E)	They have never been used on Transport aircraft.
	(F)	They never have Flaps installed on them.
Solution: (A), (C), (D)		

Q 11	Which of the following statement(s) is/are TRUE about Flying wing?	
MSQ (1 mark)	(A)	Better aerodynamic efficiency
	(B)	Better Stealth characteristics
	(C)	Lower All up weight
	(D)	Limited longitudinal CG range
Solution: (A), (B), (C), (D)		

Q 12	Which of the following statement(s) is/are TRUE about Three surface aircraft configuration?	
MSQ (1 mark)	(A)	It can allow the aircraft to have a large longitudinal CG range.
	(B)	It can relieve the load on the wings.
	(C)	It always results in a heavier aircraft.
	(D)	It helps in improving Short Takeoff and Landing performance.
	(E)	The middle surface always carries the highest Lift.
	(F)	It can lead to safer stalling characteristics.
	(G)	It has never been used for a military aircraft.
Solution: (A), (B), (D), (F)		

Q 13	Which of the following statement(s) is/are TRUE about Winglets?	
MSQ (1 mark)	(A)	They result in a lower Induced Drag.
	(B)	They increase the effective wing Aspect Ratio.
	(C)	They reduce the aircraft empty weight.
	(D)	They can be deflected to increase rolling moment.
	(E)	They are always mounted above the wing tip.
Solution: (A), (B)		

Q 14	Which of the following statement(s) is/are TRUE about Blended Wing Body (BWB) aircraft?	
MSQ (1 mark)	(A)	They have distributed structural load.
	(B)	They have lower wetted area.
	(C)	They have better aerodynamic efficiency.
	(D)	It is easy to modify the baseline aircraft to create another variant.
	(E)	It results in excellent lifting ability and Pitch control at low speeds.
	(F)	It can result in severe issues in passenger evacuation during emergencies.
Solution: (A), (B), (C), (F)		

Q 15	Which of the following statement(s) is/are TRUE about <i>White Knight Two</i> aircraft?	
MSQ (1 mark)	(A)	It has a service ceiling of 21 km AMSL.
	(B)	It is the largest aircraft in the world.
	(C)	It is equipped with two jet engines.
	(D)	It can lift a Payload of 17 tonnes to an altitude of 15 km AMSL.
	(E)	It has a T-tail configuration.
	(F)	It has a maximum seating capacity of 160 passengers.
Solution: (A), (D)		

