



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

AERONAUTICAL ENGINEERING

ASSIGNMENT QUESTIONS

Course Name	: CONCEPTUAL DESIGN OF FLIGHT VEHICLES
Course Code	: A62115
Class	: III B. Tech II Semester
Branch	: Aeronautical Engineering
Year	: 2017 – 2018
Course Coordinator	: Ms. M Snigdha, Assistant Professor, Dept of AE
Course Faculty	: Ms. G Swathi, Assistant Professor, Dept of AE

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

S No	Question	Blooms Taxonomy Level	Course Outcome
ASSIGNMENT-I			
UNIT-I OVERVIEW OF THE DESIGN PROCESS, SIZING FROM A CONCEPTUAL SKETCH AIRFOIL AND GEOMETRY SELECTION, THRUST TO WEIGHT RATIO, WING LOADING			
1	Explain the different phases of aircraft design? Explain With neat sketches?	Understand	2
2	Explain in detail Conceptual design phase in Aircraft design? Explain With neat sketches?	Remember	2
3	Elaborate range? How it is useful to design process? Explain With an example?	Understand	2
4	Elaborate Endurance? How it is useful to design process? Explain With an example	Remember	2
5	Draw the sketches of various tail configurations that have been used to help the aircraft to recover from spin and explain how they are good for the job?	Understand	2
UNIT - II			
INITIAL SIZING & CONFIGURATION LAYOUT			
1	Explain in detail productibility considerations and maintainability considerations?	Remember	4
2	Explain weapons carriage for military aircraft and gun installation? Explain with neat sketches?	Understand	4
3	Derive the expression for turn rate in level flight ($d\psi/dt$) in terms of velocity and 'n' load factor?	Remember	4
4	Explain passenger compartment for a commercial aircraft? Explain With neat sketches?	Understand	4
5	Explain the factors involved in deciding the location of the wing with respect to the fuselage? Explain in detail?	Remember	4

S No	Question	Blooms Taxonomy Level	Course Outcome
UNIT-III PROPULSION & FUEL SYSTEM INTEGRATION, LANDING GEAR & SUBSYSTEMS			
1	Explain the different jet engine inlet locations (podded Engines)? Explain With neat sketch?	Understand	6
2	Describe the various types of landing gear. If you are designing a high subsonic airliner, which type of landing gear would you go for? Justify	Understand	6
3	Explain the working principle of conformal engine? With neat sketches?	Remember	6
ASSIGNMENT-II			
4	Explain the 'Integral fuel system' integration in a fighter jet? With neat sketch?	Remember	7
5	Explain briefly Oswald span efficiency method with neat sketches?	Understand	6
6	Explain landing gear arrangements for tail dragger, quadric-cycle, and multi-bogey?	Understand	7
UNIT-IV BASELINE DESIGN ANALYSIS- AERODYNAMICS & PROPULSION, STRUCTURES & WEIGHT AND BALANCE			
1	Describe Load distribution on wing - ideal and actual, Weight distribution on wing - ideal and actual, load paths in aircraft?	Remember	9
2	Compare air load distribution over a rectangular wing with an elliptic wing. Which one of these is superior and how? Which of these has higher numerical value of Oswald wing efficiency factor? Hence define Oswald's wing efficiency factor and its value for this plan form. Make use of sketches and plots?	Understand	8
3	Explain material selection for fuselage with neat sketch?	Remember	8
4	Derive the expression for installed engine thrust corrections for supersonic military aircraft?	Understand	9
5	Explain part power operation for turbojet and turbofan engines with neat sketches?	Remember	8
UNIT-V BASELINE DESIGN- STABILITY & CONTROL, PERFORMANCE AND CONSTRAINT ANALYSIS			
1	Distinguish between static stability and dynamic stability? Explain with example?	Understand	7
2	Derive the equation for longitudinal static stability and control for an aircraft?	Remember	6
3	Derive the equation for lateral static stability and control for an aircraft?	Understand	7
4	Solve the problem for antisubmarine turbo jet aircraft is designed for loiter of three hours at distance of 3,000 km from the base. The crew weighs 400 kg and payload a distance of 3,000 km from the base. The crew weighs 400 kg and payload weigh 4600 kg. The aircraft cruises at Mach 0.6 at an altitude of 10 km, where the speed of sound can be taken to be 300 m/s. The maximum value of (L/D) is 16. Calculate the omission fuel weight fraction of the aircraft if the specific fuel consumption is 0.015 grams per Newton per second	Remember	7
5	Explain the following terms and explain how these terms affect the aerodynamic design of a civil jet aircraft Tail plane incidence, Angle of attack of wing, Cross winds, Slenderness ratio of fuselage?	Understand	7

Prepared By: Ms. M Snigdha, Assistant Professor, Dept of AE
Ms. G Swathi, Assistant Professor, Dept of AE

HOD, AE