



Reg.No. _____

End Semester Examination – Nov/Dec - 2016

Code : 11AE204/12AE214
Sub. Name : Flight Mechanics and Performance/ Flight Dynamics

Semester : 2016-17 ODD
Duration : 3 hrs
Max. marks : 100

Q. No.	Questions	Marks
PART-A(10X1=10 MARKS)		
1.	Give any two methods to reduce the drag.	(1)
2.	Oswald efficiency of an elliptical wing is _____.	(1)
3.	What is load factor?	(1)
4.	Define turning rate.	(1)
5.	What is the significance of Stick Force Gradient?	(1)
6.	What is tab angle?	(1)
7.	Write the condition for positive lateral and directional stability.	(1)
8.	What are the weather cocking effects?	(1)
9.	Define auto rotation.	(1)
10.	What is the stability criterion of stick fixed case?	(1)

PART B(5 X 3= 15 MARKS)		
11	Define induced drag and give its formula.	(3)
12	Derive the quantitative formula for Endurance of a propeller driven aircraft.	(3)
13	Define Degree of Freedom and also write no of Degree of Freedom for an airplane.	(3)
14	State the basic requirements of the rudder.	(3)
15	Define Dynamic Stability?	(3)

PART C(5 X 15= 75 MARKS)			
16.	a.	What are the different types of drag? How the equation for induced drag is developed?	(10)
	b.	What are the forces and moments acting on a flight vehicle?	(5)
(OR)			
17.	a.	Explain variation of thrust, power and SFC with velocity and altitudes for air breathing engines.	(15)
18.	a.	Explain the equation of motion for a climbing flight and also explain the climb Hodograph?	(15)
(OR)			
19.	a.	What are the limitations of pull up and push over?	(5)
	b.	Derive the expressions for turn rate and turn radius.	(5)
	c.	What are the conditions for minimum drag and power required?	(5)
20.	a.	Explain and derive an equation for Moment @ CG with the aircraft tail contribution?	(8)
	b.	Explain Aerodynamic balancing? What are the different methods used for this?	(7)
(OR)			
21.	a.	Stick Force and Stick Force Gradient.	(8)
	b.	Write short Note on Derive Stick fixed and stick free Neutral Points.	(7)
22.	a.	Explain briefly the various situations of rudder requirements? Explain the phenomenon.	(8)
	b.	Explain coupling between rolling and yawing.	(7)
(OR)			

23.	a.	What is static directional stability? What are the contributions of various components in it?	(15)
24.	a.	Define the following: a. Phugoid motion. b. Spiral Divergence c. Dutch Roll	(4) (8) (3)
(OR)			
25.	a.	What are stability derivatives? Explain. Also brief on stick fixed case.	(15)

ALL THE BEST