

School of Aeronautics (Neemrana)

Question Paper For Back / Re-back Internal Assessment Examination (Theory) - Old Scheme i.e 2012 Syllabus

Instructions For Students / Faculty

Back / Re-back Internal Examination (Total 60 Marks, 2 Hrs, Syllabus From Beginning of The Session)

Total number of questions to be given are 10, each carrying 10 marks and it is compulsory to attend 2 questions from Part A and 4 questions from Part B. There is a choice of two questions out of four in part A and 4 questions out of 6 in Part B. Part A will be theoretical or derivation type (**Not More Than 70 Words For Question**). Part B will be fully numerically oriented questions (**Not More Than 70 Words For Question**), except for the list of subjects given below. No objective type or fill in the blanks shall be given, but subpart of question can be given for both Part A & B.

* **LIST OF ELABORATIVE THEORY QUESTION SUBJECTS:** Aircraft Materials, Aircraft System, Aircraft Rules & Regulation-I, Mechanics of Composite Materials, Aircraft Design, Aircraft Rules & Regulation-II, Avionics-I, Helicopter Theory, Maintenance of Airframe and System Design, Avionics-II, Airlines and Airport Management, Maintenance of Power Plant & Systems

FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORETICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'B' OF QUESTION PAPER

STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF EXAM, AND MAY LEAVE THE EXAM HALL ON EXPIRY OF ATLEAST OF 1 Hr FROM THE STARTING TIME OF EXAMINATION

Question Paper & Student Details

Name of Faculty*	<input type="text" value="CH.P.RUDESH"/>	Date of Submission of QP	<input type="text" value="15/03/2021"/>
Subject*	<input type="text" value="7AN5 – Aircraft Stability and Control (Old)"/>	Date of Examination*	<input type="text" value="18/03/2021"/>
Email Id of Faculty:*	<input type="text" value="prudesh@soaneemrana.org"/>	Course*	<input type="text" value="B.Tech (Aeronautical Engineering)"/>
Phone Number of Faculty*	<input type="text" value="832 860 7582"/>	Semester*	<input type="text" value="Semester : 7"/>

Student Name	<input type="text"/>	Student Reg No.	<input type="text"/>
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Part A

Question : 1*

Bring out the difference between equilibrium condition and trim condition for an airplane.

Lesson Plan*

Topic*

Source*

Question : 2*

Draw the axis system of aircraft and write the criteria of longitudinal, lateral and directional stability.

Lesson Plan*

16

Topic*

Directional stability

Source*

Aircraft stability and coi

Question : 3*

What do you understand by aerodynamic balancing. Discuss some techniques used for aerodynamic balancing.

Lesson Plan*

17

Topic*

Aerodynamic balancing.

Source*

Aircraft stability and coi

Question : 4*

Differentiate between auto-rotation and spin.

Lesson Plan*

20

Topic*

Directional stability

Source*

Aircraft stability and coi

Part B

Question : 1*

Consider a model of a wing body shape mounted in a wind tunnel. The wing area and chord of test model are 2 m² and 0.45 respectively is placed in stream of air at 110 m/s. The moment about C.G. when the lift is zero is found to be -13 N-m. When the model is pitched to another angle of attack, the lift and moment about the C.G. are 4000 N and 25 N.m, respectively. Calculate value of moment-coefficient about the aerodynamic-center and location of the aerodynamic center.

Lesson Plan*

25

Topic*

Aerodynamic center.

Source*

Aircraft stability and coi

Question : 2*

If the slope of the C_m versus C_L curve is -0.15 and the pitching moment at zero lift is equal to 0.08, determine the trim lift coefficient. If the center of gravity of the airplane is located at 30% of chord length, determine neutral point.

Lesson Plan*

29

Topic*

Neutral point.

Source*

Aircraft stability and coi

Question : 3*

Derive the equation of motion of an airplane.

Lesson Plan*

30

Topic*

Equation of motion

Source*

Aircraft stability and coi

Question : 4*

A twin jet engine has the following data: Thrust per engine = 10,000 N, Span wise distance between the two engine = 10 m, rudder effectiveness = -0.001/deg. Determine the rudder deflection angle to maintain zero side slip at 100 m/s in level flight at sea level with one engine completely out.

Lesson Plan*

31

Topic*

Neutral point.

Source*

NPTEL

Question : 5

Find the expression for the longitudinal stick free neutral point.

Lesson Plan

32

Topic

Neutral point.

Source

Aircraft stability and coi

Question : 6

Prove that wing contribution is unstable in longitudinal stability.

Lesson Plan

29

Topic

Longitudinal stability.

Source


Aircraft stability and coi

Upload Scanned Document In Case of Numerical or Diagram for any of the above question

Mention question number with relevant fig / numerical / equations.
Max 150 KB

Choose files or drag here

I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.



A handwritten signature in black ink, appearing to read "Anand", is written above a horizontal line. The signature is contained within a rectangular box.