

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="Dr Bipin Kumar Dwivedi"/>	Date of Submission of QP	<input type="text" value="27/11/2020"/>
Subject*	<input type="text" value="6AN3 - Aerodynamics I (Old)"/>	Date of Examination*	<input type="text" value="07/12/2020"/>
Email Id of Faculty:*	<input type="text" value="bipinkumardwivedi@soaneemrana.org"/>	Course*	<input type="text" value="B.Tech (Aeronautical Engineering)"/>
Phone Number of Faculty*	<input type="text" value="931 400 9035"/>	Semester*	<input type="text" value="Semester : 6"/>

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

Question : 1*

Derive the fundamental equation of thin airfoil theory.

Lesson Plan*

Topic*

Source*

Question : 2*

Prove that the lift coefficient for the inviscid, incompressible flow over a thin symmetrical airfoil at small angle of attack ' α ' is equal to ' $2\pi\alpha$ '.

Lesson Plan*

7

Topic*

Thin airfoil theory

Source*

FUNDAMENTAL OF AEROC

Question : 3*

Explain about the total power loss in wind tunnel.

Lesson Plan*

24

Topic*

Wind tunnel

Source*

INSTRUMENTATION, MEASUREMENTS

Question : 4*

Explain the following:
(a) Source flow and sink flow
(b) Doublet flow and vortex flow

Lesson Plan*

15

Topic*

Potential flow

Source*

FUNDAMENTAL OF AEROC

Part B

Question : 1*

For the given velocity equation $V = 3xi - 3yj$. Determine the equation for the streamline passing through Point (2,2).

Lesson Plan*

12

Topic*

Potential flow

Source*

FUNDAMENTAL OF AEROC

Question : 2*

Consider an NACA 2412 airfoil with a chord of 0.64 m in an airstream at standard sea level conditions. The freestream velocity is 70 m/s. The lift per unit span is 1254 N/m. Calculate the strength of circulation and drag per unit span.

Lesson Plan*

18

Topic*

Kutta-Joukowski theorem

Source*

FUNDAMENTAL OF AER

Question : 3*

Consider a thin flat plate at 5 deg. angle of attack. Calculate the:
(a) lift coefficient,
(b) moment coefficient about the leading edge,

Lesson Plan*

23

Topic*

Thin airfoil theory

Source*

FUNDAMENTAL OF AER

Question : 4*

Consider the incompressible flow of water through a divergent duct. The Inlet velocity and area are 1.524m/s and 0.93m², respectively. If the exit area is 4 times the inlet area, calculate the water flow velocity at the exit.

Lesson Plan*

25

Topic*

Wind tunnel

Source*

INSTRUMENTATION, ME

Question : 5

An open circuit subsonic wind tunnel of test section 1.2×0.9m is run by a 110kw motor. If the test section speed is 90m/s, calculate the energy ratio of the tunnel.

Lesson Plan

28

Topic

Wind tunnel

Source

INSTRUMENTATION, ME

Question : 6

In a fluid, the velocity field is given by
 $V = (3x+2y)\mathbf{i} + (2z+3x-2)\mathbf{j} + (2t-3z)\mathbf{k}$, Determine the velocity component
At point (1,-2,4).

Lesson Plan

15

Topic

Potential flow

Source

FUNDAMENTAL OF AER

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.

