

# 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="Maris Brightson C L"/>	Date of Submission of QP	<input type="text" value="30/11/2020"/>
Subject*	<input type="text" value="4AN1 - Introduction to Aeronautics (Old)"/>	Date of Examination*	<input type="text" value="04/12/2020"/>
Email Id of Faculty:*	<input type="text" value="marisbrightson@soaneemrana.org"/>	Course*	<input type="text" value="B.Tech (Aeronautical Engineering)"/>
Phone Number of Faculty*	<input type="text" value="805 667 7643"/>	Semester*	<input type="text" value="Semester : 4"/>

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

Question : 1\*

Explain the following with suitable diagrams  
(1) Aspect Ratio  
(2) Taper Ratio  
(3) T/C Ratio  
(4) Dihedral Wing  
(5) Anhedral Wing

Lesson Plan*	<input type="text" value="NA"/>	Topic*	<input type="text" value="Aerodynamics"/>	Source*	<input type="text" value="Introduction to Flight - J"/>
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Question : 2\*

Explain the fundamental Gas Turbine Cycle with suitable diagrams.

Lesson Plan\*

NA

Topic\*

Propulsion

Source\*

Introduction to Flight - J

Question : 3\*

With neat illustrative diagrams explain High Lift Devices.

Lesson Plan\*

NA

Topic\*

Flight Mechanics

Source\*

Introduction to Flight - J

Question : 4\*

Write short notes on  
(1) Critical Mach Number  
(2) Drag Divergence Mach Number

Lesson Plan\*

NA

Topic\*

Aerodynamics

Source\*

Introduction to Flight - J

## Part B

Question : 1\*

Explain the following NACA Airfoil Series. What will be their geometry if the chord length is 10 m.

- (1) NACA 0018
- (2) NACA 2416
- (3) NACA 24115
- (4) NACA 612-318
- (5) NACA 4414-14

Lesson Plan\*

NA

Topic\*

Aerodynamics

Source\*

Introduction to Flight - J

Question : 2\*

An aircraft is cruising at an altitude of 10 km with a speed of 645 km/hr. The weight of the aircraft is 725 kN. The Aspect Ratio, Span Efficiency factor & Profile drag coefficient of the wing are 9.5, 0.9 & 0.01 respectively. Aircraft wing area is 122.4 m<sup>2</sup>. Calculate

- (1) Induced Drag Coefficient
- (2) Drag force acting on the aircraft

Lesson Plan\*

NA

Topic\*

Aerodynamics

Source\*

Introduction to Flight - J

Question : 3\*

Consider a Turbojet airplane flying at a velocity of 900 Kmph with an altitude of 10 km. The inlet and exit areas of the engine are 0.5 m<sup>2</sup> and 0.3 m<sup>2</sup> respectively. The velocity and pressure of exhaust gases at the exit are 500 m/s and 0.305 bar respectively. Calculate the thrust of the Turbojet engine. If the fuel flow rate is 0.5 kg/s what will be its TSFC?

Lesson Plan\*

NA

Topic\*

Propulsion

Source\*

Introduction to Flight - J

Question : 4\*

A turbojet-powered aircraft flying at an altitude of 6 km. The speed of the aircraft is 850 km/hr. Airflow rate 20 kg/s & fuel-air ratio 1/50. The compressor ratio is 5 and the Turbine Inlet temperature is 1100 K.

C<sub>p</sub> of air & gas are 1005 & 1148 J/(kg K),  
Specific heat ratio of air & gas are 1.4 & 1.3

Calculate Thrust for ideal expansion.

Lesson Plan\*

NA

Topic\*

Propulsion

Source\*

Introduction to Flight - J

Question : 5

Derive the general Thrust equation for Jet Propulsion. What will be the thrust equation for (a) Turbojet Engines (b) Rocket Engines?

Lesson Plan

NA

Topic

Propulsion

Source

Introduction to Flight - J

Question : 6

Derive the expression for the relationship between Lift Coefficient and Pressure Coefficient.

Lesson Plan

NA

Topic

Aerodynamics

Source

Introduction to Flight - J

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.

