

School of Aeronautics (Neemrana)

I-04, RIICO Industrial Area, Neemrana, Dist. Alwar, Rajasthan

Approved by Director General of Civil Aviation, Govt. of India, All India Council for Technical Education
Ministry of HRD, Govt of India & Affiliated to Rajasthan Technical University, Kota & BTU, Bikaner Rajasthan

Question Paper For Internal Assessment Examination (Theory) - Credit 2 / 29

Instructions For Students / Faculty Mid Term I (Total 40 Marks, 1.5 HRS. Syllabus From Beginning Of Session)

- Part A: Total number of questions to be given are four, each carrying 2 marks and are compulsory to attend. There is no choice. They are short answer type questions (**Not More Than 25 Words For Both Question & Answer**), no objective type or fill in the blanks. Total 8 marks.
- Part B: Total number of questions to be given are five, out of which student has to answer any three. They are long answer type (**Not More Than 50 Words For Question Only**), each carrying 6 marks. Total 18 marks.
- Part C: Total number of questions to be given are three, out of which student has to answer any two. They are numerical answer type / fully elaborative type* (**Not More Than 70 Words For Question Only**), each carrying 7 marks. Total 14 marks.

Mid Term II & III (Total 60 Marks, 2 HRS. Syllabus From Beginning Of Session)

- Part A: Total number of questions to be given are ten, each carrying 2 marks and are compulsory to attend. There is no choice. They are short answer type questions (**Not More Than 25 Words For Both Question & Answer**), no objective type or fill in the blanks. Total 20 marks.
- Part B: Total number of questions to be given are six, out of which student has to answer any four. They are long answer type (**Not More Than 50 Words For Question Only**), each carrying 5 marks. Total 20 marks.
- Part C: Total number of questions to be given are three, out of which student has to answer any two. They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question Only**)*, each carrying 10 marks. Total 20 marks.

* **LIST OF ELABORATIVE THEORY QUESTION SUBJECTS:** 1 FY1 - 04 Communication Skills (Cr 2), 1 FY1 - 05 Human Values (Cr 2), 2 FY1 - 04 Communication Skills (Cr 2), 2 FY1 - 05 Human Values (Cr 2), 3 AN1 - 02 Technical Communication (Cr 2), 4 MH1 - 02 Technical Communications (Cr 2), 4 MH1 - 03 Economics and Financial Accounting (Cr 2), 5 AN5 - 12 Aircraft Maintenance Practices (Cr 2), 6 AN3 - 01 Mechanics of Composite Materials (Cr 2), 6 AN5 - 12 Aircraft Rules and Regulation (Cr 2), 6 MH3 - 01 Automobile Engineering (Cr 2).

FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'C' 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

Mid Term	Mid Term 3	Date of Submission	21/09/2020
Name of Faculty	Mr. Maris Brightson	Date of Examination	01/10/2020
Course	B.Tech (Aeronautical Engineering)	Semester	SEMESTER : 3
Batch	Combined Batches 18, 19, SF 2	Subject	3 AN4 - 05 Introduction to Aeronautics (Cr 2)

COURSE OUTCOMES FOR REFERENCE TO FRAME QUESTION PAPER


(Faculties are required to mention relevant Course Outcome number against the respective question in QP)

Course Outcome	COURSE OUTCOME Upon completion of the course, Students will be able to CO1: Describe the classification and working principles of different types of flight vehicles and its components. CO2: Illustrate the basic principles of aerodynamics, characteristics of airfoils and NACA numbering system for airfoil. CO3: Explain the methods of aircraft construction and characteristics of aircraft materials. CO4: Analyze the characteristics of aircraft propulsion systems with its merits, demerits and applications. CO5: Explain the working of Primary and secondary control surfaces of an aircraft.		
Email I'd	marisbrightson@soaneemrana.org	Phone No.	805-667-7643
Student Name		Student Reg No.	

Part A

Question : 1	Write any 3 differences between Lighter than Air Aircraft and Heavier than Air Aircraft.		
Lesson Plan No. - 3	Topic - Aviation History	Source - Introduction to Flight - J D Anderson	CO No. - 1
Question : 2	Define Bernoulli's Principle. Write Bernoulli's Equation.		
Lesson Plan No. - 4	Topic - Aerodynamics	Source - Introduction to Flight - J D Anderson	CO No. - 2
Question : 3	What is Induced Drag? Mention the methods to reduce Induced Drag.		
Lesson Plan No. - 8	Topic - Aerodynamics	Source - Introduction to Flight - J D Anderson	CO No. - 2
Question : 4	Define Drag Divergence Mach Number.		

Lesson Plan No. - 7	Topic - Aerodynamics	Source - Introduction to Flight - J D Anderson	CO No. - 2
Question : 5	Write any 3 differences between Monocoque Construction and Semi-Monocoque Construction.		
Lesson Plan No. - 12	Topic - Structures	Source - Introduction to Flight - J D Anderson	CO No. - 3
Question : 6	Name some metallic, non-metallic and composite materials used in aircraft.		
Lesson Plan No. - 14	Topic - Structures	Source - Introduction to Flight - J D Anderson	CO No. - 3
Question : 7	Define Isentropic Process. Write the Isentropic Relations between Pressure, Temperature and Density.		
Lesson Plan No. - 15	Topic - Propulsion	Source - Introduction to Flight - J D Anderson	CO No. - 4
Question : 8	Write the thrust equation for (1) Turbojet Engines (2) Rocket Engines		
Lesson Plan No. - 19	Topic - Propulsion	Source - Introduction to Flight - J D Anderson	CO No. - 4
Question : 9	Define Aerodynamic Efficiency.		
Lesson Plan No. - 22	Topic - Flight Mechanics	Source - Introduction to Flight - J D Anderson	CO No. - 5
Question : 10	Define Aircraft Drag Polar.		
Lesson Plan No. - 22	Topic - Flight Mechanics	Source - Introduction to Flight - J D Anderson	CO No. - 5
Part B			
Question : 1	Explain various classifications of Aircraft.		
Lesson Plan No. - 3	Topic - Aviation History	Source - Introduction to Flight - J D Anderson	CO No. - 1
Question : 2	Explain the following with suitable diagrams (1) Aspect Ratio (2) Taper Ratio (3) T/C Ratio (4) Dihedral Wing (5) Anhedral Wing		
Lesson Plan No. - 6	Topic - Aerodynamics	Source - Introduction to Flight - J D Anderson	CO No. - 2
Question : 3	Derive the expression for the relationship between Lift Coefficient and Pressure Coefficient.		
Lesson Plan No. - 10	Topic - Aerodynamics	Source - Introduction to Flight - J D Anderson	CO No. - 2
Question : 4	Explain the fundamental Gas Turbine Cycle with suitable diagrams.		
Lesson Plan No. - 16	Topic - Propulsion	Source - Introduction to Flight - J D Anderson	CO No. - 4
Question : 5	Explain the functions and working of Primary Flight Control Surfaces.		
Lesson Plan No. - 24	Topic - Flight Mechanics	Source - Introduction to Flight - J D Anderson	CO No. - 5
Question : 6	With neat illustrative diagrams explain High Lift Devices.		
Lesson Plan No. - 24	Topic - Flight Mechanics	Source - Introduction to Flight - J D Anderson	CO No. - 5
Part C			
Question : 1	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 ² . Calculate (1) Induced Drag Coefficient (2) Drag force acting on the aircraft		
Lesson Plan No. - 11	Topic - Aerodynamics	Source - Introduction to Flight - J D Anderson	CO No. - 2
Question : 2	(1) The pressure at a point of the wing of an airplane is 75800 N/m ² . The airplane is flying with a velocity of 70 m/s at an altitude of 2 km. Calculate the pressure coefficient at this point. (2) Consider the low-speed airplane flying at a velocity of 55 m/s. If the velocity at a point on the fuselage is 62 m/s, What is the pressure coefficient at this point.		

Lesson Plan No. - 10	Topic - Aerodynamics	Source - Introduction to Flight - J D Anderson	CO No. - 2
Question : 3	<p>A turbojet-powered aircraft flying at an altitude of 6 km. Speed of aircraft is 850 km/hr. Airflow rate 20 kg/s & fuel-air ratio 1/50. The compressor ratio is 5 and Turbine Inlet temperature is 1100 K.</p> <p>Cp of air & gas are 1005 & 1148 J/(kg K), Specific heat ratio of air & gas are 1.4 & 1.3</p> <p>Calculate Thrust for ideal expansion.</p>		
Lesson Plan No. - 20	Topic - Propulsion	Source - Introduction to Flight - J D Anderson	CO No. - 4
<p>Upload Scanned Document In Case of Numerical or Diagram For Any of The Above Questions. (Mention question number with relevant fig / numerical / equations. Max 150 KB)</p>			
<p>I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.</p>			

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