



NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA

Instructions for Students / Faculty

Mid Term I (Total 60 Marks, 2 HRS. Syllabus from Unit-1)

- Part A: Total number of questions to be given are six (3 from CO1 and 3 from CO2), 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 12 marks.
- Part B: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student has to answer four (2 from CO1 and 2 from CO2). They are long answer type (**Not More Than 50 Words for Question**), each carrying 4 marks. Total 16 marks.
- Part C: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student has to answer four (2 from CO1 and 2 from CO2). They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question**)*, each carrying 8 marks. Total 32 marks.

Mid Term II (Total 90 Marks, 2.5 HRS., Syllabus from Unit-2)

- Part A: Total number of questions to be given are ten (5 from CO3 and 5 from CO4), each carrying 3 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 30 marks
- Part B: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student has to answer four (2 from CO3 and 2 from CO4). They are long answer type (**Not More Than 50 Words for Question**), each carrying 6 marks. Total 24 marks.
- Part C: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student has to answer any four (2 from CO3 and 2 from CO4). They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question**)*, each carrying 9 marks. Total 36 marks.

Mid Term III (Total 90 Marks, 2.5 HRS., Syllabus from Unit-3)

- Part A: Total number of questions to be given are ten (5 from CO5 and 5 from CO6), each carrying 3 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 30 marks
- Part B: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6). They are long answer type (**Not More Than 50 Words for Question**), each carrying 6 marks. Total 24 marks.
- Part C: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6). They are numerical answer type / fully elaborative type (**Not More Than 70 Words For Question**)*, each carrying 9 marks. Total 36 marks.

* **LIST OF ELABORATIVE THEORY QUESTION SUBJECTS:** 3 MH4 - 07 Manufacturing Process, 4 AN4 - 06 Aircraft Materials and Processes (Cr 3), 5 AN4 - 05 Aircraft System (Cr 3), 6 AN4 - 05 Avionics-I (Cr 3), 6 MH4 - 03 Applied Hydraulics & Pneumatics (Cr 3), 6 MH5 - 11 Principles of Management (Cr 3), 6 MH5 - 13 Aircraft Electronics System (Cr 3), 7 AN5 - 12 Maintenance of Airframe and System (Cr 3), 7 AN5 - 13 Helicopter Theory (Cr 3), 7 AG6 - 60.1 Human Engineering and Safety (Cr 3), 7 ST - 01 Avionics II (Special Theory Subject) (Cr 3), 7 MH5 - 11 Design of Mechatronics Systems (Cr 3), 7 MH5 - 12 Robotics and Machine Vision System (Cr 3), 7 MH6 - 13 Medical Electronics (Cr 3), 7 AN6 - 60.1 Aircraft Avionic System (Cr 3), 8 AN5 - 12 Maintenance of Power Plant and System



Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 126 /

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA(Cr 3), 8 AN5 - 13 Unmanned Aerial Vehicles & Systems (UAV) (Cr 3), 8 MH5 - 13 Product Development & Launching
(Cr 3), 8 EC6 - 60.2 Robotics and control (Cr 3)**Instructions For Faculties**

There should be total 6 Course Outcomes (COs) for each subject.

- Mid Term Question Papers are to be submitted as per Course Outcomes (COs) which should be divided equally in Part A, Part B and Part C according to Mid Term Examination and Credit Point.
- In Mid Term-1, the questions are to be given from CO1 and CO2. In Mid Term-2, the questions are to be given from CO3 and CO4. Similarly, in Mid Term-3, the questions are to be given from CO5 and CO6.
- **FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'C' OF QUESTION PAPER**

INSTRUCTION FOR STUDENTS

- **STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF EXAM,**

QUESTION PAPER & STUDENTS DETAILS

Type of Exam	Mid Term 3	Date of Submission	21/07/2021
Name of Faculty	Mr. Bipin Kumar Dwivedi	Date of Examination	27/07/2021
Course	B.Tech (Aeronautical Engineering)	Semester	SEMESTER : 6
Batch	Combined Batches 15, 16, 17, SF 1	Subject	6 AN4 - 04 Aircraft Performance (Cr 3)-

COURSE OUTCOMES FOR REFERENCE TO FRAME QUESTION PAPERS

(Faculties are required to mention Course Outcome Number against each part of the question paper)

Course Outcome	CO 5. Demonstrate about the flight envelope and turning performance of airplanes. CO 6. Explain the working of High Lift devices and its performance parameters.		
Email I'd	bipinkumardwivedi@soaneemrana.org	Phone No.	931-400-9035
Student Name		Student Reg No.	

PART A

All the questions are compulsory to attend.

1. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE. CO 5

Question : 1	Define the equation of motion for take-off.		
27	Take-off performance	INTRDUCTION TO FLIGHT BY JHON D ANDERSON	



Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 126 /

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA

Question : 2	Define the equation of motion for landing.		
28	Landing performance	INTRDUCTION TO FLIGHT BY JHON D ANDERSON	
Question : 3	Define the lift-off velocity.		
29	Take-off performance	INTRDUCTION TO FLIGHT BY JHON D ANDERSON	
Question : 4	Define the lift-off distance.		
30	Take-off performance	INTRDUCTION TO FLIGHT BY JHON D ANDERSON	
Question : 5	Define the ground effect.		
32	Take-off performance	INTRDUCTION TO FLIGHT BY JHON D ANDERSON	
2. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.			CO 6
Question : 6	Define the level turn of aircraft.		
31	Turning performance	INTRDUCTION TO FLIGHT BY JHON D ANDERSON	
Question : 7	Define the pull-up maneuver of aircraft.		
33	Turning performance	INTRDUCTION TO FLIGHT BY JHON D ANDERSON	
Question : 8	Define the bank turn angle of aircraft.		
34	Turning performance	INTRDUCTION TO FLIGHT BY JHON D ANDERSON	
Question : 9	Define the load factor of aircraft.		
35	Turning performance	INTRDUCTION TO FLIGHT BY JHON D ANDERSON	
Question : 10	Define the use of flap in aircraft.		
37	flaps in aircraft	INTRDUCTION TO FLIGHT BY JHON D ANDERSON	



Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 126 /

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA**PART B**

FOR MIDTERM 1 - Part B: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2).

FOR MIDTERM 2 - Part B: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student must answer four (2 from CO3 and 2 from CO4).

FOR MIDTERM 3 - Part B: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6).

3. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.

CO 5

Question : 1

Derive the expression of lift-off distance.

27

Take-off performance

INTRDUCTION TO
FLIGHT BY JHON D
ANDERSON**Question : 2**

Derive the expression of ground roll distance.

29

Landing performance

INTRDUCTION TO
FLIGHT BY JHON D
ANDERSON**Question : 3**

Explain the factors affecting the lift-off distance.

30

Take-off performance

INTRDUCTION TO
FLIGHT BY JHON D
ANDERSON**4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.**

CO 6

Question : 4

Derive the expression of turn rate and turn radius for level turn of aircraft.

31

Turning flight

INTRDUCTION TO
FLIGHT BY JHON D
ANDERSON**Question : 5**

Derive the expression of turn rate and turn radius for pull-up maneuver of aircraft.

33

Turning flight

INTRDUCTION TO
FLIGHT BY JHON D
ANDERSON**Question : 6**

Derive the expression of turn rate and turn radius for pull-down maneuver of aircraft.

35

Turning flight

INTRDUCTION TO
FLIGHT BY JHON D
ANDERSON**Question : 7 (Old Pattern)**



Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 126 /

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA**PART C**

FOR MIDTERM 1 - Part C: Total number of questions to be given are six (3 from CO1 and 3 from CO2), out of which student must answer four (2 from CO1 and 2 from CO2).

FOR MIDTERM 2 - Part C: Total number of questions to be given are six (3 from CO3 and 3 from CO4), out of which student must answer four (2 from CO3 and 2 from CO4).

FOR MIDTERM 3 - Part C: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student has to answer four (2 from CO5 and 2 from CO6).

5. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.

CO 5

Question : 1

Consider an airplane has $S = 47 \text{ m}^2$, $AR = 6.5$, $e = 0.87$, $W = 103047 \text{ N}$ CD_0 is 0.032. The Airplane is equipped with two jet engines with 40,298 N of static thrust At Sea level. The thrust specific fuel consumption is 1.0 N of fuel per newton Of thrust per hour, the fuel capacity is 1900 gal, and the maximum gross Weight is 136,960 N. Calculate the maximum range .

28

Range and endurance

INTRDUCTION TO
FLIGHT BY JHON D
ANDERSON**Question : 2**

Consider an airplane has $S = 47 \text{ m}^2$, $AR = 6.5$, $e = 0.87$, $W = 103047 \text{ N}$ CD_0 is 0.032. The Airplane is equipped with two jet engines with 40,298 N of static thrust At Sea level. The thrust specific fuel consumption is 1.0 N of fuel per newton Of thrust per hour, the fuel capacity is 1900 gal, and the maximum gross Weight is 136,960 N. Calculate the maximum endurance .

29

Range and endurance

INTRDUCTION TO
FLIGHT BY JHON D
ANDERSON**Question : 3**

A light single engine propeller driven aircraft having the wingspan 10.912m, Wing area 16.165m², gross weight 13127.5 N, fuel capacity 65 gal of aviation gasoline, piston engine shaft power of 230 hp at sea level, Specific fuel consumption 2.0025 N/(hp x h), zero lift drag 0.025, span efficiency factor 0.8.
Estimate the maximum range for the airplane.

32

Range and endurance

INTRDUCTION TO
FLIGHT BY JHON D
ANDERSON**6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.**

CO 6

Question : 4

A light single engine propeller driven aircraft having the wingspan 10.912m, Wing area 16.165m², gross weight 13127.5 N, fuel capacity 65 gal of aviation gasoline, piston engine shaft power of 230 hp at sea level, Specific fuel consumption 2.0025 N/(hp x h), zero lift drag 0.025, span efficiency factor 0.8.
Estimate the maximum endurance for the airplane.

34

Range and endurance

INTRDUCTION TO
FLIGHT BY JHON D
ANDERSON



Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 126 /

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA

Question : 5	The characteristics of the airplane are, aspect ratio=6.2, wing area=16.82m ² , efficiency factor e=0.91, weight=13350N and zero lift drag coefficient=0.027. The airplane is powered by single piston engine of 345HP maximum at sea level and propeller has efficiency of 0.83. Estimate the landing ground roll for the airplane. Assume a paved runway, CLmax during ground roll is 1.8. After touch down assume zero lift.
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36	Landing performance	INTRDUCTION TO FLIGHT BY JHON D ANDERSON	
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Question : 6	Consider an airplane has wing area 47 m ² , aspect ratio 6.5, span efficiency Factor 0.87, weight 103047 N and zero lift drag coefficient is 0.032. The Airplane is equipped with two jet engines with 40,298 N of static thrust each at Sea level. Estimate the sea level lift-off distance for the airplane. Assume a paved runway, CLmax during ground roll is 0.8. Wings are 1.524m above the ground.
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38	Take-off performance	INTRDUCTION TO FLIGHT BY JHON D ANDERSON	
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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)	
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I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.	
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