School of Aeronautics (Neemrana) | School of Aeronautics

APPROVED BY DIRECTOR GENERAL OF CIVIL AVIATION, MINISTRY OF CIVIL AVIATION, GOVT. OF INDIA
APPROVED BY ALL INDIA COUNCIL FOR TECHNICAL EDUCATION & AFFILIATED TO RAJASTHAN TECHNICAL UNIVERSITY, KOTA
& BIKANER TECHNICAL UNIVERSITY, BIKANER, RUN & MANAGED BY L N VERMA MEMORIAL SOCIETY

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DELHI ADMINISTRATION, UNDER SOCIETIES REGISTRATION ACT XXI OF 1860.

Question Paper For Internal Assessment Examination (Theory) - Credit 4 / 31 / SET 1

Instructions for Students/FacultyMid Term I (Total 80 Marks, 2 HRS. Syllabus from Unit-1)

- Part A: Total number of questions to be given are ten (5 from CO1 and 5 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 20 marks.
- 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). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 5 marks. Total 20 marks.
- 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). They are numerical answer type / fully elaborative type (**Not More Than 70 Words for Question)** *, each carrying 10 marks. Total 40 marks.

Mid Term II (Total 120 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 4 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 40 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 7 marks. Total 28 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 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 13 marks. Total 52 marks.

Mid Term III (Total 120 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 4 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 40 marks.
- Part B: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student must answer four (2 from CO5 and 2 from CO6). They are long answer type (**Not More Than 50 Words for Question)**, each carrying 7 marks. Total 28 marks.
- Part C: Total number of questions to be given are six (3 from CO5 and 3 from CO6), out of which student must 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 13 marks. Total 52 marks.

* LIST OF ELABORATIVE THEORY QUESTION SUBJECTS: NO SUBJECT UNDER CREDIT FOUR

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.

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- 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, AND MAY LEAVE THE EXAM HALL ON EXPIRY OF ATLEAST OF 1 Hr FROM THE STARTING TIME OF EXAMINATION.

QUESTION PAPER AND STUDENTS DETAILS

Type of Exam	Mid Term 1	**Date of Submission**	19/03/2021
Name of Faculty	Mr. Korapati Akhil	**Date of Examination**	22/03/2021
Course	B.Tech (Aeronautical Engineering)	**Semester**	SEMESTER : 6
Batch	Combined Batches 15, 16, 17, SF 1	**Subject**	6 AN4 - 02 Propulsion-II (Cr 4)

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	CO 1. the basic concepts & fundamentals of Jet Engine Intakes and Exhaust Nozzles. CO 2. Apply the fundamental concepts of Jet Engine Combustion Chambers and its functions.
Email I'd	korapatiakhil@soaneemrana.org	**Phone No.**	701-345-8080
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.		1	
Question : 1	What are streamline and stream tube? Explain with neat sketch.		
2	1D gas dynamics	GAS TURBINES v ganesan	
Question : 2	Explain difference between laminar flow and turbulent flow?		
2	1D gas dynamics	GAS TURBINES v ganesan	
Question : 3	Explain about normal shock wave and oblique shock wave?		
5	Normal shock wave and oblique shock wave	GAS TURBINES v ganesan	
Question : 4	Explain about subsonic, sonic and supersonic flow		

| 2 | 1D Gas dynamics | GAS TURBINES v ganesan | |

Question : 5 | What is the difference between Air breathing and Non Air breathing engines

| 1 | Introduction | GAS TURBINES v ganesan | |

| **2. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.** | 2 |

Question : 6 | What are the various forms of combustion system?

| 9 | Combustion process | GAS TURBINES v ganesan | |

Question : 7 | Write short notes of air fuel ratio in gas turbine engine?

| 14 | Aircraft fuels | GAS TURBINES v ganesan | |

Question : 8 | Write short notes of fuel injection?

| 9 | Combustion process | GAS TURBINES v ganesan | |

Question : 9 | Write short notes of LHV and HHV fuels?

| 14 | Aircraft fuels | GAS TURBINES v ganesan | |

Question : 10 | write down about jet engine combustion chamber efficiency?

| 12 | combustion chamber efficiency | GAS TURBINES v ganesan | |

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.** | 1 |

Question : 1 | Explain flow through (i) open systemin (Flow process), and closed system (Non flow process).

| 2 | 1D gas dynamics | GAS TURBINES V Ganesan | |

Question : 2 | Explain the terms "stagnation pressure" and stagnation temperature?

| 2 | 1D gas dynamics | GAS TURBINES V Ganesan | |

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Question : 3	What is the aircraft engine system thrust reversing?		
7	Thrust reversing	GAS TURBINES V Ganesan	

4. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		2	

Question : 4	Classify the types of combustion chambers?		
10	Classify the types of combustion chambers	GAS TURBINES V Ganesan	

Question : 5	Explain about flame stabilizing zone in combustion chamber?		
13	flame stabilizing	GAS TURBINES V Ganesan	

Question : 6	Explain about flame tube cooling process?		
13	flame tube cooling process	GAS TURBINES V Ganesan	

Question : 7 (Old Pattern)			

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.		1	

Question : 1	supersonic wind tunnel the air temperature & pressure in the reservoir of the wind tunnel are To =1000K & Po =10atm. The static temperatures at the throat & exit are $T^* = 833$ K & Te =300 K,. The mass flow through the nozzle is 0.5 kg/s. For air, Cp = 1008J/(kg) (K). find i)velocity at throat V^*, ii) velocity at the exitVe, iii)Area of throat A^* iv) Ae.		
5	Flow through nozzle	INTRODUCTION TO FLIGHT JD ANDERSON	

Question : 2	Combustion chamber of a rocket engine fuel is burned, resulting with the following conditions : T0 = 3144 K, Po = 20 atm , R = 378 J/(kg) (K), & specific heat gas constant = 1.26 , Pe at the Ae is 1 atm . and the At is 0.1 m^2. flow through the nozzle, find (a) the velocity at the exit & (b) the mass flow through the nozzle		
5	Flow through the nozzle.	INTRODUCTION TO FLIGHT JD ANDERSON	

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Question : 3	Derive the equation of area velocity relation.		
5	Flow through the nozzle	INTRODUCTION TO FLIGHT JD ANDER SON	
6. CHOOSE COURSE OUTCOME (CO) NUMBER ACCORDING TO THE TYPE OF MIDTERM, AS PER INSTRUCTIONS ABOVE.		2	
Question : 4	The ratio of net work to turbine of an ideal gas turbine plant is 0.563. Take the inlet temperature to the compressor as 300 k calculate the temperature drop across the turbine if the thermal efficiency of the unit is 35%. Assume a mass flow rate of 10 kg/s, $Cp = 1KJ/Kg\ K$ and specific heat constant = 1.4.		
8	Combustion equations	GAS TURBINES v ganesan	
Question : 5	A gas turbine plant works between temperature limits of 300 K and 900 K the pressure limits are 1 bar and 4 bar. Estimate the thermal efficiency of the plant and shaft power available for external load in KW. Assume mass rate of flow of air to the compressor as 1600 kg/min		
11	Combustion performance	GAS TURBINES v ganesan	
Question : 6	Compute the indicated mean effective pressure and efficiency of a joule cycle if the temperature at the end of combustion is 350 K and 1 bar. The pressure ratio is assume $Cp = 1.005\ KJ/(Kg)\ (K)$.		
12	Effect of operating variable performance	GAS TURBINES v ganesan	
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)*			
I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.			