School of Aeronautics (Neemrana)

Question Paper For Internal Assessment Examination (Theory) - Old Scheme i.e 2012 Syllabus

Instructions For Students / Faculty

Mid Term I (Total 40 Marks, 1 Hr. & 30 Min)

Total number of questions to be given are 8, each carrying 10 marks and it is compulsory to attend 2 questions from each part i.e. Part A and B. There is a choice of two questions out of four in each part. 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.

Mid Term II (Total 50 Marks, 1 Hr. & 45 Min)

Total number of questions to be given are 8, each carrying 10 marks and it is compulsory to attend 2 questions from Part A and three questions from Part B. There is a choice of two questions out of four in part A and 3 questions out of 4 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.

Mid Term III (Total 60 Marks, 2 Hrs)

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 THEORITICAL 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

STARTING TIME OF EXAMINATION

Question Paper & Student Details

Mid Term* Mid Term 1

Name of Faculty* Deepali Gupta

Subject* 7AN3 – Aerodynamics II (Old)

Batch Eleventh (11)

Email Id of Faculty:* deepalisinghal19@gmail.com

Date of Submission of QP 02/09/2019

Date of Examination* 07/09/2019

Course* B.Tech (Aeronautical Enginee...

Semest... Semester : 7

Phone Number of Faculty* 914 930 0396

Student Name

Student Reg No.

Part A

Question : 1* Derive area-velocity relation.

Lesson Plan* 5 Topic* One- dimensional isentr Source* Book

Question : 2* Derive area ratio in terms of Mach number.

Lesson Plan* 8 Topic* One- dimensional isentr Source* Book

Question : 3* Derive continuity, momentum and energy conservation equations.

Lesson Plan* 5 Topic* One- dimensional isentr Source* Book

Question : 4* Define stagnation point and derive the relation between stagnation temperature and free stream temperature.

Lesson Plan* 5 Topic* One- dimensional isentr Source* Book

Part B

Question : 1* Define the types of flow in nozzle.

Lesson Plan* 8 Topic* One- dimensional isentr Source* Book

Question : 2* Consider the isentropic flow over an airfoil. The free stream conditions are T=245 K and P=4.35*10^4 N/m^2. At a point on the airfoil, the pressure is 3.6*10^4 N/m^2. Calculate the temperature, density and entropy difference at this point.

Lesson Plan* 8 Topic* One- dimensional isentr Source* Book

Question : 3*	Consider a point in a flow where the velocity and temperature are 396.24 m/s and 266.7 K, respectively. Calculate the total enthalpy at this point.				
Lesson Plan*	8	**Topic***	One- dimensional isentr	**Source***	Book
Question : 4*	Define enthalpy, bulk modulus and compressibility. State the difference between ideal gas and perfect gas.				
Lesson Plan*	2	**Topic***	One- dimensional isentr	**Source***	Book
Question : 5					
Lesson Plan		**Topic**		**Source**	
Question : 6					
Lesson Plan		**Topic**		**Source**	

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.

Answer Sheet Details	
Mid Term	Mid Term 1
Name of Faculty	Deepali Gupta
Subject	7AN3 – Aerodynamics II (Old)
Date of Submission of QP	19/09/2019
Batch	Tenth (10)
Email Id of Faculty:	deepalisinghal19@gmail.com
Date of Examination	09/09/2019
Course	B.Tech (Aeronautical Engineering)
Semester	Semester : 7
Phone Number of Faculty	914-930-0396

Part A	
Question : 1	Step 1: Write the governing equation i.e. continuity, momentum and energy equations. Step 2: From continuity equation take log on both side and then differentiate. Step 3: We get dρ/ρ+dA/A+dV/V=0 Step 4: Take Euler equation i.e. dp=-ρ*V*dV Step 5: after solving and rearranging we get dA/A=(m^2-1)dv/v
Question : 2	Please refer class notes.
Question : 3	Please refer class notes.
Question : 4	Stagnation point: In a compressible medium, there will be a change in density and temperature at point O but the velocity at that point is 0. Step 1: as we know from energy equation, h+v^2/2=constant, so after solving this equation and referring class notes we get To/T=1+((γ-1)*M^2)/2
Part B	
Question : 1	From area-velocity relation i.e. dA/A=(m^2-1)dv/v 1. For M<1, as increase in velocity is associated with a decrease in area and vice versa. So, for subsonic compressible flow, to increase the velocity we must have a convergent duct and to decrease the velocity we must have a divergent duct. 2. For M>1, as increase in velocity is associated with an increase in area and vice versa. So, for supersonic compressible flow, to increase the velocity we must have a divergent duct and to decrease the velocity we must have a convergent duct. Please refer class notes.
Question : 2	From isentropic relation between pressure and temperature, calculate T, which is equal to 232.1 K. From ideal gas equation P=rho*R*T, calculate free stream density, which is equal to 0.619 kg/m^3. Now again from isentropic relation between temperature and density, calculate density, which is equal to 0.541 kg/m^3. Now from entropy difference relation, substitute the value of Cp, temperatures, R, pressure, calculate the entropy difference, which is equals to 0 due to isentropic process, where entropy remains constant
Question : 3	h=CpT, calculate Cp from given data and calculate h Then from energy equation at stagnation point, calculate stagnation enthalpy, which is equal to 346.53 kJ/kg.

Question : 4	In compressible flows, internal energy often appears with the quantity [pv]. Their sum is expressed by one single property called enthalpy. Thus, h= u + pv For a perfect gas, h=CvT+RT h=(Cv+R)T h=CpT Bulk modulus: Ratio of compressive stress to the volumetric strain. K=-VdP/dV Comressibility: Ratio of volumetric strain to the compressive stress. β=-dV/(VdP) at constant temperature A gas which obeys the laws of Boyle and Charles is known as Ideal gas. Boyle's law- at constant temperature (pV=constant) Charles law- at constant pressure (V/T=constant) Perfect gas- It is an ideal gas whose specific heat remains constant at all temperature. d/dT(Cv and Cp)=0
Question : 5	
Question : 6	
Upload Scanned Document In Case of Numerical or Diagram for any of the above question	
I have scrutinized the answer sheet. There is no spelling mistake or any type of irrelevant answers.