School of Aeronautics (Neemrana) | School of Aeronautics

APPROVED BY DIRECTOR GENERAL OF CIVIL AVIATION, MINISTRY OF CIVIL AVIATION, GOV'T 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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RUN AND MANAGED BY LAXMI NARAIN VERMA MEMORIAL SOCIETY, REGISTERED,
DELHI ADMINISTRATION, UNDER SOCIETIES REGISTRATION ACT XXI OF 1860.

Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 97 / SET 1

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

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	Internal Improvement Exam	Date of Submission	22/03/2021
Name of Faculty	Mr. Korapati Akhil	Date of Examination	26/03/2021
Course	B.Tech (Aeronautical Engineering)	Semester	SEMESTER : 5
Batch	Combined Batches 12, 13, 14	Subject	5 AN4 - 04 Propulsion-I (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 1. Predict performance characteristics of Aircraft Piston Engines based upon the cycle operation. CO 2. Interpret the concept of Engine Performance Parameters and operating characteristics. CO 3. Gain insights into Propeller Fundamentals and Construction Methods. CO 4. Investigate the Propeller Pitch Control and Propeller Synchronizing in aircraft power plant. CO 5. Demonstrate about the Propeller Maintenance procedure. CO 6. Explain the working of Gas Turbine Engines basic principle and performance parameters.

Email I'd	k.akhil2110@gmail.com	Phone No.	701-345-8080
Student Name		Student Reg No.	

PART A

All the questions are compulsory to attend.

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Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 97 / SET 1

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA

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

Question : 1	Classify the types of propulsion system based on engines?		
1	Objective of propulsion	IC engine V Ganesan	
Question : 2	Explain about the Heat engine and classify based on engine mechanism?		
2	Definition of engine and working process	IC engine V Ganesan	
Question : 3	Draw ideal P-V and T-S diagrams for 4 - stoke Otto cycle and also 4- stroke diesel cycle engines.		
11	Compression ratio and engine efficiencies	IC engine V Ganesan	
Question : 4	Discuss about difference between SI & CI engines.		
5	SI & CI engines.	IC engine V Ganesan	
Question : 5	Explain about specific fuel consumption of reciprocating engines?		
9	Engine performance and parameters	IC engine V Ganesan	

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

Question : 6	Classify the Basic thrust providing propellers.		
15	Fundamentals of propellers	Fundamentals of propellers kroes	
Question : 7	How the propeller torque reaction acting on the aircraft?		
16	thrust force and torque	Fundamentals of propellers kroes	
Question : 8	Explain about impact damage, over speed damage?		
28	impact damage, over speed damage	Fundamentals of propellers kroes	
Question : 9	Discuss about slip and slip function.		
15	propeller slip	Fundamentals of propellers kroes	
Question : 10	How to find stages of compressor in jet engine ?		
36	construction arrangement of jet engines	Fundamentals of propellers kroes	

PART B

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Question Paper For Internal Assessment Examination (Theory) - Credit 3 / 97 / SET 1

NAME OF STUDY CENTER: SCHOOL OF AERONAUTICS, NEEMRANA

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.

Question : 1	Discuss the difference between ideal and actual valve timing diagrams of petrol engine ?	
8	valve timing diagram	IC engines RK RAJPUT
Question : 2	Explain engine terminologies :- 1) Bore. 2) stroke. 3) stroke to Bore ratio. 4) dead centers. 5) displacement of swept volume. 6) cubic capacity. 7) clearance volume. 8) compression ratio	
2	working of IC engines	IC engines RK RAJPUT
Question : 3	Draw and discuss about SI engine battery ignition system and magneto ignition system	
14	ignition system	IC engines RK RAJPUT

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

Question : 4	Explain about:- 1) Propeller tracking. 2) Static propeller balancing. 3) Dynamic propeller balancing. 4) Engine vibration analysis.	
17	engine propeller vibrations	Fundamentals of propellers kroes
Question : 5	Draw and Explain operation merits and demerits of jet engines those are :- 1) turbo prop engine. 2) turbo jet engine. 3) turbo fan engine. 4) turbo shaft engine	
36	operation merits and demerits of jet engines	Gas Turbies V ganesan
Question : 6	Discuss about overall efficiency of jet engine?	

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39	overall efficiency	Gas Turbies 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.

Question : 1	In a constant volume 'Otto cycle', the pressure at the end of compression is 15 times that at the start, the temperature of air at the beginning of compression is 38 degrees centigrade and maximum temperature attained in the cycle is 1950 degrees centigrade determine :- 1) compression ratio. 2) thermal efficiency of the cycle. 3) work done.		
11	compression ratio engine efficiencies	IC engines RK RAJPUT	
Question : 2	An engine with 200 mm cylinder diameter and 300 mm stroke works on theoretical diesel cycle . the initial pressure and temperature of air used are 1 bar and 27 degrees. the cut-off is 8 percentage of the stroke determine : 1) pressure and temperatures at all salient points. 2) theoretical air standard efficiency. 3) mean effective pressure.		
11	compression ratio engine efficiencies	IC engines RK RAJPUT	
Question : 3	Derive Thrust equation and find speed ratio of jet engine?		
35	thrust equation	GAS turbines V Ganesan	

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

Question : 4	A turbo jet power plant user aviation kerosene have calorific value of 43 m j /kg fuel consumption is 0.18 kg / hour / N of thrust , when the thrust is 9 KN. the aircraft velocity is 500 m/s the mass of air passing through the compressor is 27 kg/s . calculate the air fuel ratio and overall efficiency		
40	performance parameters of jet engine	GAS turbines V Ganesan	

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Question : 5	The effective jet exist velocity from a jet engine is 2700 m/s the forward flight velocity 1350 m/s and the air flow rate is 78.6 kg / s calculate the:- 1) trust. 2) thrust power. 3) propulsive efficiency.		
40	performance parameters of jet engine	GAS turbines V Ganesan	
Question : 6	A 42.5 KW engine has a mechanical efficiency of 85 percent. Find the indicated power and frictional power. If the frictional power is assumed to be constant with load, what will be the mechanical efficiency at 60 percent?		
9	Engine performance and parameters	IC engines RK RAJPUT	
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.			