Hall Ticket No | | | | | | | | | | | Question Paper Code: AAE010

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER

Third YearB.TechV Semester End Examinations– 2019

Regulations: IARE - R16

AIRCRAFT SYSTEMS AND CONTROL

(AERONAUTICAL ENGINEERING)

Time: 3 hours **Max. Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. a) What are the flight instruments in aircraft? What are the standbyinstruments in case of each type of instrument? **[7M]**
   b) Explain air data measurement and flight management system brieflywith sketches. **[7M]**

2. a) Explain how the operating environment conditions of an aircraft are maintained. **[7M]**
   b) Explain the health, safety and environmental issues and standards, regulations of project environment? **[7M]**

UNIT – II

3. a) Define Power conversions. Explain power conversion and energy storage systems with sketches. **[7M]**
   b) Does all aircraft need cabin pressurization systems? Explain fire protection systems. **[7M]**

4. a) What is fire protection system? Explain any one fire protectionsystem? **[7M]**
   b) Explain reversed bootstrap and ram powered bootstrap systems with sketches. **[7M]**

UNIT – III

5. a) What is a bleed air and write use of bleed air in aircraft systems? **[7M]**
   b) Explain the operating principle and constructional features of bleed air control in pneumatic systems. **[7M]**

6. a) Examine the important components of a typical hydraulic system and their functions. **[7M]**
   b) List out various types of braking and anti-skidding systems in aircraft and discus the working principle briefly. **[7M]**

UNIT – IV

7. a) Explain Limited authority engine control system with suitable blockDiagram. **[7M]**
   b) Write Short notes on Engine Power off takes, Fuel Tank safety and Inflight fuelling. **[7M]**

8. a) Justify How fuel transfer pump differs from fuel booster pump. **[7M]**
b) Justify input and output signals of engine control system. List out these signals. **[7M]**

UNIT – V

9. a) Discuss the merits and de merits of cable and pulley system forcontrolling the flight control surfaces. **[7M]**
b) Write the inter-relationship of flight control, guidance and flight Management. **[7M]**

10 a) Discuss any two systems of the communication and navigation aids. **[7M]**
b) Write and explain briefly the aircraft control surfaces with a neat sketch. **[7M]**

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COURSE OBJECTIVES (COs):

The course should enable the students to:

I	Explain the concept and meaning of system and classify the various systems required for aircraft and their contribution in order to fulfill the aircraft tasks.
II	Describe the various types of Electrical power generations and distribution in aircraft and impart the knowledge of pneumatic, hydraulic and environmental control system.
III	Demonstrate the different flight control actuators and flight control system and fly-by-wire control laws and give knowledge about the landing gears systems and brake management system.
IV	Explain the concept of different aircraft gas turbine engines and their control systems and describe the fuel system characteristics and their operating modes and knowledge about the fuel safety management.

COURSE OUTCOMES (COs):

CO 1	Define the System concepts, sub-systems, Generic system definition, inputs, outputs, feedback, external influence
CO 2	Describe the Electrical loads and power generation in aircraft
CO 3	Define Hydraulic systems and pneumatic systems
CO 4	Describe the Principle of operation of aircraft gas turbine engines
CO 5	Define Flight control systems- primary and secondary flight control systems.

COURSE LEARNING OUTCOMES (CLOs):

AAE010.01	Define the meaning of the system and its characteristics and identify different types of aircraft systems.
AAE010.02	Describe the various electrical power generations in the aircraft and discover more electric aircraft.
AAE010.03	Estimate the electrical power requirements and can optimize the load distribution.
AAE010.04	Describe the importance of hydraulic systems and its components and develop hydraulic systems.
AAE010.05	Illustrate the importance and criticality of landing gears.
AAE010.06	Recognize the applications of pneumatic systems and the application of the bleed air.
AAE010.07	Classify the various types of engine control system including advanced digital controls.
AAE010.08	Identify important flight control operations and selects suitable flight control actuations.
AAE010.09	Demonstrate the various types of air conditioning systems and vapour cycle systems.
AAE010.10	Identify the environmental control systems relating to aircraft systems.
AAE010.11	Classify the types of hydraulic fluids applied in aircraft industry and advancement in it.
AAE010.12	Estimate the various fuel inerting systems and indications for aircraft systems.
AAE010.13	Illustrate the importance of fly-by-wire technology in aircraft systems.
AAE010.14	Describe the pneumatics systems and its components.
AAE010.15	Estimate the various engine performances and their application in aircraft systems.

MAPPING OF SEMESTER END EXAMINATION TOCOURSE OUTCOMES

SEE Question No.		Course Outcomes		Course Outcomes	Blooms' Taxonomy Level
1	a	AAE010.01	Define the meaning of the system and its characteristics and identify different types of aircraft systems.	CO 1	Remember
	b	AAE010.01	Define the meaning of the system and its characteristics and identify different types of aircraft systems.	CO 1	Understand
2	a	AAE010.01	Define the meaning of the system and its characteristics and identify different types of aircraft systems.	CO 2	Understand
	b	AAE010.01	Define the meaning of the system and its characteristics and identify different types of aircraft systems.	CO 2	Understand
3	a	AAE010.02	Describe the various electrical power generations in the aircraft and discover more electric aircraft.	CO 2	Remember
	b	AAE010.09	Demonstrate the various types of air conditioning systems and vapour cycle systems	CO 2	Understand
4	a	AAE010.10	Identify the environmental control systems relating to aircraft systems	CO 3	Understand
	b	AAE010.03	Estimate the electrical power requirements and can optimize the load distribution.	CO 3	Remember
5	a	AAE010.04	Describe the importance of hydraulic systems and its components and develop hydraulic systems.	CO 3	Understand
	b	AAE010.06	Recognize the applications of pneumatic systems and the application of the bleed air.	CO 3	Remember
6	a	AAE010.05	Illustrate the importance and criticality of landing gears.	CO 3	Remember
	b	AAE010.14	Describe the pneumatics systems and its components.	CO 3	Understand
7	a	AAE010.07	Classify the various types of engine control system including advanced digital controls.	CO 4	Understand
	b	AAE010.12	Estimate the various fuel inerting systems and indications for aircraft systems.	CO 4	Remember
8	a	AAE010.12	Estimate the various fuel inerting systems and indications for aircraft systems.	CO 4	Understand
	b	AAE010.15	Estimate the various engine performances and their application in aircraft systems.	CO 4	Remember
9	a	AAE010.08	Identify important flight control operations and selects suitable flight control actuations.	CO 5	Remember
	b	AAE010.13	Illustrate the importance of fly-by-wire technology in aircraft systems.	CO 5	Understand
10	a	AAE010.13	Illustrate the importance of fly-by-wire technology in aircraft systems.	CO 5	Understand
	b	AAE010.08	Identify important flight control operations and selects suitable flight control actuations.	CO 5	Remember

Signature of Course Coordinator **HOD, AE**