Hall Ticket No | | | | | | | | | | | Question Paper Code: BAEB06

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER - II

M.Tech I Semester End Examinations, January - 2020

Regulations: R18

UNMANNED AERIAL VEHICLES

(AEROSPACE 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)	Discuss the various roles of unmanned aircraft, and how they can impact several missions such as ISR and Penetrating Strike.	**[7M]**
	b)	Describe the composition of UAV systems and how they contribute to the development of the UAV ecosystem.	**[7M]**
2.	a)	Describe which types of UAV systems are used in the Indian Air Force and the reason for their deployment.	**[7M]**
	b)	Describe the types of UAV systems used in various battle scenarios. Also discuss why they would employ that specific UAV?	**[7M]**

UNIT – II

3.	a)	Describe the long-range role aircraft, and what kinds of UAV systems can be used for such purposes.	**[7M]**
	b)	Describe Novel hybrid aircraft configurations, and the various radio/radar signatures.	**[7M]**
4.	a)	What are the steps in conceptual design for UAV systems	**[7M]**
	b)	Describe the various dispensable and non-dispensable payloads. What are the	**[7M]**

UNIT – III

5.	a)	Describe the communications data rate and bandwidth usage.	**[7M]**
	b)	Describe what is NAVSTAR Global Positioning, and why it is important in UAV systems?	**[7M]**
6.	a)	Describe how UAVS can be built for reliability, and the factors involved.	**[7M]**
	b)	Describe the Design for manufacturing and development of UAVs.	**[7M]**

UNIT – IV

7.	a)	Define the various preparations for System-in flight testing. Explain the various factors involved in system in flight testing.	**[7M]**
	b)	Describe how in UAVs you can establish reliability and how one can ensure the various aspects of it.	**[7M]**
8.	a)	What is the different types of system certifications that can be obtained? Explain each of the certifications in detail. .	**[7M]**
	b)	Describe the UAV Sub-Assembly and Sub-System testing. Explain the different components involved.	**[7M]**

UNIT – V

9.	a)	Explain about the various steps involved in UAV system deployment.	**[7M]**
	b)	List out the hierarchical structures in the arm and air forces.	**[7M]**
10.	a)	Explain the preliminary considerations prior to establishing a hierarchy?	**[7M]**
	b)	Discuss the various commercial and civilian roles in paramilitary missions and aircraft.	**[7M]**

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COURSE OBJECTIVES:

The course should enable the students to:

I	Acquire the knowledge of various disciplines contributing to the design, development and deployment of UAVs.
II	Explain the design of UAV systems and their configuration
III	Develop and deploy the UAV systems.

COURSE OUTCOMES (COs):

CO 1	Understand the various applications of UAS and be able to describe the categories of UAV systems.
CO 2	Demonstrate knowledge in the design of UAV systems
CO 3	Demonstrate knowledge in communications and media of UAV systems.
CO 4	Illustrate concepts in system design and development of UAVs.
CO 5	Describe the trials and operations in UAV systems.

COURSE LEARNING OUTCOMES (CLOs):

BAEB06.01	Understand the concept of unmanned aircraft and UAV and UAS.
BAEB06.02	Explain the various roles of unmanned aircraft.
BAEB06.03	Emphasize the basic composition of UAV systems.
BAEB06.04	Develop the basic systems in the designs of UAV systems.
BAEB06.05	Describe the aerodynamics of UAV vehicles
BAEB06.06	Describe the signature of UAV vehicles
BAEB06.07	Illustrate the various aspects of payloads.
BAEB06.08	Understand the Sensors used in UAVs
BAEB06.09	Explain the Navigation systems used in UAVs
BAEB06.10	Understand the navigation systems that are used in UAVs
BAEB06.11	Explain various navigation systems and the design for maintenance
BAEB06.12	Describe the system certifications
BAEB06.13	Understand the UAV sub-assemblies
BAEB06.14	Explain the various aspects of the documentation of flight testing
BAEB06.15	Discuss various aspects of the UAVs integration into naval carriers

MAPPING OF SEMESTER END EXAMINATION - COURSE OUTCOMES

SEE Question No		Course Learning Outcomes		Course Outcomes	Blooms Taxonomy Level
1	a	BAEB06.02	Explain the various roles of unmanned aircraft.	CO 1	Understand
	b	BAEB06.03	Emphasize the basic composition of UAV systems.	CO 1	Understand
2	a	BAEB06.02	Explain the various roles of unmanned aircraft.	CO 1	Remember
	b	BAEB06.03	Emphasize the basic composition of UAV systems.	CO 1	Remember
3	a	BAEB06.05	Describe the aerodynamics of UAV vehicles	CO 2	Remember
	b	BAEB06.04	Describe radio tracking systems and reliability by design.	CO 2	Understand
4	a	BAEB06.05	Describe the aerodynamics of UAV vehicles	CO 2	Remember
	b	BAEB06.06	Develop the system certifications	CO 2	Understand
5	a	BAEB06.07	Illustrate the various aspects of payloads.	CO 3	Remember
	b	BAEB06.08	Define the rotary wing aerodynamics of tactical aircraft.	CO 3	Understand
6	a	BAEB06.08	Discuss radio/radar signatures	CO 3	Understand
	b	BAEB06.07	Illustrate the various aspects of payloads.	CO 3	Remember
7	a	BAEB06.12	Differentiate the in-flight testing of design for manufacture and development	CO 4	Remember
	b	BAEB06.10	Understand the navigation systems that are used in UAVs	CO 4	Understand
8	a	BAEB06.12	Describe the system certifications	CO 4	Remember
	b	BAEB06.11	Explain various navigation systems and the design for maintenance	CO 4	Remember
9	a	BAEB06.15	Discuss various aspects of the UAVs integration into naval carriers	CO 5	Remember
	b	BAEB06.15	Discuss various aspects of the UAVs integration into naval carriers	CO 5	Remember
10	a	BAEB06.15	Discuss various aspects of the UAVs integration into naval carriers	CO 5	Understand
	b	BAEB06.13	Understand the UAV sub-assemblies	CO 5	Remember

Signature of Course Coordinator **HOD, AE**