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Academic year 2023-24(odd sem)

DEPARTMENT OF
AEROSPACE ENGINEERING

Date	MAY 2024	Maximum Marks	50
Course Code	AS124AT	Duration	90 Min
Sem	I Semester	Offline Test-1	

Introduction to Drone Technology

Sl. No	Questions	M	BT	CO
1.	Provide a comprehensive overview of UAV systems, accompanied by a clear diagram that emphasizes the significance of each subsystem.	10	1	1
2.	Categorize and briefly elucidate the following types of UAVs: a) UAVs categorized by airframe b) UAVs categorized by range and endurance	10	2	2
3.	India exhibits significant potential in the realm of developing indigenous drones. Substantiate this assertion by citing at least four pertinent examples of its accomplishments.	10	3	1
4.	Describe briefly about the parts of Quadcopter with the help of labeled diagram.	10	2	2
5.	List and explain the following with the help of labeled sketch. a)Airfoil terminology b)Wing terminology	10	1	2

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks Distribution	Particulars		CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Test	Max Marks	20	30	00	00	20	20	10	00	00	00

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Academic year 2023-2024 (Even Sem)

DEPARTMENT OF
AEROSPACE ENGINEERING

Date	June 2024	Maximum Marks	50
Course Code	AS124AT	Duration	90 Min
Sem	II Semester		

Sl. No.	Questions	M	BT	CO
1.	Explain the Major Structural stresses action on Drone with an example for each.	10	2	1
2	Describe about the Wing and its structural members in the construction of drone with the help of diagram.	10	1	2
3	Write a brief note on the following: a)BLDC motor b)Solar cell	10	1	3
4	Describe the construction and working of Turbojet engine with the help of illustration.	10	1	2
5	Explain the following with the help of labeled sketch. a)Lithium ion battery b)Fuel cell	10	2	3

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks Distribution	Particulars		CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Test	Max Marks	10	20	10	00	30	20	00	00	00	00

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Academic year 2023-2024 (Even Sem)

DEPARTMENT OF

AEROSPACE ENGINEERING

Date	June 2024	Maximum Marks	50
Course Code	AS124AT	Duration	90 Min
Sem	II Semester		

Sl. No	Questions	M	BT	CO
1	Distinguish the properties of at least three different materials commonly used in UAV construction. Discuss how each material affects the performance, durability, and cost of the UAV.	10	2	1
2	Describe about the Wing and its structural members in the construction of drone with the help of diagram.	10	1	2
3.	Recognize the role of composite materials in UAV construction. What are the advantages and potential drawbacks of using composites over traditional materials like aluminum?	10	1	3
4	Describe the construction and working of Turbojet engine with the help of illustration.	10	1	2
5	Summarize the sandwich construction methods involved in the composite Material parts with the help of illustration.	10	2	3

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks Distribution	Particulars		CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Test	Max Marks	10	20	10	00	30	20	00	00	00	00

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AS114ATB / AS124ATB

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RV COLLEGE OF ENGINEERING®

(An Autonomous Institution Affiliated to VTU)

I / II Semester B. E. Regular / Supplementary Examinations August-2024

INTRODUCTION TO DRONE TECHNOLOGY

Time: 03 Hours *Maximum Marks: 100*

Instructions to candidates:

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. In Part B question number 2 is compulsory. Answer any one full question from 3 and 4, 5 and 6, 7 and 8, 9 and 10.

PART-A

			M	BT	CO
1	1.1	*UAV's* in India must comply with the regulatory guidelines issues by _____.	01	1	1
	1.2	The _____ term refers to the unmanned aerial vehicle's ability to return to a predefined location autonomously.	01	2	2
	1.3	The classification of *UAVs* based on endurance includes categories such as _____.	01	1	2
	1.4	The _____ is the curved surface of the airfoil which helps in generating lift.	01	2	3
	1.5	The condition beyond which the increased angle of attack lead to loss of lift is generally called as _____.	01	1	3
	1.6	MALE in the context of *UAVs* stands for _____.	01	1	3
	1.7	Define Aspect Ratio of a wing surface.	02	2	3
	1.8	The speed regime in which Mach number > 1 is called as _____.	01	2	2
	1.9	Electric *UAVs* used _____type of motors due to their efficiency and ease of control.	01	1	2
	1.10	The positive electrode in lithium-ion battery is usually made of _____.	01	1	3
	1.11	UAV operational zones are categorized into _____ zones, each with specific flying regulations.	01	2	4
	1.12	Bypass ratio of Turbo engine is defined as _____.	01	2	4
	1.13	The distance between the leading and trailing edge of an aerofoil is defined by _____.	01	1	2
	1.14	The longitudinal loads are carries by _____ in a aircraft wing.	01	1	2
	1.15	The _____ sensor measures the altitude of a *UAV* by detecting atmospheric pressure changes.	01	1	3
	1.16	Cameras and sensors are critical for surveillance and data collection missions are classified as _____ type of payloads.	01	1	3
	1.17	Radars send out _____ waves similar to wireless computer networks and mobile phones.	01	2	2
	1.18	Optical or visible light cameras operate in the _____ to _____ μm wavelength range.	01	1	2
	1.19	The *MEMS* based magnetometer works on the principle of _____.	01	1	1

PART-B

2	a	Classify various types of *UAV* based on range or endurance.	08	1	1
	b	List down the drones used by India and its need with respect to modern technology; also explain the applications of drones in India.	08	2	2
3	a	With a neat sketch of cambered aerofoil explain the terminologies, Also explain in brief, about *NACA* nomenclature.	08	2	2
	b	Compare the aerodynamic principles governing the flight of fixed-wing *UAVs* versus rotary-wing *UAVs*.	08	2	3
		OR			
4	a	Describe the effects of angle of attack on forces acting on an aerofil, and explain the concept of stall.	08	2	3
	b	Describe the types of drag acting on a *UAV* by describing the variation in boundary layers associated with it.	08	2	3
5	a	Describe the components and operation of a typical *UAV* propulsion system with a propeller.	08	2	3
	b	Describe the various types of batteries used in *UAVs* and their respective advantages.	08	2	4
		OR			
6	a	Explain the role and working of solar power systems and solar arrays in *UAVs*.	08	2	2
	b	With a neat figure explain the working parts of basic piston engines and its applications in *UAV*.	08	1	3
7	a	Compare and contrast the advantages and disadvantages of using composites versus metals in *UAV* construction.	08	2	3
	b	Describe the different types of aerodynamic loads that act on a *UAV* during flight and their impact on the *UAV's* structure.	08	2	4
		OR			
8	a	Compare the parts of monocoque and semi-monocoque construction and explain why semi monocoque is advantageous.	08	2	3
	b	Explain the considerations involved in selecting materials for different components of a *UAV*.	08	1	3
9	a	Differentiate between non-dispensable and dispensable payloads in *UAVs* and provide examples of each.	06	2	4
	b	Discuss the following with neat figures: i) *MEMS* Barometer ii) *MEMS* Accelerometer	10	2	3
		OR			
10	a	Explain the concept of 'No Drone Zones' and provide example of areas where *UAV* operations are restricted.	10	2	3
	b	Discuss the operational and procedural requirements specified by the *DGCA* for *UAV* operators.	06	2	4