Register Number:……..

KUMARAGURU
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B.E. DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Fourth Semester

AERONAUTICAL ENGINEERING

U18AET4004: UAV System Design

COURSE OUTCOMES

CO1: Discuss the configuration, performance parameters, and design aspects of unmanned aerial vehicle (UAV).
CO2: Compare the sensors, payloads and actuators suitable for various UAVs.
CO3: Explain the working of UAV propulsion systems.
CO4: Discuss the communication and navigation systems in UAV.
CO5: Explain the practical limitations in the design and development of an UAV.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Differentiate top-down approach from bottom-up approach.	CO1	[K_2]
2.	State any four parameters involved in the enhancement of unmanned aircraft system performance.	CO1	[K_2]
3.	What is the need of potentiometer in servo-motor?	CO2	[K_2]
4.	List out the use of hall affect sensor in drone industries.	CO2	[K_2]
5.	How scientific payloads are differing from conventional payloads? List out few scientific payloads.	CO2	[K_2]
6.	Why rotating parts are important for microjet engines?	CO3	[K_2]
7.	Enumerate the operational procedures involved in Brushless Direct Current Motor.	CO3	[K_2]
8.	How many different ways of communication media are available in UAV communication system?	CO4	[K_1]
9.	What is the major output of MEMS accelerometer? Briefly explain it.	CO5	[K_2]
10.	What did you understand the term “self-contained navigation system”?	CO4	[K_2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Explain in detail about the three design stages involved in the development of unmanned aerial vehicles with practical examples.	8	CO1	[K4]
	b)	How effectively environmental conditions are supports the selection process of unmanned aircraft systems?	8	CO5	[K4]
12.	a)	Write the name of anyone real-time motion sensor imposed in UAVs and explain it components, working principle, and operational procedures.	8	CO2	[K4]
	b)	What did you understand about Altitude Sensor? Explain in detailed about its main physical principles, sensing elements, and classifications.	8	CO2	[K3]
13.	a)	Explain in detail about the procedures involved in the design process of payloads assembly in UAV with neat flowchart.	12	CO2	[K4]
	b)	Write down any five name of the payloads, which are comes the under the families of Electro-optic and Radar Imaging payloads.	4	CO2	[K3]
14.	a)	List out and explain in details about all the rotating components used in UAV's gas turbine engine.	8	CO3	[K4]
	b)	Explain in detail about the components and operational procedures of UAV's rotary engine.	8	CO3	[K3]
15.	a)	List out and explain in detail about all the modes available in UAV control.	8	CO4	[K4]
	b)	Compare and contrast the different loops involved in Autopilot system.	8	CO4	[K3]
16.	a)	Explain in detail about your observations on the importance of Mission Planning and Control Station in UAVs.	8	CO5	[K4]
	b)	How the working principle of differential GPS is various from GPS's working principle? Explain your answers in a detailed manner.	8	CO5	[K3]

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