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Code No. : 18532 (A) N

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (Mech. Engg.) VIII-Semester Main Examinations, May-2023

Unmanned Aerial Vehicles (PE-VI)

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	What is DGCA? List the DGCA classification of UAVs.	2	1	1	1
2.	What does DDD stand for, and name the seven roles in respect to UAVs?	2	1	1	1
3.	Define the types of flows based on Mach number.	2	1	2	1
4.	Name the three categories of aerostat.	2	1	2	1
5.	What is the full form of "LiDAR" and explain its significance	2	1	3	1
6.	What is a navigation system? List any four uses of navigation systems.	2	1	3	1
7.	What are the roles of "CAD" and "CAE" in the analysis of UAVs?	2	1	4	1
8.	What is a 3D model in CAD? Classify the two types of 3D models in CAD.	2	3	4	1
9.	What is the full form of CFD" and explain its significance.	2	2	5	1
10.	List the three basic modules in executing the CFD analysis.	2	1	5	1
<i>Part-B (5 × 8 = 40 Marks)</i>					
11. a)	Distinguish between the manned aircraft and unmanned air vehicles with a clear note on atleast ten factors.	4	3	1	3
b)	Illustrate the four main forces acting on an aircraft with a neat sketch and explain them.	4	2	1	3
12. a)	Describe the aero foil nomenclature with the help of a neat diagram.	4	2	2	2
b)	Analyze the differences between the ailerons, flaps and spoilers with the help of neat sketches.	4	3	2	2
13. a)	Classify various types of cameras used on unmanned air vehicles and list their advantages.	4	2	3	6
b)	Explain different types of navigation systems.	4	2	3	6

Contd... 2

14. a)	Explain the roles of additive manufacturing in improving the structural and aerodynamics efficiencies of UAV.	4	2	4	5
b)	Illustrate the differences in the process-flow for conventional and additive manufacturing techniques.	4	4	4	5
15. a)	Elaborate the steps in the modeling and CFD analysis of UAV with the help of a neat block diagram.	4	3	5	10
b)	Describe in detail the factors that effect the performance of multirotor unmanned air vehicle.	4	2	5	2
16. a)	Describe the five applications of unarmed unmanned air vehicles and the three applications of armed unmanned air vehicles.	4	2	1	12
b)	Classify drag and explain any four types of drag acting on an aircraft with the help of neat sketches.	4	2	2	2
17.	Answer any <i>two</i> of the following:				
a)	Describe the anatomy of unmanned air vehicle with the help of a neat block diagram.	4	4	3	1
b)	Elaborate the potentials and challenges of additive manufacturing for Unmanned Air Vehicles.	4	3	4	2
c)	Distinguish with atleast eight parameters the CFD analysis of multirotor and fixed wing UAVs.	4	4	5	4

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	37.5%
iii)	Blooms Taxonomy Level – 3 & 4	42.5%
