# CBCS SCHEME

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**15AE661**

## Sixth Semester B.E. Degree Examination, Aug./Sept. 2020
## Unmanned Aerial Vehicles Basics and Applications

Time: 3 hrs.                                                                                 Max. Marks: 80

**Note: *Answer any FIVE full questions, choosing ONE full question from each module.***

### Module-1

1   a.   Explain Generic UAV systems with a neat sketch.                                     (10 Marks)
    b.   Write short notes on :
         i)   Small UAV's
         ii)  Large UAV's                                                                    (06 Marks)

**OR**

2   a.   Describe classes of UAV system?                                                     (12 Marks)
    b.   Explain different missions of a UAV's.                                              (04 Marks)

### Module-2

3   a.   Explain boundary layer concept.                                                     (08 Marks)
    b.   Define Induced drag. Derive an equation for induced drag.                          (08 Marks)

**OR**

4   a.   Derive an equation for Rate of climb for UAV's.                                     (08 Marks)
    b.   Derive endurance equation for a Propeller driven aircraft.                         (08 Marks)

### Module-3

5   Explain Longitudinal lateral and dynamic stability with neat sketches.                  (16 Marks)

**OR**

6   a.   Explain Aerodynamic control, Pitch control and Lateral control.                     (08 Marks)
    b.   Write short note on : Sensors supporting the autopilot.                             (08 Marks)

### Module-4

7   a.   List the sources of electric power. Explain batteries used in UAV.                  (08 Marks)
    b.   Using momentum generator concepts prove that the power required producing a given
         amount of lift is inversely proportional to the square of the wingspan or propeller diameter.
                                                                                             (08 Marks)

**OR**

8   a.   Explain different materials used in the construction of UAV.                        (08 Marks)
    b.   Explain Maneuver load diagram.                                                      (08 Marks)

### Module-5

9   a.   Explain the elements of local area Network.                                         (08 Marks)
    b.   Describe different layers of OSI model.                                             (08 Marks)

**OR**

10  a.   Explain different techniques used in search operation by UAV's.                     (08 Marks)
    b.   Explain different types of Payloads of UAV.                                         (08 Marks)

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