

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

**Course Code: AE463**

**Course Name: AEROSPACE & NAVIGATION INSTRUMENTS**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two full questions, each carries 15 marks.*

Marks

- |   |    |  |     |
|---|----|--|-----|
| 1 | a) | Explain the basic aerodynamic principle related to the flight of an aircraft.                      | (5) |
|   | b) | What is the significance of lift-to-drag ratio (L/D) and how is it related to the Angle of Attack? | (5) |
|   | c) | Explain the working of turbojet engine with neat diagram.  | (5) |
| 2 | a) | What is drag? What are the factors affecting the drag?   | (6) |
|   | b) | Briefly explain about the different types of Liquid-fuel rocket engines.                           | (9) |
| 3 | a) | Write short notes on (i) Absolute ceiling (ii) Service ceiling (iii) Range                         | (6) |
|   | b) | State and explain Kepler's Laws of Planetary motion.   | (3) |
|   | c) | Explain in detail the airfoil nomenclature. What is the significance of using quarter chord point? | (6) |

**PART B**

*Answer any two full questions, each carries 15 marks.*

- |   |    |  |     |
|---|----|--|-----|
| 4 | a) | Draw and explain the circuitry of a typical capacitance fuel-gauge system.                   | (6) |
|   | b) | With the help of neat diagram explain the working of Airspeed indicators.                    | (5) |
|   | c) | Explain the working principle of a pitot static tube.  | (4) |
| 5 | a) | Explain the working of a Direct-indicating magnetic compass with suitable diagram.           | (5) |
|   | b) | What are altimeters? Explain the working principle of Aneroid Altimeters with block diagram. | (5) |
|   | c) | Describe different types of Pitot-static errors.   | (5) |
| 6 | a) | Explain the working of a Remote indicating compass using neat diagrams.                      | (8) |
|   | b) | Write short notes on (i) Standard atmosphere (ii) Radio altimeter                            | (7) |

**PART C**

*Answer any two full questions, each carries 20 marks.*

- 7 a) Explain the different segments of a GPS system. (10)
- b) Explain the working principle of (a) MEMS accelerometer (b) MEMS Gyroscopes (10)
- 8 a) What are the different components of an Autopilot system? (5)
- b) Explain the working principle and construction of fibre optic gyroscope with neat diagram. (10)
- c) Explain the basic principle of an accelerometer. (5)
- 9 a) Explain in detail the working and the different components of INS. What are the advantages of INS over other Radio navigation systems? (10)
- b) Explain the working of VHF phase comparison direction finder. (10)

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