

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Eighth Semester B.Tech Degree Supplementary Examination August 2021

Course Code: AO482**Course Name: FLIGHT AGAINST GRAVITY**

Max. Marks: 100

Duration: 3 Hours

PART A*Answer any three full questions, each carries 10 marks.*

Marks

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| 1 | a) What are biplanes and Monoplanes? | (6) |
| | b) What is aspect ratio for an airplane wing and what is its significance? | (4) |
| 2 | a) Explain the history of aviation. | (4) |
| | b) With a sketch explain the forces acting on an airplane. | (6) |
| 3 | a) What is the purpose of the following in an airplane a.) fuselage b.) wings c.) vertical stabilizer d.) horizontal stabilizer e.) rudder | (5) |
| | b) Explain with a sketch the difference between symmetrical and cambered airfoil. | (5) |
| 4 | a) Write a brief note on helicopters. | (6) |
| | b) Explain the variation of coefficient of lift with angle of attack. | (4) |

PART B*Answer any three full questions, each carries 10 marks.*

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| 5 | a) Explain the structure of atmosphere. | (6) |
| | b) Explain the need for defining the Standard Atmosphere. | (4) |
| 6 | a) What is static stability and dynamic stability? What are the criteria for longitudinal static stability of an airplane? | (7) |
| | b) Define Mach Number. What is its significance in classifying fluid flow? | (3) |
| 7 | a) Define Geometric altitude and Absolute Altitude. | (4) |
| | b) Derive the relation between pressure and altitude in the Isothermal layer. | (6) |
| 8 | a) State and Explain Kepler's laws. | (6) |
| | b) From Kepler's second law, prove that a satellite have maximum velocity when it is nearest to earth. | (4) |

PART C*Answer any four full questions, each carries 10 marks.*

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| 9 | a) What are composite materials? What are its advantages over metallic materials to be used in airplane construction? | (6) |
| | b) What are the different non metallic materials used in aircraft construction? | (4) |
| 10 | a) Explain monocoque and semi monocoque construction used in the construction of aircraft structure? | (5) |

- b) List the different metallic materials used for aircraft construction. (5)
- 11 Explain the different wing configurations of aircrafts. (10)
- 12 a) With the help of a neat sketch explain the working of Turbo prop engines. (8)
- b) What are the advantages of turbo prop engines over turbo jet? (2)
- 13 a) Explain liquid propellants and solid propellants. (6)
- b) What are the advantages and disadvantages of solid propellants over liquid propellants? (4)
- 14 a) What are the different types of rockets? (5)
- b) Explain the typical application of rockets. (5)
