Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

IV SEMESTER B.TECH. (AERONAUTICAL ENGINEERING)

END SEMESTER MAKEUP EXAMINATION JUNE 2017

SUBJECT: AIRCRAFT PROPULSION [AAE 2202]

REVISED CREDIT SYSTEM
(16/06/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A. Explain the thrust equation of Jet propulsive device. **(4)**

1B. For an ideal IC engine operating with combustion at constant pressure given that it is operating with P_a=1 bar, T_a=340 K, compression Ratio 23, Isobaric expansion ratio 2. The working medium is air. For 1 Kg of air calculate (a) Work done under various cycle legs, (b) Heat added and Heat rejected during various cycle legs, (c) Carnot cycle efficiency (d) Indicated mean effective pressure. **(6)**

2A. Explain the different losses that occur in the piston engine with neat diagram. **(4)**

2B. A brayton cycle operates with a regeneration of 78% effectiveness. The air at the inlet to the compressor is at 0.1 MPa and 34^0C, the pressure ratio is 6.5 and the maximum cycle temperature 950^0C. If the compressor and turbine have efficiencies of 85 percentage each, find the percentage increase in the cycle efficiency due to regeneration. **(6)**

3A. Explain the design of axial flow compressor flow parameters. **(4)**

3B. Explain the thermodynamic analysis of compressor with the help of Enthalpy/Temperature – Entropy diagram. Show the thermodynamic efficiency of compressor (η_C) with first and second mean index. **(6)**

4A. With neat diagrams explain the different types of cylinders that are used in reciprocating engine. **(4)**

4B. List the advantages and disadvantages of all three types of multi spools engines. **(6)**

5A. Draw the classification chart of air breathing propulsion systems. **(4)**

5B. Explain with neat diagrams the single stage performance characteristics and multistage performance characteristics of compressor. **(6)**