Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

III SEMESTER B.TECH (AERONAUTICAL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: AIRCRAFT PRODUCTION TECHNIQUES [AAE 2102]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.
- Draw sketches in **PENCIL** only

1A.	Classify Non- traditional machining process. Explain with neat sketch electro chemical machining process, process characteristics, process parameters, advantages, limitations, applications	**5**
1B.	Classify zero and one dimensional crystal defects. Also explain the role of any one crystal defects on the mechanical properties of the metal.	**3**
1C.	Sketch and distinguish between FCC and BCC basic crystal structures.	**2**
2A.	Define Forging. Explain important changes observed during forging process	**2**
2B.	The solidification temperatures of Lead and Tin on equilibrium cooling are 320°C and 230°C respectively. They form an eutectic containing 60% Tin (by weight) at 180°C. The maximum solubilities of Tin in Lead and Lead in Tin at eutectic temperature are 20% and 5% by weight respectively. Similarly the maximum solubilities of Lead in Tin and Tin in Lead are 3% and 5% by weight respectively at 50°C. Assuming the lines to be linear, draw phase diagram to the scale and label the phase regions. For 75% Tin alloy, determine the following: i) Weight percentage of the pre-eutectic Tin-rich solid solution formed. ii) Temperature where there are equal proportions of liquid and solid phases exists. iii) Weight ratio of two solid solutions in the eutectic mixture.	**5**
2C.	Define Rolling. With neat sketch explain change in grains structure during hot rolling process	**3**
3A.	Differentiate with neat sketch UP milling & DOWN milling process	**3**
3B.	Differentiate slip and twining	**2**
3C.	What is the objective of heat treatment process? Explain annealing & hardening of steel and also state the reason why these operations are carried out on steel.	**5**

4A.	Recommended a casting process to get φ 1m x 4m huge cylindrical shaped product and explain with neat sketch process, process features, parameters, advantages, limitations	**5**
4B.	With a neat sketch explain the hand layup technique	**3**
4C.	Write short notes on a. Cast Iron. b. Interstitial solid solution.	**2**
5A.	List and explain the Hume rothery rules	**2**
5B.	Neatly sketch Iron-Graphite equilibrium diagram and mark the phases.	**5**
5C.	Explain powder metallurgy process. Also write considerations that make powder metallurgy an important commercial technology	**3**