Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

III SEMESTER B.TECH. (AERONAUTICAL ENGINEERING)
END SEMESTER EXAMINATIONS, JANUARY 2022
SUBJECT: AEROSPACE MATERIALS & MANUFACTURING [AAE 2154]
REVISED CREDIT SYSTEM
(24/01/2022)

Duration: 1 Hour 15 minutes Max. Marks: 20

Instructions to Candidates:

- **Answer all the questions.**
- **Assume missing data if any.**

Q N	Question	Max marks	CO	BT
1A)	Calculate the atomic packing factor for Hexagonal Close-packed Crystal Structure. Given: c/a = 1.633.	(04)	CO1	Apply L3
1B)	Two metals A and B have their melting points at 900 ^{o}C and 800 ^{o}C, respectively. A eutectic reaction takes place between 40% A and 60% B at 600 ^{o}C. A and B have unlimited mutual liquid solubilities. Their solid solubilities are as follows 10% B in A at 600 ^{o}C and 5% B in A at O^{0}C 8% A inB at 600 ^{o}C and 4% A in B at O^{0}C Assuming liquidus, solidus, and solvus lines to be straight. No solid-state reactions or any intermediate phase changes occur in the series. (a) Draw the phase diagram of A-B for the series and label all the salient temperatures, compositions, and regions (b) Find the room-temperature structure of an alloy of com[position 60% A and 40 % B, concerning the number, type, extent, and composition of the phases.	(04)	CO2	Apply L4

1C)	Describe the effect of the following alloying elements on the mechanical properties of magnesium. (a) Aluminium (b) Zinc (c) Manganese (d) Zirconium	(02)	CO3	Understand L1
2A)	Explain the age hardening phenomenon and microstructure evolution in non-ferrous alloy with the help of TTT-Diagram.	(04)	CO3	Apply L4
2B)	Explain the pultrusion process with a neat diagram.	(03)	CO4	Apply L2
2C)	Write a note on Laser beam machining (LBM) with a schematic representation. Explain the dependence of different process parameters on LBM.	(03)	CO5	Analyze L2