

MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institution of Manipal University

## V SEMESTER B.TECH. (AUTOMOBILE ENGINEERING) END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: COMPOSITE MATERIALS [AAE 4024]

## REVISED CREDIT SYSTEM (05/12/2016)

Time: 3 Hours

MAX. MARKS: 50

## Instructions to Candidates:

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

1A.	What do you mean by thermoset matrix material? With suitable sketch	(02)
	explain the curing reaction of epoxy matrix material.	(03)
1B.	With suitable sketch explain the types of reinforcements based on weave	(03)
	pattern of fibers.	(00)
1C.	With neat sketch explain the fabrication of Ex-PAN carbon fiber and list	(04)
	important properties of the same.	(04)
2A.	List and explain the functions of basic raw materials used in vacuum bagging	(03)
	process.	(00)
2B.	With neat sketch explain the Resin Transfer Moulding process. List its	(04)
	advantages, disadvantages and applications.	(04)
2C.	Define volume fraction and weight fraction. Derive the equation for Rule of	(03)
	Mixture with suitable assumptions.	
3A.	Assume that the fibers in a composite lamina are arranged in a triangular	
	array as shown in the figure below. Determine the maximum fiber volume	
	fraction that can be packed in this arrangement.	
	rf	(02)
		(03)

а

3B.	Classify the types of adhesive. With example explain the bonding process of	(02)
	two component, no mix adhesive.	(02)
3C.	With neat sketch explain the injection moulding process. List the advantages	(05)
	and disadvantages, applications of the process.	(03)
4A.	What are the major challenges faced in machining of composite materials?	(04)
	With neat sketch explain laser machining of composites.	(04)
4B.	What do you mean by deposition process? With example explain the types of	(04)
	deposition process used in fabrication MMC.	(04)
4C.	With suitable diagram explain two step curing cycle adopted in autoclave	(02)
	moulding process.	(02)
5A.	Classify the types of infiltration process. With suitable sketch explain sol gel	(04)
	infiltration process.	(04)
5B.	With suitable sketch explain the temperature gradient CVI process.	(03)
5C.	What is in situ fabrication? List the advantages, disadvantages of the	(02)
	process.	(03)