Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B. TECH END SEMESTER EXAMINATIONS, APRIL 2019

SUBJECT: **INTRODUCTION TO COMPOSITE MATERIALS** [**MME 3286**]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A.	Differentiate between particulate reinforced and fiber reinforced composite.	**04**
1B.	Explain sandwich structure, with neat sketch.	**04**
1C.	Summarize the advantages and disadvantages of glass fiber.	**02**
2A.	The average density of a carbon-fiber-epoxy composite is 1.615 g/cm^3. The density of the epoxy resin is 1.21 g/cm^3 and that of the carbon fibers is 1.74 g/cm^3. (a) What is the volume percentage of carbon fibers in the composite? (b) What are the weight percentages of epoxy resin and carbon fibers in the composite?	**04**
2B.	A unidirectional carbon-fiber-epoxy-resin composite contains 68 percent by volume of carbon fiber and 32 percent epoxy resin. The density of the carbon fiber is 1.79 g/cm^3 and that of the epoxy resin is 1.20 g/cm^3. (a) What are the weight percentages of carbon fibers and epoxy resin in the composite? (b) What is the average density of the composite?	**04**
2C.	Classify the composite materials based on matrix and reinforcement.	**02**
3A.	Explain hand lay-up process with neat sketch. List the advantages, limitations and applications of hand lay-up process.	**03**
3B.	Explain with neat sketch the injection molding process. List the advantages, limitations and applications of the injection molding process.	**03**
3C.	Differentiate between adhesive and mechanical joints used to join PMCs.	**02**
3D.	Compare the filament winding process and pultrusion process.	**02**
4A.	Explain different methods of thermoforming with neat sketch.	**03**
4B.	Write a note on potential future applications of composites.	**03**
4C.	Explain bag molding process with neat sketch.	**02**
4D.	Discuss the common in-service defects found in the composite.	**02**
5A.	Explain ceramics matrix composite. List the advantages and disadvantages of CMCs.	**04**
5B.	List the advantages and disadvantages of MMCs over PMCs	**04**
5C.	Compare monolithic metals and metal matrix composites.	**02**