Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

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
(07/01/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. Define composite material. List major properties, advantages and disadvantages of composite material. **(03)**

1B. With suitable sketch explain the fabrication process of aramid fibers. **(04)**

1C. With neat sketch explain the fabrication of polyethylene fibers. **(03)**

2A. Calculate the fibre volume fraction in a cladding panel made from dough moulding compound (DMC) containing the following constituents:
glass fibre 22 wt%, polyester resin 53 wt%, calcium carbonate filler 25 wt% **(03)**
Assume the density of calcium carbonate is 2.7 g/cm^3, Density of polyester resin is 1.37 g/cm^3, Density of fiber is 2.58 g/cm^3.

2B. With neat sketch explain the spray lay-up process. List its advantages, disadvantages and applications. **(04)**

2C. Differentiate between polar and helical winding process. **(03)**

3A. Sketch and explain compression moulding process. List its advantages, disadvantages and applications. **(03)**

3B. What do you mean by MMC? Compare MMC with monolithic metals and polymer matrix composites. **(03)**

3C. With neat sketch explain the stir casting process. List the advantages and disadvantages, applications of the process. **(04)**

4A. Explain the methods of surface preparation adopted in adhesive bonding process. **(02)**

4B. Sketch and explain the abrasive water jet machining process used in machining of composite laminates. **(04)**

4C. With suitable sketch explain polymer infiltration and pyrolysis process. **(04)**

5A. Sketch and explain sintering process used for the fabrication of MMC's. List the advantages, disadvantages of the process. **(05)**

5B. What do you mean by reactive melt infiltration? Explain with suitable example. **(02)**

5C. Define the following terms **(03)**

- Laminate
- Gelation
- Voids in composites