Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2018

SUBJECT: COMPOSITE MATERIALS [AAE 4024]

REVISED CREDIT SYSTEM
(30/11/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. Define composite material and with schematic sketch explain the factors influencing the properties of fiber reinforced polymer matrix material. **(03)**

1B. Explain the curing process of vinyl-ester matrix and list the major properties and applications of the same. **(03)**

1C. With neat sketch, explain the fabrication process of boron fibers. List the major properties and applications of the same. **(04)**

2A. Sketch and explain the spray lay-up process and list the major advantages, disadvantages and applications of the same. **(05)**

2B. Differentiate between polar and helical winding process. **(02)**

2C. With suitable diagram, explain the process involved in curing of prepreg based composite materials. **(03)**

3A. Sketch structural reaction injection moulding and and explain the steps involved in the process. List the major advantages, disadvantages and applications of the same. **(05)**

3B. Differentiate between hot isostatic pressing and hot press process. List the major steps involved in the process. **(03)**

3C. Define adhesive bonding and explain the theory of adhesive bonding. **(02)**

4A. With suitable diagram, explain the process of composite material machining using laser technology. **(04)**

4B. Sketch and explain the process involved in DIMOX process. List the major advantages and disadvantages of the same. **(04)**

4C. A composite material need to produced using woven glass fabric reinforcement with a thickness as close to 4 mm as possible. Two fabric types available (300 g/m^2 and 500 g/m^2) for fabrication. The manufacturing process is resin infusion, which produces laminates with a volume fraction of 52%. If we use 2 plies of the lighter fabric at the tool surface, how many plies of the heavier fabric are required? What will be the weight per square meter of the resulting laminate? **(02)**

5A. Explain the different types of chemical vapour infiltration process used in manufacturing of carbon-carbon composites. **(04)**

5B. Explain the stages involved in the fabrication of ceramic matrix composites. **(02)**

5C. Define Nano composites. Explain the arc discharge process of production of Nano tubes. **(04)**