Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

I SEMESTER M.TECH. (AUTOMOBILE ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2018

SUBJECT: AUTOMOTIVE MATERIALS AND STRUCTURES [AAE 5101]

REVISED CREDIT SYSTEM
(22/12/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. Define the proportional limit limit, elastic limit with respect to stress/strain curve. Also explain the offset method to determine the proof stress. **(04)**

1B. Explain the strain hardening process and its stages. **(03)**

1C. Briefly explain the Creep failure modes. **(03)**

2A. Briefly explain the material selection strategy adopted during the design requirement. **(05)**

2B. Discuss the two types of liner used in the cylinder block. **(03)**

2C. What are the reasons behind the different shapes of the piston crown? **(02)**

3A. With graph explain the forming limit diagram. **(05)**

3B. Briefly explain the types of the sheet hydroforming process. **(04)**

3C. What is cryofit? **(01)**

4A. List three types of RTM injection equipment. With a sketch explain any two of them. **(05)**

4B. With neat sketch explain the stir casting process used for particulate composite manufacturing. **(03)**

4C. Explain the gel time test procedure for resin. **(02)**

5A. Derive the expression for the maximum poisons ratio which relates longitudinal strain and transverse strain. **(05)**

5B. Evaluate transverse modulus for the composite lamina with the following properties E_f= 14.8 GPa, E_m= 3.45 GPa, v_m (Poisons ratio) =0.36 and V_f=0.65. **(03)**

5C. Determine the in-plane shear modulus G_{12} of glass epoxy composite with properties G_f=28Gpa, G_m=1300MPa and V_f= 0.6. **(02)**