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M.Tech II Semester Supplementary Examinations August/September 2018 **MECHANICS & MANUFACTURING METHODS OF COMPOSITES**

(Common to CAD/CAM & PEED)

(For students admitted in 2013, 2014, 2015 & 2016 only)

Time: 3 hours

Max. Marks: 60

Answer any FIVE questions All questions carry equal marks

- 1 What are the different types of composites used in industry? Also list out their aerospace and structural applications.
- 2 For a glass epoxy composite E_f = 85 GPa, E_m = 3.4 GPa, Poisson's ratio V_m = 0.3 and $V_f = 0.25$. Find the minor Poisson's ratio V_{21} and G_{21} for a fiber volume fraction of 60%.
- 3 Obtain an expression for the longitudinal tensile strength, minimum fiber volume fraction and critical fiber volume fraction of a unidirectional lamina using mechanics of material approach.
- 4 What is Hooke's law? Derive the Hooke's law for the two dimensional unidirectional lamina.
- Explain the various features of the following laminates: 5 Rankerco
 - (a) Cross ply laminates.
 - (b) Angle ply laminates.
- Discuss the following in detail: 6
 - (a) Free edge effects.
 - (b) Failure envelope.
- Derive the governing differential equation for a laminated unidirectional anisotropic plate 7 and deduce the conditions for orthotropic and isotropic plates.
- 8 Explain the following in detail:
 - (a) Resin transfer molding.
 - (b) Preparation of fiber reinforced laminates by hand lay up.
