Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

I SEMESTER M.TECH. (MET) END SEMESTER EXAMINATIONS

NOVEMBER 2017

SUBJECT: MANUFACTURING MATERIALS (MME-5122)

REVISED CREDIT SYSTEM
(16/11/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Draw neat sketches using PENCIL only
- Missing data may be suitable assumed.

1A	Name and explain any three types of intermediate phases present in super alloy systems. Give an example for each	4 marks
1B	Name any three types of carbides present in super alloys. Also explain their role in property alteration.	3 marks
1C	What are the similarities between cobalt and nickel based super alloys. Comment on the rupture strength of both super alloys with respect to working temperature	3 marks
2A	Name and explain any two strengthening methods and any two point imperfections in ceramics.	4 marks
2B	Name and explain the purpose of any two thermal treatments for wet processed ceramics.	3 marks
2C	With simple microscopic diagram explain the shape memory effect in alloys.	3 marks
3A	Write short notes on (i) Cermets and applications (ii) Ceramics in medical applications	4 marks
3B	With a sketch explain the pultrusion method of manufacturing of PMC's	3 marks
3C	List and explain the factors to be considered in coating the cutting tools to enhance their productivity.	3 marks
4A	What is the role of surface treatment methods in engineering? Differentiate Laser disperging, Laser alloying and Laser cladding surface treatment methods	4 marks
4B	Explain Polymer Infiltration and Pyrolysis method of fabricating the ceramic matrix composites.	3 marks
4C	Explain the significance of an interphase layer in CMC? List the materials that could be used for interphase layer.	3 marks

5A Apply rule of mixture to derive the modulus of elasticity of composite material which is loaded along the fiber orientation. List the assumptions made. For an industrial application, E-glass fibers are used to reinforce nylon resin are used under iso - strain loading state. If the nylon contains 38% glass fibers by volume, what fraction of the applied force is carried by the glass fibers? (The elastic modulus for E-glass fibers and nylon are 10.75 $x10^6$ and 0.8 $x10^6$ N/mm^2, respectively) 4 marks

5B With an example, explain any four types of nomenclature to represent the orientation and symmetry of fibers in composite structures. 3 marks

5C Explain steps in PVD. Write any two differences between PVD and CVD. 3 marks