Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

I SEMESTER M.TECH. (ME) END SEMESTER EXAMINATIONS, NOVEMBER 2018

SUBJECT: MANUFACTURING MATERIALS [MME 5122]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

❖ Instructions to Candidates:

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

1A. Compare the melting points, densities and crystal structures of Magnesium, Aluminium and Ferrous. **3M**

1B. What do the following Magnesium alloy designations refer to (i) AZ91D, (ii) AZ91E (iii) EZ33A-T5? **3M**

1C. What are the age hardening precipitates in Monel K-500? **2M**

1D. What are the major phases present in nickel base super alloys? **2M**

2A. How are titanium alloys classified? Mention the important engineering properties of each group. **3M**

2B Describe the effect of following elements in plain carbon steel: Magnesium, Sulphur, Phosphorus and Silicon. **3M**

2C. What type of steel parts are carburized? **2M**

2D. What type of microstructure is usually formed in the cores of carburized plain carbon steels? Why? **2M**

3A. What are microalloyed steels? What are the principal elements that are added to produce microalloyed steel. **3M**

3B. Explain two forms of solid solutions in Ferrous added to form steel. **2M**

3C. Derive an expression for modulus of elasticity under Iso stress loading of composite laminate. **3M**

3D For an industrial application, E-glass fibers are used to reinforce nylon resin are used under iso - strain loading state. If the nylon contains 35% 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 10.5 $x10^6$ and 0.75 $x10^6$ N/mm^2, respectively). **2M**

4A. With neat sketches explain polymer infiltration and pyrolysis method of manufacturing CMC. **4M**

4B. Explain unidirectional method of manufacturing MMC's. **3M**

4C. With a neat sketch describe Laser beam surface hardening. **3M**

5A. Explain CVD. Write any two differences between PVD and CVD. **4M**

5B. With neat diagrams and details explain any three fiber stacking sequence in a composite laminate. **3M**

5C. Explain the principle of sputtering with a neat diagram. List different sputter deposition techniques. **3M**