Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

II SEMESTER M.TECH (T & M) END SEMESTER EXAMINATIONS,

APRIL 2019

SUBJECT: **MICROSTRUCTURE & SURFACE CHARACTERIZATION [MME 5206]**

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A.	Discuss the steps involved in sample preparations for OM and SEM analysis	**5**
1B.	Define (i) grains; (ii) grain boundaries & (iii) microstructure	**3**
1C.	Discuss why metallography is important in tribology?	**2**
2A.	Name the major parts of an optical microscope and state their functions.	**3**
2B.	Discuss the information output from optical microscope and how it is usefulness in materials characterization?	**5**
2C.	What is meant by depth of field? What is the depth of focus?	**2**
3A.	Why does the column of an electron microscope need to be evacuated?	**2**
3B.	Discuss the out puts of SEM-EDS and how it is usefulness in understanding the materials characterization?	**6**
3C.	How do you analyze the SEM image?	**2**
4A.	Field emission microscope: Describe the principle! Which are the advantages/disadvantages of this method?	**4**
4B.	Explain the electron beam interaction with thin specimen (schematics).	**4**
4C.	Which are the advantages/ disadvantages of transmission electron microscopy (TEM) in comparison to scanning electron microscopy (SEM)?	**2**
5A.	How X-Rays are produced? Explain with schematics	**3**
5B.	Discuss the materials/surface characterization required to be carried out on any coated samples. Provide justification for each analysis.	**5**
5C.	What are the differences between XRD and XPS?	**2**