Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

SECOND SEMESTER M.Tech. (ASE) DEGREE END SEMESTER EXAMINATION
May/June 2016
SUBJECT: SPACE ENVIRONMENT AND SYSTEM DEGRADATION IN SPACE
(ICE - 570)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates
- Answer **ANY FIVE** full questions.
- Missing data may be suitably assumed.

1A. Explain with the help of a table five families of spacecraft orbits.

1B. List the impact of spacecraft environments on various spacecraft systems in tabular form.

1C. Write a short note on Polar clefts.

(3+5+2)

2A. Describe the meteoroid environment effects in space.

2B. With the help of a graph, explain the atmospheric temperature with altitude in earth's atmosphere.

2C Write an equation of a Lorentz force on a charged particle in an electromagnetic field.

(4+4+2)

3A. What is radiation? Discuss different types of radiation in space.

3B. Explain the mean atomic oxygen density as a function of solar activity.

3C. Determine the charge deposited per micron in silicon by a particle with an LET of 10 $MeVcm^2mg^{-1}$.

(4+4+2)

4A. Sketch earth magnetosphere showing the various regions and geomagnetic field magnetic elements.

4B Explain in details about the composition of air in the lungs as a function of altitude.

4C Write any two major components of F1 region.

(5+4+1)

5A. With the help of a schematic diagram, explain the heat pipes used in spacecraft thermal control components.

5B. Explain the ORDEM 2000 space debris flux for the international space station.

5C Draw the block diagram of thermal system development process.

(4+4+2)

6A. What are the factors taken into account in selecting a thermal control coating of spacecraft?

6B. Describe the momentum exchange tethers for active debris removal.

6C Write any two criteria for material outgassing.

(4+4+2)