Reg. No. | | | | | | | | | | |

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SECOND SEMESTER M.TECH. (AEROSPACE ENGG.)

END SEMESTER DEGREE EXAMINATION, APRIL/MAY - 2019

SUBJECT: SPACE ENVIRONMENT AND SYSTEM DEGRADATION IN SPACE [ICE 5240]

TIME: 3 HOURS MAX. MARKS: 50

Instructions to candidates :*Answer ALL questions and missing data may be suitably assumed.*

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

1B Write a short note on bow shock.

1C Determine the magnetic rigidity of a proton with a kinetic energy of 25 MeV.

(5+2+3)

2A Establish the pressure vs altitude relationships and sketch the graph for this relation.

2B Describe the single event upset due to heavy ions with neat diagram.

2C Determine the pressure of the earth's atmosphere at 5-km altitude a) not taking into account the lapse rate and b) then taking into account the lapse rate.

(4+3+3)

3A Explain the compton scattering of primary interactions of photons with matter.

3B Explain with the help of the graph MSISE-90 mean atomic oxygen density as a function of solar activity.

3C Write any two major components of E region.

(5+4+1)

4A Sketch the floating type grounding option for solar array to the spacecraft.

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

4C Write any two criteria for material out gassing.

(4+4+2)

5A Describe the momentum exchange tethers for active debris removal.

5B Write a heat conduction equation for thermal control system.

5C Describe the albedo radiation in spacecraft thermal environment system.

(5+3+2)

****