Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

SECOND SEMESTER M.TECH. (AEROSPACE ENGINEERING)

END SEMESTER EXAMINATION APRIL - 2018

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

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A.	Explain with the help of a table five families of spacecraft orbits.	**5**
1B	Write a short note on Polar clefts.	**2**
1C.	Determine the speed of a 1g micrometeoroid that is equivalent in energy to a 2kg bowling ball dropped from 100m.	**3**
2A.	Define the neutral environment and explain its impact on spacecraft.	**4**
2B.	Describe the single event upset due to heavy ions with neat diagram.	**3**
2C.	Determine the fraction of meteoroids with a velocity less than 50km/s.	**3**
3A.	Explain the Compton scattering of primary interactions of photons with matter.	**5**
3B.	Describe the Stochastic radiation effects in ionizing radiation.	**4**
3C.	Write any two major components of F2 region.	**1**
4A.	Sketch the negative grounding option for solar array to the spacecraft.	**4**
4B.	Explain in details about the E region of the ionosphere layer.	**4**
4C.	Determine the equivalent dose for tissue exposed to 5Gy of gamma rays and 1Gy of 1-MeV neutrons.	**2**
5A.	Explain in details about the Electro-Dynamic tethers.	**4**
5B.	Write any four factors taken into account for selecting a thermal coating in spacecraft.	**2**
5C.	Describe the second surface mirror used for radiating surface of a radiator.	**4**