

**GUJARAT NATIONAL LAW UNIVERSITY  
GANDHINAGAR**

Course: **Space Science and Communication Technology**  
Semester- VI (Batch: 2020-25)

**End Semester Examination: May 2023**

**Date: 12<sup>th</sup> May, 2023**

**Duration: 2 hours**

**Max. Marks: 40**

**Instructions:**

- Read the questions properly and write the answers in the given answer book.
- Do not write anything on the question paper.
- The respective marks for each question are indicated in-line.
- Indicate correct question numbers in front of the answer.
- Draw diagrams (if any) only with a pencil.
- No questions or clarification can be sought during the exam period, answer as it is, giving reason, if any.

- |   | <b>Marks</b>                  |
|---|-------------------------------|
| <p>Q.1 The Telecommunication Company “Y” intends to train the new recruits about various dimensions related to communication. In this regard, forms a Team to collect the relevant material. Answer to the following questions so as to assist the Team:</p> <p>a) Name the Filter that can help to segregate the received frequencies into three categories.</p> <p>b) Name the circuit that can be used to remove the noise attached to a signal by way of removal of the unwanted portion of the received signal.</p> <p>c) Explain the ionosphere along with its various layers and the probable impact that the ionosphere can have on the radio wave propagation especially the sky waves.</p> <p>d) Explain any six points in favour of using the geosynchronous satellite communication system and four points reflecting the limitations of this system.</p> | <p>(1+1+<br/>4+5=<br/>11)</p> |
| <p>Q.2 Astronomical activities have always fascinated humans and the month of April, 2023 was special in this aspect as the Lyrid meteor shower lighted up the night sky around the world. Answer the following questions so that it helps in understanding the dimensions associated with the meteor shower:</p> <p>a) What is the difference between a meteor and a meteorite? Amongst the two, which one helps in understanding the universe in a better manner and how?</p> <p>b) Explain the nomenclature rules framed by the International Astronomical Union with regard to the meteor shower.</p> <p>c) Explain the various phases/periods of space insurance. Which phase has the highest probability to deal with the problem caused by the meteor shower?</p>  | <p>(2+3+<br/>4=9)</p>         |
| <p>Q.3 Student Satellite (STUDSAT) is the first pico-satellite developed in India by a consortium of seven engineering colleges from Karnataka and Andhra Pradesh. The committee formed to enlighten the students from different institutions require the answer to the following questions:</p> <p>a) Explain the various types of remote sensing that are available based on the platform, highlighting one merit and demerit of each.</p> <p>b) Explain any three sources of error in the Global Positioning System, so that appropriate mechanisms to rectify the same for Indian satellites can be developed.</p>  | <p>(3+3+<br/>4=10)</p>        |

- c) The satellites launched are under the threat of getting hit by man-made debris in view of which, explain any eight sources of space debris.

Q.4 "X" is planning to set-up a company in the field of communication. In view of which answer the following questions to help "X" understand the domains of various types of communication: (2+3+5=10)

- a) Which is the cheapest optical fiber cable and explain the working of this cable with the help of a neat diagram.
- b) Explain the working of a Helium-Neon Gas Laser with the help of a neat diagram.
- c) Explain the ten building blocks of the fifth generation (5G) of mobile network.

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