

**GUJARAT NATIONAL LAW UNIVERSITY
GANDHINAGAR**
Course: **Space Science and Communication Technology**
Semester- VI (Batch: 2019-24)

End Semester Online Examination: May 2022

Date: 14th May, 2022

Duration: 8 hours

Max. Marks: 40

Instructions:

- The respective marks for each question are indicated in-line.
- Indicate correct question numbers in front of the answer.
- No questions or clarification can be sought during the exam period, answer as it is, giving reason, if any.
- Diagram/s shall be made with a pencil only.
- Word Limit: 5 Marks: 600-700 words, 4 Marks: 400-450 words, 3 Marks: 300-350 words, 2 Marks: 200-250 words, 1 Mark: 30-50 words.

- | | Marks |
|---|------------------|
| <p>Q.1 The universe still remains a mystery and attempts are being made by scientists across the globe to explore it to find answers to the unsolved mysteries. Answer the following questions to enable understand the universe or the attempts that are being made:</p> <p>a) What is the name of the latest telescope launched in space by any agency to explore the universe?</p> <p>b) There are several stars in the universe and the sun being the nearest to the earth is the easiest one to observe and study. Based on the observations, explain the various spheres of the sun, so as to understand the in-general probable structure of a star.</p> | <p>(1+3=4)</p> |
| <p>Q.2 The satellites are one of the best resources to gather information over a region. Answer the following questions to understand the mechanism to depict such gathered information:</p> <p>a) Which orbit is usually followed by the Earth Observation Satellites?</p> <p>b) Explain any four components of the Geographic Information System that helps in reflecting the captured information.</p> <p>c) Explain any six visual elements that help in comparing the different targets depicted in a satellite image.</p> | <p>(1+2+3=6)</p> |
| <p>Q.3 Country "X" has allowed a multinational telecommunication company "Y" to start its services in its territory. The company has a policy to train new recruits and accordingly requires answers to the following questions so as to impart the training:</p> <p>a) Name the a.c. component that stores energy within it in the form of an electric field?</p> <p>b) If a technician is provided with the component in question (a) and resistors, then which circuit shall be used to determine the value of the unknown component(s). Explain the working in turn the mechanism to obtain the unknown values.</p> <p>c) Explain any six propagation factors which impact the signals that have frequency above about 3 GHz, while being used as part of radio wave propagation.</p> | <p>(1+3+3=7)</p> |

- Q.4 India, understanding the importance, has been taking several measures since years to make a mark of self in the space sector. Answer the following questions to enable understand by the newly recruits in ISRO, not only the measure taken to boost its presence in this sector but also the future measures that will have to be taken: (1+4+4=9)
- What is the name of the independent nodal agency under the Department of Space that will allow space activities and usage of DOS owned facilities by the Non-Government-Private-Entities as well as prioritize the launch manifest.
 - In view of the encouragement being provided to the private entities, in near future more number of launches can be seen which in-turn will also boost the space insurance sector necessitating them to develop simulation models. Explain any eight factors that shall be considered for constructing the probability distributions of launch, post separation phase and in-orbit failures in a model.
 - The increased presence in this sector will result in generation of more debris by the agency, hence cataloguing and database shall be maintained. Explain any eight characteristics of the orbiting objects that shall be recorded to enable undertaking this task.
- Q.5 Communication has become the backbone of growth by a country. Answer the following questions to enable Country "Z" understand the measures taken by India and that shall be taken by it to strengthen the sector in its territory: (1+4+4=9)
- What is the name of the satellite launched by India to boost communication and improve disaster links among its six neighbours in south Asia?
 - Name the fabrication process of optical fiber that is best in terms of performance however is expensive in comparison to the other available processes. Explain this process with the help of a neat diagram.
 - India has different types of satellite launch vehicles. Explain any eight principal parameters of a launch vehicle so that it enables the concerned officials of the other country to understand the intricacies behind a launch vehicle.
- Q.6 Read the case and answer the questions: (05)
- Renal was traveling to Amsterdam and misplaced her phone during a security check at SVP International Airport, Ahmedabad. She suspected the mobile phone being stolen and tried to locate it, however the mobile phone wasn't switched off. By informing the airport authorities she feared the risk of victimisation. She was able to recover her mobile phone after almost a struggle of two hours. This led to delay in her flight check-in process. While searching for the important data related to her personal identification documents in the mobile phone, she realised that some of the important documents were missing/deleted.
- Explain any two methods of mobile phone searching, which could have helped her trace the phone conveniently.
 - Explain the mobile forensic tools that could have been used for live acquisition and recovery of data.
