

26/10/13

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**B.E./B. Tech. (FT) DEGREE EMD SEMESTER ARREAR EXAMINATIONS OCT-DEC 2013  
GEOINFORMATICS ENGINEERING BRANCH  
GI 9024 AIRBORNE LASER TERRAIN MAPPING  
REGULATIONS 2008 SEMESTER VI**

**Max. Marks 100**

**Max. Time 3 Hrs.**

Note: Answer ALL Questions.  
Assume Suitable data if required  
Illustrate with sketches wherever necessary  
**PART A (10 x 2 = 20 Marks)**

1. Differentiate Doppler LiDAR and Range Finder LiDAR
2. What are the characteristics of LASER
3. Why is Binary format preferred over ASCII format for Laser Scanner data?
4. What is the role of IMU in Airborne LASER Scanner
5. What is meant by Filtering of 3D Point Cloud data of Airborne Laser Scanner?
6. What is Bore Sighting and why is it required?
7. What is texture mapping?
8. What are the two wavelengths of LASER used in Bathymetric Laser Scanner?
9. List the typical horizontal and vertical accuracy of Airborne Laser Scanner derived data
10. Describe the advantage of Airborne Laser Scanning over Photogrammetry in terms of Canopy penetration.

**PART B (5 x 16 = 80 Marks)**

11. a. If you were to generate DEM of a given project site covering thousands of Square Kilometers, compare the merits and demerits of using GPS Levelling, Photogrammetry and Airborne Laser Scanning, in terms of Speed, Accuracy, Cost, Labour, Weather Dependence and Site conditions (10)
- b. Why Airborne Laser Scanning is preferred over Photogrammetry in mapping of Deserts (6)
12. a. i. With a neat sketch explain the components of LASER (5)
- ii. What factors are considered in deciding the choice of wavelength of Airborne Laser Scanner (3)
- iii. Tabulate and describe the typical parameters of any two Airborne Laser Scanner (8)
- (OR)
12. b. i. Discuss in detail the Geoscience Laser Altimeter System (GLAS) mission in mapping and monitoring of snow cover in Polar Regions (8)
- ii. Discuss in detail any satellite LiDAR mission employing Differential Absorption LiDAR to map Aerosol Concentration in Atmosphere (8)
13. a. i. With a neat sketch, illustrate and describe the specific role of each of the various components of a typical Airborne Laser Scanning System (10)
- ii. What is the concept used in Bathymetric Laser Scanning to derive shallow Water Depth (6)
- (OR)
13. b. i. With a neat sketch discuss in detail the various scanning mechanisms and explain which scanning mechanism would you prefer to achieve uniform point density (8)
- ii. With neat sketches derive the formulae used to calculate Swath Width, Laser Foot Print Diameter, Along track and across track point spacing and point density using Flying Height, Scanning Angle, Pulse Repetition Frequency, Speed of Aircraft and other parameters (8)
14. a. What is meant by Geolocating Laser Foot Prints and explain in detail the various co-ordinate transformations required to geolocate the Laser Foot Prints (OR)
14. b. With reference to a case study, explain the image processing techniques involved in generating bare earth Digital Elevation Model from 3D Point Cloud
15. a. Explain in detail the utility of Airborne Laser Scanner derived DSM and DEM in different application domains namely Forestry, Disaster Management, Flood Inundation Modelling and Mapping of Transmission Line Conductor. (OR)
15. b. With neat sketches explain in detail Airborne Laser Scanner data requirement, software requirement, texture mapping and visualization hardware requirement in generation of 3D City Models.