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**B.E./B. Tech. (FT) DEGREE EMD SEMESTER EXAMINATIONS APRIL-MAY 2011**  
**GEOINFORMATICS ENGINEERING BRANCH**  
**GI 511 AIRBORNE LASER TERRAIN MAPPING**  
**REGULATIONS 2004 SEMESTER VIII**

13

**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. Explain any two distinguishing features of LASER light compared to optical light
2. What is the significance of laser beam divergence on laser foot print?
3. List any two commercially available Airborne Laser Scanners
4. Why is Binary format preferred over ASCII format for the storage of Airborne Laser Scanner data?
5. With a neat sketch differentiate Digital Surface Model (DSM) and Bare Earth Digital Elevation Model (DEM)
6. What is 3D Point Cloud and why is filtering done on a 3D Point Cloud data?
7. What is meant by texture mapping in 3D city modelling application
8. List any two advantages of Airborne Laser Scanning technology over conventional levelling and GPS
9. With a neat sketch briefly write about the advantage of Direct Georeferencing
10. List the conditions under which Airborne Laser Scanning Technology is preferred over Photogrammetry

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

11. Discuss in detail the advantages and disadvantages of Airborne Laser Scanning Technology with conventional levelling, Photogrammetry, GPS Survey and Satellite Altimetry in deriving high resolution digital elevation model. Compare the above techniques with respect to factors like area covered, speed, accuracy, cost, accessibility, dependance on weather and suitability for all terrain conditions.
12. a. Explain the Salient features of satellite based altimeter GLAS (Geoscience Laser Altimeter System) with a detailed explanation on how the data collected were used for temporal monitoring of polar ice sheets.  
(OR)
12. b. With a neat sketch explain the typical parameters of any one commercially available airborne topographic scanner and airborne bathymetric scanner. Bring out the salient differences among the topographic and bathymetric scanner
13. a. i. With a neat sketch, discuss in detail the significance and role of all components of a Typical Airborne Laser Scanner (10)  
ii. Describe in detail the various components of a typical terrestrial laser scanner (6)  
(OR)
13. b. i. Discuss in detail the various methods of scanning patterns used by Airborne Laser Scanners and discuss the merits of each one of them (10)  
ii. Given the following: Average flying height of 800 m, Laser scan angle 35 degrees, Pulse rate of 10 KHz, scan rate of 50 Hz, longest dimension of study area is 15 Km, smallest dimension of rectangular study area 10 Km, flying speed over ground 60 m/sec, strip over lap of 15 %. Calculate the Swath Width, Number of Points per scan line, Along track spacing and Across track spacing (6)
14. a. Discuss in detail with neat sketches, the various co-ordinate transformations required to geolocate and to compute ground co-ordinates of a laser footprint  
(OR)
14. b. Explain in detail the various steps involved such as blunder point removal, grid conversion, determination of search window size in deriving Bare Earth Digital Elevation Model from 3D Laser cloud points
15. a. With neat sketches discuss in detail the various steps involved in extracting roads from the 3D Point Cloud data from an Airborne Laser scanner and also briefly write about checking the completeness and correctness of the extracted roads.  
(OR)
15. b. With neat sketches describe in detail the data requirements, integration of various sources of data, software modules used for editing, rendering and visualization, in producing 3D city Models using Airborne Laser Scanner Data