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MGY-003

POST GRADUATE CERTIFICATE IN GEOINFORMATICS (PGCGI)

Term-End Examination

00622

December, 2014

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 hours   *Maximum Marks : 50*

Note : *All questions are* **compulsory***. Marks for each question are indicated against it.*

1. Answer *all* parts :

   (a) Fill in the blank spaces with appropriate word(s) : *4×1=4*

      (i) The word 'PPS' is an abbreviation of _____ .

      (ii) The word 'GRASS' stands for _____ .

      (iii) The word 'SDSS' stands for _____ .

      (iv) 'RMSE' stands for _____ .

(b) State if the following statements are *True (T)* or *False (F)* : 3×1=3

(i) Interpolation is a method of creating new spatial data from existing sample data.

(ii) Scanning is the process of connecting paper maps or drawing into a form which cannot be stored into electronic storage devices.

(iii) DEM is an example of non-cartographic map model.

(c) Match the items given in Column A with those in Column B : 3×1=3

Column A		Column B	
(i)	TIGER	(1)	Data Structure
(ii)	Spiral Model	(2)	GNSS
(iii)	Elevation	(3)	GIS design

2. Write short notes on any *four* of the following : 4×5=20

(a) GPS segments

(b) Organisational aspects of GIS

(c) Hierarchical and Relational database models

(d) Non-cartographic GIS outputs

(e) Data quality

(f) Topological Modelling

3. (a) Describe the applications of GPS in any five areas with illustrations, wherever necessary. *10*

OR

(b) Give a comparative account of various GIS data models. *10*

4. (a) Discuss the different data conversion methods in GIS. Also explain data integration. *10*

OR

(b) What do you understand by spatial analysis ? Discuss in detail the various methods of spatial analysis suitable for raster data with illustrations, wherever required. *10*

MGY-003

POST GRADUATE CERTIFICATE IN GEOINFORMATICS (PGCGI)

Term-End Examination

00168

June, 2015

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 hours   *Maximum Marks : 50*

Note : *All questions are **compulsory**. The marks for each question are indicated against it.*

1. Answer *all* parts :

   (a) Fill in the blank spaces with appropriate word(s) :   4×1=4

   (i) The word 'RTK' stands for _____ .

   (ii) The word 'TIGER' is an abbreviation of _____ .

   (iii) The word 'DGPS' stands for _____ .

   (iv) 'DLG' stands for _____ .

(b) State if the following statements are *True (T)* or *False (F)* : 3×1=3

(i) Zonal operations do not perform operations on zones of contiguous blocks of pixels. (True/False)

(ii) Data structure is the format of the data as stored and manipulated on computer. (True/False)

(iii) Topology is the organisation of spatial relationships between features in a GIS. (True/False)

(c) Match the items given in Column A with those in Column B : 3×1=3

Column A	Column B
(i) Line-in-polygon	(1) Overlay
(ii) Spaghetti	(2) GNSS
(iii) Speed	(3) Vector data model

2. Write short notes on any *four* of the following : 4×5=20

(a) Any five sources of error in GPS observations

(b) Spatial data structure

(c) Overlay analysis

(d) Geospatial data input

(e) GPS signal structure

(f) Raster to Vector data conversion

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3. (a) Discuss in detail the GPS survey planning and procedures. *10*

OR

(b) What is GIS ? Describe in detail its components with suitable illustrations, wherever required. *10*

4. (a) What do you understand by data quality in the context of GIS ? Explain the components of data quality. *10*

OR

(b) Discuss in detail the approaches and models of GIS project design. *10*

| MGY-003 |

POST GRADUATE CERTIFICATE IN GEOINFORMATICS (PGCGI)

Term-End Examination

00619

December, 2015

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 hours   *Maximum Marks : 50*

*Note : All questions are **compulsory**. Marks for each question are indicated against it.*

1. Answer **all** parts of the following :

    (a) Fill in the blank spaces with appropriate word(s) :   4×1=4

        (i) GLONASS is the navigation satellite system of _____ .

        (ii) The abbreviation 'MCS' stands for _____ .

        (iii) The word 'RTK' stands for _____ .

        (iv) GIS is a computerised system that helps in evaluating _____ data.

(b) State whether the following statements are *True (T)* or *False (F)* : 3×1=3

    (i) GIS data model is a conceptual representation of geographic data of real world features into digitally and logically represented spatial objects.

    (ii) Geo-referencing is the process of assigning location to any entity in real world coordinates.

    (iii) Interoperability makes GIS database so rigid that it cannot be opened and analysed in any GIS environment.

(c) Match the items given in Column A with those given in Column B : 3×1=3

Column A		Column B
(i) Data quality	(1)	Maps and tables
(ii) GIS outputs	(2)	Global operations
(iii) Raster analysis	(3)	Accuracy and consistency

2. Write short notes on any *four* of the following : 4×5=20

    (a) Galileo

    (b) Applications of GPS

    (c) Network Modelling

    (d) Comparison of Raster and Vector Data Models

    (e) Data Integration

    (f) Cartographic GIS Output

3. Attempt any *one* part of the following :

   (a) Discuss the segments and principles of GPS operations. **10**

   (b) What do you understand by data quality ? Explain in detail the various components of data quality. Add a note on the errors that occur while processing data. **10**

4. Attempt any *one* part of the following :

   (a) Give a brief account of the various aspects of GIS design with suitable examples. **10**

   (b) What is a database ? Discuss the types and models of databases with suitable illustrations. **10**

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MGY-003

POST GRADUATE CERTIFICATE IN GEOINFORMATICS (PGCGI)

Term-End Examination

June, 2016

00586

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 hours   *Maximum Marks : 50*

Note : *All questions are* **compulsory.** *Marks for each question are indicated against it.*

1. Answer *all* parts :

    (a) Fill in the blank spaces with appropriate word(s).   *4×1=4*

    (i) _____ is an indigenous GPS aided geo-augmented navigation system.

    (ii) The abbreviation 'DGPS' stands for _____ .

    (iii) The word 'DBMS' stands for _____ .

    (iv) _____ is the data about data.

(b) State if the following statements are *True (T)* or *False (F)* : $3 \times 1 = 3$

(i) Hierarchical model organises data as a tree-like structure.

(ii) Topological modelling comprises a set of functions which are used to process spatial and non-spatial data in order to facilitate the decision-making processes in GIS environment.

(iii) Maps are the only final output product of the GIS platform.

(c) Match the items given in Column A with those given in Column B : $3 \times 1 = 3$

Column A	Column B
(i) Structured query language	(1) Managing and organising views
(ii) Topological error	(2) Relational database
(iii) GIS information product	(3) Unclosed polygon

2. Write short notes on any *four* of the following : $4 \times 5 = 20$

(a) Spatial and Non-spatial Database

(b) Georeferencing

(c) Errors in GPS Observation

(d) Raster Analysis

(e) Data Conversion Methods

(f) Vector Data Structure

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3. Attempt any *one* part :

    (a)   What is GPS ? Explain in detail the area where GPS technology is used.   *10*

    (b)   What do you mean by GIS modelling ? Discuss topological and surface modelling with suitable illustrations.   *10*

4. Attempt any *one* part :

    (a)   Give an account of various components of GIS.   *10*

    (b)   What is GIS output ? Discuss different types of GIS outputs.   *10*

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POST GRADUATE CERTIFICATE IN GEOINFORMATICS (PGCGI)

00244

Term-End Examination

December, 2016

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 hours   *Maximum Marks : 50*

Note : *All questions are **compulsory**. Internal choices are given in Questions no. 2 to 4. The marks for each question are indicated against it.*

1. Answer *all* parts :

    (a) Fill in the blank spaces with appropriate word(s).   3×1=3

    (i) The word DBMS stands for _____ .

    (ii) DEM stands for _____ .

    (iii) The word GAGAN stands for _____ .

(b) State if the following statements are *True (T)* or *False (F)* :   3×1=3

(i) Attribute is a set or collection of data that describes the characteristics of real world entities.

(ii) Buffer operation is an important spatial analysis function for point and line in GIS.

(iii) Data integration is a process of transformation of spatial and non-spatial data from one form to the other.

(c) Match the items given in Column A with those given in Column B :   4×1=4

Column A	Column B
(i) Polygon	(1) Exactness of measured data
(ii) Object-Oriented	(2) Closeness between digital database and real world
(iii) Precision	(3) Vector Data
(iv) Accuracy	(4) Database Model

2. Write short notes on any *four* of the following : 4×5=20

    (a) Database Creation

    (b) Spatial Elements and their Representation

    (c) GLONASS

    (d) Georeferencing

    (e) Raster to Vector Data Conversion

    (f) Spiral GIS Design Model

    (g) Data Consistency

3. Discuss the basic steps to find User's Location using a GPS device. 10

OR

    (a) What do you understand by Topological Modelling ? 5

    (b) Write about the three segments of GPS. 5

4. Discuss the five components of GIS. 10

OR

    (a) Write about the different types of GIS output. 5

    (b) State the advantages and disadvantages of raster and vector GIS data models. 5

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POST GRADUATE CERTIFICATE IN GEOINFORMATICS (PGCGI)

Term-End Examination

June, 2017

00372

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 hours   *Maximum Marks : 50*

Note : *All questions are **compulsory**. Internal choices are given in questions no. 2 to 4. The marks for each question are indicated against it.*

1. Answer *all* parts :

    (a) Fill in the blank spaces with appropriate word(s).   *4×1=4*

        (i) _____ is known as data about data.

        (ii) GRASS stands for _____ .

        (iii) The word LORAN stands for _____ .

        (iv) DTM stands for _____ .

(b) State if the following statements are *True (T)* or *False (F)* : 3×1=3

    (i) The fundamental equation of satellite navigation is

        Distance = Velocity of light × Travel Time of the satellite signal

    (ii) Shortest Path Model is an example of Topological Network Modelling.

    (iii) Vector Data Model represents the real world in a regular set of cells in grid pattern.

(c) Match the items given in Column A with those given in Column B : 3×1=3

Column A	Column B
(i) Intersection	(1) Mobile GPS receiver
(ii) Rover	(2) Overlay process
(iii) Space segment	(3) Satellites

2. Write short notes on any *four* of the following : 4×5=20

   (a) Trilateration

   (b) Overlay Methods

   (c) Historical Development of GNSS

   (d) Shortest Path and Location-Allocation Network Model

   (e) Cartographic Outputs

   (f) Advantages and Disadvantages of Raster and Vector Data Models

   (g) People as a Component of GIS

3. Explain data integration and its types. Comment on its relevance in GIS. 10

OR

   (a) What do you understand by Map Digitization ? 5

   (b) Distinguish between Accuracy and Precision. 5

4. Discuss the applications of GPS. 10

OR

   (a) What is database ? Explain its types and characteristics. 5

   (b) Write about the two components of GIS design. 5

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POST GRADUATE CERTIFICATE IN GEOINFORMATICS (PGCGI)

Term-End Examination

01122

December, 2017

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 hours   Maximum Marks : 50

Note : All questions are **compulsory**. The marks for each question are indicated against it.

1. Answer *all* parts of the following :

    (a) Fill in the blank spaces with appropriate word(s).   4×1=4

    (i) The abbreviation GAGAN stands for _____ .

    (ii) The orbiting satellites transmitting radio-navigation signals are referred to as _____ segment of GPS.

    (iii) Points, lines and polygons are discrete features represented by _____ data model.

    (iv) _____ is data about data.

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(b) State whether the following statements are *True (T)* or *False (F)* : 3×1=3

   (i) GRASS is a free and open source GIS software.

   (ii) Surface modelling represents the Earth's surface in digital form by taking information of latitude, longitude and altitude.

   (iii) The integration of spatial and non-spatial data is not required for analysing any data in a GIS platform.

(c) Match the items given in Column A with those given in Column B : 3×1=3

Column A	Column B
(i) Hierarchical model	(1) Non-cartographic output
(ii) Shaded relief map	(2) Proximity analysis
(iii) Buffer operation	(3) Organising data in a tree-like structure

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2. Write short notes on any *four* of the following : 4×5=20

    (a) GLONASS

    (b) GPS Segments

    (c) Database Management System

    (d) Data Quality

    (e) Cartographic GIS Outputs

    (f) Georeferencing

3. Discuss in detail the applications of GPS in any five fields giving suitable examples. *10*

OR

Define GIS models. Describe network and surface modelling in GIS. *10*

4. What is GIS ? Explain in detail the components and organisational aspects of GIS. *10*

OR

Discuss the components and models of GIS design with suitable examples. *10*

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POST GRADUATE CERTIFICATE IN GEOINFORMATICS (PGCGI)

Term-End Examination

00554   **June, 2018**

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 hours   *Maximum Marks : 50*

Note : *All questions are* **compulsory.** *Marks for each question are indicated against it.*

1. Answer *all* parts of the following :

   (a) Fill in the blank spaces with appropriate word(s) :   *4×1=4*

      (i) GPS receiver uses the concept of _____ to determine its position on the Earth's surface.

      (ii) GAGAN is the navigation satellite system of _____ country.

      (iii) The word 'OGC' stands for _____.

      (iv) _____ data describes attributes of the geographic features.

(b) State whether the following statements are *True (T)* or *False (F)* : 3×1=3

(i) GPS technology offers a solution for all survey tasks.

(ii) Analog data needs to be converted into digital format before using it in any GIS platform.

(iii) Vertical data integration is a process of merging spatial data of all the adjacent areas.

(c) Match the items given in Column A with those given in Column B : 3×1=3

Column A	Column B
(i) GIS design	(1) Focal operation
(ii) Raster analysis	(2) Location interconnected with routes and lines
(iii) Network modelling	(3) Waterfall model

2. Write short notes on any *four* of the following : 4×5=20

   (a)   GPS Survey

   (b)   Geospatial Data Input

   (c)   Components of GIS

   (d)   Differential GPS

   (e)   Data Quality

   (f)   Raster Analysis

3. What is GPS ? Give a comparative account of various principles of GPS operation. 10

OR

Discuss in detail, data conversion methods in GIS. 10

4. What are GIS data models ? Explain raster and vector data models. 10

OR

Give a brief account of various types of GIS outputs with suitable examples. 10

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POST GRADUATE CERTIFICATE IN GEOINFORMATICS (PGCGI)

Term-End Examination

December, 2018

00702

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 hours   *Maximum Marks : 50*

Note : *All questions are* **compulsory***. Internal choices are given in questions no.* **2** *to* **4***. The marks for each question are indicated against it.*

1. Answer *all* parts :

    (a) Fill in the blank spaces with appropriate word(s) :   *3×1=3*

         (i) The word LORAN stands for _____ .

         (ii) GPS, GLONASS and GALILEO are examples of _____ .

         (iii) The word TIGER stands for _____ .

(b) State whether the following statements are *True (T)* or *False (F)* : 3×1=3

(i) A point-in-polygon operation is a key feature of GIS analysis.

(ii) Relational, Network and Hierarchical are examples of non-spatial data query.

(iii) Spatial Decision Support System is a synthesis of GIS and decision support system.

(c) Match the items given in Column A with those given in Column B : 4×1=4

Column A	Column B
(i) Geodesy	(1) International metadata standard
(ii) ISO 19115	(2) Spatial discipline
(iii) Latitudes and Longitudes	(3) GIS software
(iv) GRASS	(4) Line symbols

2. Write short notes on any *four* of the following : 4×5=20

   (a) Data Quality Issues

   (b) Data Integration

   (c) Data and Information

   (d) Advantage and Disadvantages of Vector Data

   (e) Types of GPS Receivers

   (f) Non-Cartographic Output

   (g) Georeferencing

3. Explain raster analysis operations. 10

OR

Illustrate different sources of error in GPS observations. 10

4. Describe any four data conversion methods in GIS. 10

OR

Explain different types of database models in GIS. Draw figures wherever required. 10

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POST GRADUATE CERTIFICATE IN GEOINFORMATICS (PGCGI)

Term-End Examination

June, 2019

00941

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 hours　　　　　　　　*Maximum Marks : 50*

Note : *All questions are **compulsory**. Internal choices are given in question nos. 2 to 4. The marks for each question is indicated against it.*

1. Answer *all* parts :

   (a) Fill in the blank spaces with appropriate word(s) :　　　　　　　　　*3×1=3*

   (i) _____ is useful for overlaying and spatial analysis in GIS.

   (ii) _____ is a flat board used for vectorisation of any map object.

   (iii) PPS stands for _____.

(b) State whether the following statements are *True (T)* or *False (F)* : 3×1=3

   (i) A TIN surface is composed of points, lines, triangles, hull polygon and topology.

   (ii) Buffer operation is an important spatial analysis function for point and line in GIS.

   (iii) Planimeter is an instrument for measuring 3-D figures.

(c) Match the items given in Column A with those given in Column B : 4×1=4

Column A	Column B
(i) Address interpolation	(1) Geocoding
(ii) Accuracy	(2) Redlands, California
(iii) ESRI	(3) India
(iv) GAGAN	(4) Exactness of manual data

2. Write short notes on any **four** of the following : 4×5=20

    (a) Error and its Types

    (b) Geographic Data and Geographic Information

    (c) Advantages and Disadvantages of Raster Data

    (d) Formats and Accuracy of GPS Data

    (e) Cartographic Outputs

    (f) Components of GIS Design

    (g) Surface Modelling

3. Elaborate the reference framework in 2-dimensional and 3-dimensional mapping. *10*

OR

Discuss the advantages and disadvantages of GPS over conventional surveying. *10*

4. What is metadata ? Elaborate metadata standards, formats and creation. *10*

OR

Discuss in detail, applications of GNSS. *10*

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MGY-003

POST GRADUATE CERTIFICATE IN GEOINFORMATICS (PGCGI)

Term-End Examination

December, 2019

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 hours   *Maximum Marks : 50*

Note : *(i)* *All questions are compulsory.*

(ii) *Internal choices are given in question no. 2 to 4.*

(iii) *The marks for each question are indicated against it.*

1. Answer all parts :   4x1=4

   (a) Fill in the blank spaces with appropriate word(s).

   (i) RTK stands for _____ which uses a radio data link to transmit satellite data from Reference to Rover.

   (ii) _____ is an international industry consortium with companies, government agencies and universities participating to develop publicly available open source GIS Software.

   (iii) _____ is the process of transformation of spatial and non-spatial data from one form to another.

   (iv) _____ means the flexible mobility of GIS database in terms of its usage where it can be opened and analysed in any Software by any GIS professional.

   (b) State if the following statements are **True (T)** or **False (F)** :   3x1=3

   (i) Height of instrument (HI) refers to the correct measurement of the distance of the GPS antenna above the reference mounted over which it has been placed.

   (ii) Database Management refers to GIS capability to collect, store, analyse and provide access to data.

   (iii) Vector to raster conversion is the process in which entire vector data is converted into an array of cells with corresponding attribute data attached to it.

(c) Match the items in Column - A with those in Column - B :   3x1=3

Column - A		Column - B	
(i)	Network analysis	(1)	GRASS
(ii)	GIS software	(2)	Drum plotter
(iii)	Hard copy	(3)	Shortest path

2. Write short notes on **any four** of the following :   4x5=20

   (a) Components of GNSS

   (b) Sources of errors in DGPS

   (c) Types of database

   (d) Georeferencing

   (e) Area contiguity

   (f) Data accuracy

   (g) Data integration

3. Elaborately explain the principle of GPS operation. Draw neat well labelled diagrams   10
to support your answer.

OR

Discuss the advantages and disadvantages of raster and vector data models.   10

4. Give a brief account of the components of GIS design.   10

OR

Discuss in brief the various operations involved in raster data analysis. Give neat well   10
labelled diagrams wherever required.

_____

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No. of Printed Pages : 4   **MGY-003**

Post Graduate Certificate in Geo-Informatics (P. G. C. G. I)
Term-End Examination
June, 2020

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 Hours   *Maximum Marks : 50*

Note : All questions are compulsory. Internal choices are given in Question No. 2 to 4. The marks for each question are indicated against it.

1. Answer all parts :

    (a) Fill in the blank spaces with appropriate word(s) : 1 each

    (i) .... is satellite based radio navigation system operated by the

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[2]   MGY-003

Ministry of Defense of the Russian Federation.

(ii) The .... is a measure of the range or distance, between GPS receiver and the GPS satellite.

(iii) SQL stands for ....

(iv) .... converts the data from various formats into GIS in discrete vector formats.

(b) State if the following statements are True (T) or False (F) :   1 each

(i) Global positioning system needs minimum of five satellites to provide 3D position.

(ii) Nominal is a quantitative and non-ranking scale of measurement that classifies features on intrinsic characteristics.

(iii) Rasterisation is the conversion of raster data to vector data.

(c) Match the items given in column A with those in Column B :   1 each

Column A		Column B
(i)	Precision	(i) Reconstruction of contour maps
(ii)	Database Model	(ii) Exactness of measured data
(iii)	DEM	(iii) Hierarchical

2. Write short notes on any *four* of the following :

5 each

(a) Computer Hardware Module in GIS

(b) Map digitisation

(c) Surface modelling

(d) Data accuracy

(e) Non-cartographic outputs

(f) Spiral GIS design model

(g) Types of GPS receivers

3. Discuss the steps you would follow for carrying out GPS survey. Give well labelled diagrams where ever required.   10

Or

Briefly discuss the types of vector data structure with the help of well labelled diagrams, where ever required.

4. Give an account of various operations involved in vector data analysis. Give neat well labelled diagram wherever required.　　　　10

Or

Explain elaborately the Waterfall model of system life cycle.

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MGY-003

POST GRADUATE CERTIFICATE IN GEOINFORMATICS (PGCGI)

Term-End Examination
December, 2020

MGY-003 : GLOBAL NAVIGATION SATELLITE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEM

Time : 2 Hours　　　　*Maximum Marks : 50*

Note : *(i)* *All questions are compulsory.*

　　　　(ii) *Internal choices are given in Question No. 2 to 4.*

　　　　(iii) *The marks for each question are indicated against it.*

1.　Answer all parts :

　(a)　Fill in the blank spaces with appropriate word(s) :　　　　4 × 1 = 4

　　(i)　Digitiser, disk drive, plotter, printer, tape drive and visual display unit are the computer hardware components of ....

Lot-I　　　　　　　　　　　　　　**P. T. O.**

(ii) .... is a group of statistical techniques to interpolate the random values such as elevation.

(iii) Contiguity is a topological concept where two .... get connected by a common node through arc-node topology.

(iv) .... errors are the errors present in source geospatial data which cannot be removed.

(b) State if the following statements are True (T) *or* False (F) : $3 \times 1 = 3$

(i) Geospatial data describes both the locations and the characteristics of non-spatial data.

(ii) Accuracy refers to the exactness of measured data.

(iii) Rasterisation is a process that converts the raster data into array of cells.

(c) Match the items given in column A with those in Column B :   3 × 1 = 3

Column A		Column B	
(i)	Open Source Software	(1)	Control Point
(ii)	Bench Mark	(2)	Trilateration
(iii)	GPS	(3)	GRASS

2. Write short notes on any *four* of the following :   4 × 5 = 20

(a) GALILEO

(b) Disadvantages of GPS over conventional surveying methods

(c) Data and information

(d) Methods of raster data input

(e) Types of data integration

(f) Components of GIS design

(g) Types of GIS output

3. Discuss in detail sources of error in GPS observation.   10
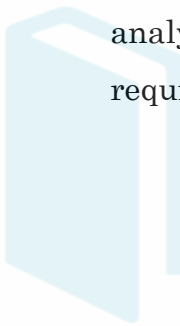
P. T. O.

Or

Elaborately discuss the advantages and disadvantages of raster and vector data models.

4. Explain various data conversion methods.   10

Or

Discuss in detail various operation in raster analysis. Draw well labelled diagram, wherever required.

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