

KATHMANDU UNIVERSITY
End Semester Examination
May/June, 2022

Marks scored:

Level : B.E.

Year : II

Course : GEOM 204

Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

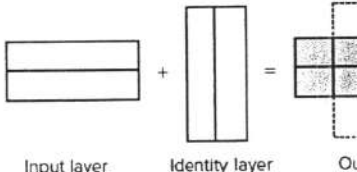
Registration No.:

Date :

SECTION "A"
[20 Q × 0.5 = 10 marks]

Encircle the most appropriate answer.

1. Which of the following statement is **FALSE**?
 - a. A GIS usually employs a database management system (DBMS) to handle attribute data, which can be large in size in the case of vector data.
 - b. A DBMS offers join and relate operations.
 - c. A DBMS also offers tools for adding, deleting, and manipulating attributes.
 - d. A relate operation connects two tables and keeps the tables physically together.
2. Data exploration does not refer to which of the following activity:
 - a. visualizing
 - b. storing
 - c. manipulating
 - d. querying
3. "Arcs have directions and left and right polygons." Which relationship does this relationship support?
 - a. Connectivity
 - b. Contiguity
 - c. Area- Definition
 - d. Volume Definition
4. The geodatabase organizes vector data sets into:
 - a. Feature classes and feature datasets
 - b. Feature datasets and shapefiles
 - c. Shape files and feature classes
 - d. Shape files and coverage files only
5. 8-bit raster can store _____ possible values:
 - a. 8
 - b. 16
 - c. 32
 - d. 256
6. LiDAR system includes a:
 - a. laser scanner mounted in an aircraft, GPS, and an Inertial Measurement Unit.
 - b. laser scanner mounted in an aircraft, TS, and an Inertial Measurement Unit (IMU).
 - c. Radio wave mounted in an aircraft, GPS, and an Inertial Measurement Unit (IMU).
 - d. Optical Sensor, theodolite, and an Inertial Measurement Unit (IMU).
7. A bi-level scanned file is a scanned image containing values of:
 - a. 1 or 256
 - b. 0 or 1
 - c. True or False
 - d. Right or Wrong
8. If slope is the first derivative of elevation, then what is the directional component of slope?
 - a. Watershed and Contour
 - b. Curvature
 - c. Aspect
 - d. TIN

9. Which is the **FALSE** statement?
- Vectorization converts vector data to raster data.
 - Quadtree is a raster data structure that divides a raster into a hierarchy of quadrants.
 - Maps, photographs, and images can be stored as digital graphic files.
 - In cell by cell encoding raster is stored as a matrix, and its cell values are written into a file by row and column.
10. Which one of the following is a global stochastic spatial interpolation model?
- Trend Surface
 - Kriging
 - Regression
 - IDW
11. Which one of the following is local deterministic spatial interpolation model?
- Trend Surface
 - Kriging
 - Regression
 - IDW
12. ____ transformation allows rotation of the rectangle and preserves its shape but not size.
- Equi-area
 - Similarity
 - Affine
 - Projective
13. Affine transformation requires minimum of ____ control points.
- 1
 - 4
 - 3
 - 7
14. If A national forest has to restrict oil and gas well drilling within 500 feet of roads or highways which vector analysis tool you use for this purpose:
- Clip
 - Union
 - Buffer
 - Mosaic
15. Which GIS method does the operation reflects as shown?
- Union
 - Symmetrical Difference
 - Identify
 - Intersect
- 
16. A common error from overlaying polygon layers is:
- Slivers
 - Undershoot
 - Dangling
 - Silvers
17. What does not reclassify raster do?
- Simplify data
 - Generalize data
 - Easy interpretation of data
 - Extrapolate Data
18. What roles does a database administrator not expected to fill?
- Create database security settings that reflect the needs of the organization
 - Install and configure server hardware
 - Create queries for reporting purposes
 - Backup and Recovery of database
19. What is a 'tuple'?
- An attribute attached to a record.
 - Another name for a table in an RDBMS.
 - A row or record in a database table.
 - Another name for the key linking different tables in a database.
20. Interpolation is made possible by a principle called _____.
- Spatial Autocorrelation
 - Spatial auto-correction
 - Thematic Autocorrelation
 - Thematic auto-correction

KATHMANDU UNIVERISTY
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Level : B.E.
Year : II
Time : 2 hrs. 30 mins.

Course : GEOM 204
Semester : II
F.M. : 40

SECTION "B"
[8 Q × 5 = 40 marks]

Attempt *ANY EIGHT* questions. Assume suitable data if necessary.

1. Define GIS with applications and explain the components of GIS. What are the limitations of using a GIS? [3+2]
2. What is topology, and why is it important in GIS? Write the run-length coding for each of the rows in this raster. [2.5+2.5]

c	c	c	c	a	a	a	a	a
a	a	b	b	d	d	d	a	a
e	e	e	f	f	f	f	f	e
a	a	a	a	a	a	a	a	a
c	c	a	a	a	b	f	d	e

3. Define an affine transformation, including the form of the equation. Why is it called a linear transformation? What is the root mean square error (RMSE), and how does it relate to a coordinate transformation? [3+2]
4. What are the five types of accuracy/precision errors associated with geographic information? Provide an example of each type of error. [5]
5. What are the different elements used to describe the raster data model? Discuss various scales of raster data analysis. [2+3]
6. When querying by geography, what is the difference between a source layer and a target layer? What is the difference between the CONTAIN, COMPLETELY CONTAIN, and ARE CONTAINED BY queries? [2+3]
7. Describe the fundamental process of watershed delineation in GIS. Discuss the factors that influence the watershed analysis. [3.5+1.5]

8. Why do we perform spatial interpolation? Compute the Rainfall at point 0 using the IDW method of interpolation using the neighboring points 1,2,3,4, and 5. [1+4]

Between Points	Distance	Rainfall (mm)
0,1	18.000	20.820
0,2	20.880	10.910
0,3	32.310	10.380
0,4	36.056	14.600
0,5	47.202	10.560

9. Discuss how you would select suitable areas to build new secondary schools in your hometown using GIS. Use at least four factors/criteria that determined the selection process. Your discussion must include and justify data types and analysis methods used. [5]

10. Write Short notes on (*ANY TWO*): [2.5+2.5]

- a. Metadata
- b. TIN
- c. Thiessen Polygons